

Environmental and Social Management and Planning Framework

October 2020



Assam Intra-State Transmission System Enhancement Project

Prepared for Asia Infrastructure Investment Bank (AIIB)

Prepared by Assam Electricity Grid Corporation Limited (AEGCL)

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Abbreviations

AIIB	Asian Infrastructure Investment Bank
AEGCL	Assam Electricity Grid Corporation Limited
AERC	Assam Electricity Regulatory Commission
AH	Affected Household
APCB	Assam Pollution Control Board
ASEB	Assam State Electricity Board
BPL	Below Poverty Line
CEA	Central Electricity Authority
CPCB	Central Pollution Control Board, Government of India
DC or D/C	Double Circuit
DPR	Detailed Project Report
EA	Executing Agency
EHV	Extra High Voltage
EIA	Environmental Impact Assessment
ESIA	Environmental and Social Impact Assessment
E&S	Environment and Social
ESMP	Environmental and Social Management Plan
ESMPF	Environmental and Social Management Planning Framework
ESP	Environmental and Social Policy
FGD	Focus Group Discussion
GHG	Greenhouse Gas
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GoA	Government of Assam
GoI	Government of India
GSS	Grid Sub-station
HTLS	High Temperature Low Sag
IA	Implementing Agency
IBAT	Integrated Biodiversity Assessment Tool
IMD	Indian Meteorological Department
IP	Indigenous Peoples
INR	Indian Rupee
LA	Land Acquisition
MoEF&CC	Ministry of Environment, Forest and Climate Change
MSL	Mean Sea Level
OPGW	Optical Power Ground Wire
PAH	Project-Affected Household
PAP	Project-Affected People
PMC	Project Management Consultancy
PMU	Project Management Unit
RFCLARRA	Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013
RP	Resettlement Plan
RoW	Right of Way
RPF	Resettlement Planning Framework
SC or S/C	Single Circuit
SF ₆	Sulphur Hexafluoride
ST	Scheduled Tribe
IPPF	Indigenous People Planning Framework
IPP	Indigenous People Plan
WEIGHTS AND MEASURES	
Ha. (hectare)	10,000 sq. m = 2.47105 Acre
GW	Gigawatt
km (kilometer)	1,000 meters
kV	kilovolt (1,000 volts)
kW	kilowatt (1,000 watts)
MVA	Megavolt Ampere
MW	Megawatt



Executive Summary

Assam Electricity Grid Corporation Ltd (AEGCL), the sole transmission utility of Assam, is responsible for the operation, maintenance and development of the Intra State Transmission System of the state of Assam. AEGCL currently has 66 substations with 6,882 MVA capacity and its transmission network comprises 5,701 Circuit kms of transmission lines of various voltage classes ranging from 66 kV to 400 kV along with an exclusive network of 1,373 kms of optical power ground wire (OPGW). As of March 2018, AEGCL transmitted 9,168 million units (against a requirement of 10,189 million units) of energy from various sources of generations and inter-state and inter-regional import points to Assam's distribution network. During the same period, AEGCL was able to meet 95% of the maximum demand of the distribution companies.¹

Asian Infrastructure Investment Bank (AIIB) is considering supporting enhancement of power transmission to improve the reliability of power supply through the proposed "Assam Intra-State Transmission System Enhancement Project" (The Project). The total Project cost is approximately USD365million with a request from the Government of India (GoI) to AIIB for a financial assistance of USD304 million (83% of the project cost). The Project is expected to include the following components:

- a. Construction of 10 new substations, 332.945 km of associated transmission lines, 3 nos. of bay extensions at existing AEGCL Sub-Station, and Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS
- b. Augmentation of 14 existing substations (replacement of old transformers with new transformers)
- c. Augmentation of 186 km of transmission line, restringing by high temperature low sag (HTLS) conductors
- d. Replacement of ground wire to OPGW for 636 km of transmission lines and substation equipment at substations

Power transmission projects including the construction of substations have not been listed in the list of environmentally sensitive projects and hence no environmental clearance is required, as per the Environmental Impact Assessment (EIA) notification of 2006 and its subsequent amendments by the Ministry of Environment, Forest and Climate Change (MoEF&CC). Clearance from the Assam Forest Department is required only in cases where a project is constructed on forestland or requires cutting of forest trees. Based on the preliminary screening, forest clearance is not applicable.

As per AIIB's Environmental and Social Policy (ESP), since the Project is likely to have a limited number of potentially adverse environmental and social (E&S) impacts; the impacts are not unprecedented; few if any of them are irreversible or cumulative; they are limited to the project area; and can be successfully managed using good practice in an operational setting, the Project is expected to be Category B.

The sub-projects under the proposed AIIB funding/loan have not been fully identified, as the final project sites and the alignment of the transmission lines are yet to be confirmed after detailed design is prepared and exhaustive surveys are conducted. Therefore, an Environmental and Social Management Planning Framework (ESMPF) is being developed to ensure that the sub-projects will be assessed and implemented in conformity with AIIB's ESP.

This ESMPF report comprises baseline data on existing conditions of physical, ecological, economic, and social aspects, together with the identified and anticipated E&S impacts and proposed mitigation measures. The existing substations were audited to provide the remediation measures for E&S risks. The ESMPF study is conducted based on sampling sub-projects with clear footprints, to provide the model Environmental and Social Impact Assessment (ESIA) for selected sub-projects, generic Environmental and Social Management Plan (ESMP) and a Resettlement Planning Framework (RPF) for implementation, as well as to clearly guide the further E&S assessment by providing specific guidelines. An Indigenous People Planning Framework (IPPF) is prepared to guide the preparation of Indigenous People Plans (IPPs, if applicable) and compliance during Project implementation. AIIB requires AEGCL to prepare the E&S assessment (sub-project specific ESIA/ESMP, Resettlement Plan etc.) for all non-assessed sub-projects during project implementation in

¹ AEGCL Office, March 2020



conformity with the ESMPF prior to contractors' mobilization. To avoid the potential E&S risks, AEGCL will consult with AIIB for careful selection of the site to avoid encroachment of socially, culturally and archaeological sensitive areas (e.g. sacred groves, graveyard, religious worship place, monuments etc.); and avoid encroachment into such areas by careful site and alignment selection (National Parks, Wildlife Sanctuary, Biosphere Reserves and Biodiversity hotspots). Activities located in the above mentioned areas will be excluded from the project scope through the application of the E&S screening and project categorization guidance.

Assam is divided into three geographic zones namely: Lower Assam, Central Assam and Upper Assam. The major subprojects sites are scattered in thirteen districts covering all the three zones within the Brahmaputra Valley. With the 'Tropical Monsoon Rainforest Climate', Assam is a temperate region and experiences heavy rainfall and humidity. In Assam, the protected area (PA) network consists of 5 National Parks (NPs), and 20 Wildlife Sanctuaries (WLSs) (including 2 proposed WLSs). All these NPs and WLSs hold a large number of endangered and local species. Assam has five Elephant Reserves (Sonitpur ER (1,420 sq. km), Dehing-Patkai ER (937 sq. km), Kaziranga-Karbi Anglong ER (3,270 sq. km), Dhansiri-Lungding ER (2,740 sq. km), and Chirang-Ripu ER (2,600 sq. km) and eight (8) Elephant Corridors connect these Elephant Reserves, PAs and nearby forests located in the neighboring states.

The Population of Assam according to the 2011 census stands at about 31 million, making it the 14th most populated state in India. The state makes up about 2.5% of the country's population with a growth rate of 16.93%. The density of population is almost equivalent to the national average. As per the Land Utilization Statistics for the year 2014-15(Provisional), the total reporting area of the State was 78.44 lakh hectares, making it the 16th largest state in the country in terms of area.

Assam is a melting pot of diverse Scheduled Tribes (STs) showcasing a range of dialects, culture and traditions. The tribal population of 38,84,371 (2011 Census), constitutes 12.4% of the total population of the state; having registered a 17.4% decadal growth in 2001-2011. The major tribes include Bodo (35.1%), Mishing (17.52%), Karbi (11.1%), Rabha (7.6%), Sonowal Kachari (6.5%), Lalung (5.2%), Garo (4.2%), and Dimasa tribes (3.2%); accounting for 90% of the ST of the state. The seven districts (Dima Hasao, Karbi Anglong, Dhemaji, Baksa, Chirang, Udalguri and Kokrajhar) have ST population exceeding 25% and together account for 53.3% of the state's tribal population.

The project is not expected to cause significant impacts on the surrounding E&S landscape, whereas the project will contribute to major economic development in the associated areas. The potential adverse E&S impacts and their mitigation measures are described in the ESMP, which will be implemented during the project lifecycle. Since many provisions of the ESMP are to be implemented by the contractors, to ensure its proper implementation and monitoring, the ESMP forms a part of the bidding documents.

Based on the site visits and Beeline study, the subprojects are largely situated on or pass through plain terrain under single/double crop cultivation, tea plantations or waste land areas at few places. The identified subprojects will not fall under any protected areas as notified by GoI. The identified suitable routes for various transmission lines cross major and minor rivers at multiple locations, which will require additional design specification for towers as used by AEGCL in previous projects, to avoid tower footings in the rivers.

The proposed substations, which are already identified and finalized will be mostly located on government Patta Land or AEGCL's own land. The acquisition of land is not being undertaken for the transmission line component in the project, and the construction of transmission towers will cause a temporary change in the land use. Design and construction of substations and transmission lines will be undertaken to minimize negative social impacts, such as permanent/temporary land acquisition, adverse effect on agriculture and/or livelihoods, associated construction disturbances and risks (including gender-based violence). If permanent or temporary land acquisition is required in certain cases it will be carried out by negotiating with the landowners in presence of district revenue officers as per the guidelines mentioned in the RPF, following national laws: 'Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013', National Resettlement and Rehabilitation Policy, 2007 (NRRP), Provision in the Electricity Act, 2003 read with relevant provisions of Indian Telegraph Act, 1885 and AIIB's ESP.

There are no associated facilities for the project as the project will only provide system strengthening for power transmission system in Assam. AEGCL is not constructing any dedicated line for any particular power plants but rather a host of generation projects across the state.



Meaningful consultations were carried out with various stakeholders during ESMPF preparation and will continue throughout the project implementation. Individual consultation of Project-Affected People (PAP), in line with COVID-19 preventive measures, will also be carried out during implementation. The Grievance Redress Mechanism (GRM) will be established immediately to ensure PAPs' and Workers' grievances are addressed in a timely manner. This will include a Grievance Redress Committee (GRC) consisting of representatives from AEGCL, local administration, head of Panchayat, and PAP representative under the chairmanship of project director or its representative. PAPs or workers who believe they have been or are likely to be adversely affected by AIIB's failure to implement the ESP in this Project, can submit their submissions to the AIIB in line with Banks' Policy on AIIB Project-affected People's Mechanism.

AEGCL has developed E&S management procedures for other multilateral development banks, for instance, World Bank and Asian Development Bank. Same system with elaborated institutional arrangement will be applied to the project. To enable effective implementation of this ESMPF, further E&S assessments on subprojects, and supervision of E&S compliances, AEGCL will manage the E&S matters through a well-designed organizational structure of Project Management Unit at corporate level and Project Implementation Units at divisional level, supported by the general management consultancy. Capacity building program will be provided to contractors and AEGCL who work on the project on day-to-day basis.

Benefits far outweigh negative impacts. Overall, the major E&S impacts associated with the Project are limited to the construction period and can be mitigated to an acceptable level by implementation of ESMPF and by best engineering and environmental practices.



1. Introduction

1.1. Background

Reliable power supply is not only essential for livelihood but also boosts the economic growth of region. Strengthening the electricity transmission network plays a major role in improving reliability to power supply by reducing the transmission losses by reducing the length of transmission lines from power generation utilities to the distribution utilities. Assam Electricity Grid Corporation Ltd (AEGCL), the state-owned transmission company of Assam with financial assistance from Asian Infrastructure Investment Bank (AIIB) proposes to undertake “Assam Intra State Transmission System Enhancement Project” to enhance the transmission capacity and improve power supply to residents and industries.

AEGCL, a Public Sector Company was registered under ‘Company Act, 1956’. It was formed out of restructured Assam State Electricity Board in 2003 and was notified as the State Transmission Utility (STU). Its core business is to efficiently transport electrical power from electrical power bulk heads to the distribution company networks in the state of Assam. AEGCL is playing a strategic role as it is the largest STU in North-East region of India. AEGCL’s vision is to “to provide 24*7 reliable quality and affordable power to all consumers of Assam”. AEGCL is currently targeting on the following milestones:

- Implementing the Action Plan to handle peak power of 6500 MW by 2030 by adding 48 nos. new Extra High Voltage (EHV) substations, 4,607 circuit kilometers transmission lines in phased manner.
- Capacity enhancement of 4,272 MW by financial year (FY) 2024-25
- Investment plan to add 4,096 MW to achieve 7176MW is INR 9510.00 crore (approx.)

At present, AEGCL has been developing, operating and maintaining transmission system consisting of total line length of 5701.22 ckt km and 66 grid substations with 6,882 MVA capacity.

1.2. The Project

AIIB is considering supporting the enhancement of power transmission to improve the reliability of power supply through the proposed “Assam Intra-State Transmission System Enhancement Project” (The Project). The total project cost is approximately USD365million with a request from Government of India (GoI) to AIIB for a financial assistance of USD304 million (83% of the project cost). The project is expected to include the following components:

- a. Construction of 10 new substations, 332.945 km of associated transmission lines, 3 nos. of bay extensions at existing AEGCL Sub-Station, and Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS.
- b. Augmentation of 14 existing substations (Replacement of old transformers with new transformers).
- c. Augmentation of 186 km of transmission line, restringing by high temperature low sag (HTLS) conductors.
- d. Replacement of ground wire to optical power ground wire (OPGW) for 636 kms of transmission lines and substation equipment at substations.

1.3. Scope of Work and Methodology Adopted

Power transmission projects including the construction of substations have not been listed in the list of environmentally sensitive projects and hence no environmental clearance is required, as per the Environmental Impact Assessment (EIA) notification of 2006 and its subsequent amendments by the Ministry of Environment, Forests and Climate Change (MoEF&CC). Clearance from the Assam Forest Department is required only in cases where a project is constructed on forest land or requires cutting of forest trees.

The sub-projects under the proposed AIIB funding/loan have not been identified as the final project sites and the alignment of the transmission lines are yet to be confirmed, after detailed design is prepared and exhaustive surveys are conducted. Therefore, an Environmental and Social Management Planning Framework (ESMPF) is



being developed to ensure that the sub-projects will be assessed and implemented in conformity with AIIB's Environmental and Social Policy (ESP).

In order to ensure the sustainability of environmental and natural resources, socio-economic conditions and to develop a long-term perspective of achieving environmentally and socially sustainable development, the ESMPF is prepared to identify the associated Environmental and Social (E&S) risks and impacts during project life cycle, to address the concerns of Project Affected People (PAP), and to provide guidelines to carry out E&S Assessment Studies for subprojects without clear footprints at this stage.

This ESMPF report comprises baseline data on existing conditions of physical, ecological, economic, and social aspects, together with the identified and anticipated E&S risks, impacts and proposed mitigation measures. The existing substations were audited to provide the remediation measures for E&S problems. The ESMPF study is conducted based on sampling sub-projects with clear footprints, to provide the model Environmental and Social Impact Assessment (ESIA) for selected sub-projects and a generic Environmental and Social Management Plan (ESMP) for implementation and a Resettlement Planning Framework (RPF) for implementation, as well as to clearly guide the further E&S assessment by providing specific guidelines. An Indigenous People Planning Framework (IPPF) is prepared to guide the preparation of Indigenous People Plans (IPPs, if applicable) and compliance during Project implementation. AIIB requires AEGCL to prepare the E&S assessment for all non-assessed sub-projects during project implementation in conformity with the ESMPF. To avoid the potential E&S risks, activities located in or directly adjacent to key biodiversity area or national protected areas-including wildlife sanctuaries or reserves, forests, cultural heritage sites, and all cultural resources² and other socially sensitive areas will be excluded from the project scope through the application of the E&S screening and project categorization guidance.

The purpose of the ESMPF is to ensure that the sub-projects will be assessed and implemented in conformity with the policies of the GoI, Government of Assam (GoA), as well as the AIIB's Environmental and Social Policy (ESP) and Environmental and Social Standards (ESSs). The objectives of ESMPF are as follows:

- Incorporate approaches for management of E&S risks and impacts that are common to Project aspects such as (but not restricted to) Impacts during various phases of project development, Livelihoods improvement/restoration issues, Temporary and permanent land acquisition, Entitlements and compensation framework, Occupational and community health and safety, Grievance Redress mechanism (GRM), and Monitoring and evaluation etc.
- Lay down the procedures for conducting E&S studies to prepare ESIA/ESMP of subprojects without clear footprints at this stage
- Serve as tool for specific action plans, programs, policies, standards and procedures that executing agency, implementing agency, consultants and contractors should adopt and adhere to during the project execution and implementation
- Following tasks to be accomplished
 - a. Conducting model ESIA for selected sub-projects and Audit on existing substations
 - b. Preparation of ESMPF with an RPF to include details such as:
 - Description of the applicable policies and procedures to be followed;
 - Analysis of the anticipated E&S risks and impacts;
 - Screening and assessment of Project-related activities;
 - Provisions for disclosure of and consultation on the ESMPF with the RPF; and
 - Implementation and monitoring requirements.
 - c. Plan for Consultation and Disclosure of Documentation
 - d. Development of Project Level GRM
 - e. Development of Indigenous People Planning Framework (IPPF) (Appendix 12)

The specific methodology of the assignment includes:

- To conduct screening of project activities and identify the activities that potentially interact with environmental and social resources in the project area during various phases of project development;

² Cultural resources include movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.



- To conduct scoping to identify potential generic impacts due to project intervention and the key stakeholders associated with towards further developing strategy for baseline data generation and detailed impact analysis;
- Analysis of Environmental and Socioeconomic Baseline of the project area;
- Identify and assess the anticipated E&S impacts of the proposed project – both positive and negative;
- Identify and analyze alternatives to the proposed sub projects;
- Propose mitigation measures for negative impacts and enhancement measures for positive impacts to be undertaken during and after the implementation of the proposed projects;
- Verify compliance with national environmental regulations and policies, AIIB's ESP, and industry best practice and standards;
- Share the project information and disclosure finding of the ESMPF with the stakeholders (institutional and community including Potential PAPs) to obtain their feedback about the project, perceived impacts and preferred mitigation measures, and to collect information on environmental, ecological, and socioeconomic baseline in the project area;
- Development of framework for Project Level GRM;
- Identification of demographics of Project Affected People for development of IPPF;
- Development of management measure for Occupational, Health and Safety during project cycle; and
- Based on the above-mentioned exercises finalizing an ESMPF.



2. Legal and Policy Framework

This chapter deals with the laws, regulations and policies, of GoI, GoA, International conventions and the AIIB pertaining to E&S risks and impacts. The laws, regulations and policies potentially relevant to the Project are discussed here. This section may be updated should new laws, regulations and policies are made and enforced or the existing ones are amended. Applicable laws, regulations and policies need to be considered for effective management of environmental aspects; including siting criteria, environmental pollution control requirements, needs for institutional mechanisms, occupational and community health and safety requirements, resource utilization, and considerations for cultural and social concerns, etc.

2.1. Indian National Laws/Regulations/Policies

There are several existing national/state level laws and policies potentially applicable to the Project. The following sections detail the various regulatory frameworks pertaining to the project.

2.1.1. Environment Protection (Act) 1986 and Environmental Protection Rules 1986 and subsequent amendments

The GoI has framed an ‘Umbrella Act’ called the Environment (Protection) Act, 1986 which is designed to provide a framework for the coordination of central and state authorities for protection of environment. This Act was passed as an overall comprehensive act “for protection and improvement of environment”. Under this Act, rules have been specified for discharge/emission of effluents and different standards for environmental quality. These include Ambient Noise Standard, Emission from Motor Vehicles, Mass Emission Standard for Petrol Driven Vehicles, General Effluent Standards etc.

2.1.2. EIA Notification, 2006 and subsequent amendments

EIA notification 2006 and its subsequent amendments lists out type of projects that requires EIA and Environmental Clearance from MoEF&CC or State EIA Authority prior to commencement of any developmental work or project expansion. The notification gives stage-wise guidance for processing of Environmental Clearance. The objective of the notification is to formulate a transparent, decentralized and efficient regulatory mechanism to:

- Incorporate necessary environmental safeguards at planning stage
- Involve stakeholders through the public hearing process
- Identify developmental projects based on impact potential
- Securing provision for mitigation efforts

The construction of substation and Transmission line project does not come under purview EIA Notification 2006 and its subsequent amendments. However, project associated activity like creation of borrow area (if any) for the project will require prior Environmental Clearance.

2.1.3. Wildlife Protection Act, 1972 and subsequent amendments

The Wildlife Protection Act, 1972 has allowed the government to establish several National Parks and Sanctuaries over the past 37 years, to protect and conserve the flora and fauna and their habitat.

2.1.4. Forest (Conservation) Act, 1980 and subsequent amendments

The Indian Forest Act (1927) was amended in 1980 to check the rapid deforestation occurring throughout India, and the Forest (Conservation) Act, 1980 came into existence. At the state level, the government was empowered to declare reserves and protected forest and was also given the authority to acquire land for extension and preservation of the forests. Forest (Conservation) Rules, 2003 explains the procedure for procuring clearance for diversion of forests land for non-forest purpose. This Act provides for the conservation of forests and regulating the diversion of forest lands to non-forestry purpose. Any transmission line project falling under the forest area will require prior clearance from the relevant authorities under Forest (Conservation) Act 1980. The



process for forest clearance is depicted in **Appendix 1**. Any transmission line passing from the forest land needs to maintain a minimum clearance between the conductors and trees (Refer **Table 1**) to adhere the specification as specified in IS: 5613 and by the MoEF&CC guidelines.

Table 1: IS: 5613 & MOEF&CC guidelines on Right of Way

S. No.	Transmission lines voltage (In KV)	Maximum RoW (in meter)	Minimum clearance between conductor and trees
1	132	27	4.0
2	220	35	4.6
3	400 SC/DC	46/52	5.5

Below each conductor, a width clearance of 3 meters (m) would be permitted for the movement of tension stringing equipment. The trees on such strips would have to be felled but after stringing work is completed, the natural vegetation will be allowed to regenerate. Felling/pollarding/pruning of trees will be done with the permission of the local forest officer whenever necessary to maintain the electrical clearance. One outer strip shall be left clear to permit maintenance of the power line.

2.1.5. Ancient Monuments and Archaeological Sites & Remains Act 1958 and subsequent amendments

This Act is to ensure preservation of ancient and historical monuments and archaeological sites and remains of national importance and for the regulation of archaeological excavations and for the protection of sculptures, carvings and other like objects. According to this Act, areas within the radii of 100m and 300m from the “protected property” are designated as “prohibited areas” and “regulated areas” respectively. No development activity is permitted in the “prohibited areas”. Development activities are not permitted in the “regulated areas” without prior permission from the Archaeological Survey of India (ASI) if the site/remains/ monuments are protected by ASI or the State Directorate of Archaeology.

2.1.6. Water (Prevention and Control of Pollution) Act 1974 and subsequent amendments

The Act is enacted to prevent pollution of water sources through the industrial or any other construction activity and for maintaining or restoring of wholesomeness of water. The Act prohibits discharge of pollutants into water bodies beyond a given standard and lays down penalties for non-compliance with its provisions.

The Act resulted in the establishment of the Central and State Level Pollution Control Boards whose responsibilities include managing water quality and effluent standards, as well as monitoring water quality, prosecuting offenders and issuing licenses for construction and operation of any facility. This will include generation of liquid effluent during construction or from domestic activities in workers colony.

2.1.7. The Air (Prevention and Control of Pollution) Act 1981 and subsequent amendments

The purpose of this Act is to prevent, and control air pollution and preserve air quality. This Act empowers Central and State Pollution Control Boards for managing air quality and emission standards, as well as monitoring air quality, prosecuting offenders and issuing licenses for construction and operation of any facility. Air quality includes noise levels also. This Act has notified National Ambient Air Quality Standard for different land uses.

2.1.8. Noise Pollution (Regulation and Control) Rule 2000 and subsequent amendments



The Noise Pollution (Regulation and Control) rules are promulgated under Environmental (Protection) Act, 1986. The noise pollution rules lay down terms and conditions as are necessary to reduce noise pollution, including during night hours. The rule provides ambient noise level standards for various types of land uses.

2.1.9. Ozone Depleting Substances (Regulation and Control) Rules 2000

By notification dt. 17th July, 2000 under Sections 6, 8 and 25 of the Environment (Protection) Act 1986, the MoEF&CC has notified rules for the regulation/ control of Ozone Depleting Substances (ODS) under the Montreal Protocol. As per the notification, certain control and regulation has been imposed on manufacturing, import, export, and use of these compounds. AEGCL is following the provisions of the notification and is phasing out all equipment, which uses these substances, and is aiming at CFC free organization in the near future.

2.1.10. Wetlands (Conservation and Management) Rules 2017

Wetlands (Conservation and Management) Rules, 2017 are promulgated under Environmental (Protection) Act, 1986 for prohibiting reclamation and degradation through drainage and landfill, pollution (discharge of domestic and industrial effluents, disposal of solid wastes), hydrological alteration (water withdrawal and changes in inflow and outflow), over-exploitation of their natural resources resulting in loss of biodiversity and disruption in ecosystem services provided by wetlands by conservation of wetlands.

As defined in the rule, 'wetland' means an area of marsh, fen, peatland or water; whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters, but does not include river channels, paddy fields, human-made water bodies/tanks specifically constructed for drinking water purposes and structures specifically constructed for aquaculture, salt production, recreation and irrigation purposes. Whereas, 'wetlands complexes' means two or more ecologically and hydrologically contiguous wetlands and may include their connecting channels/ducts

The rules shall apply to the wetlands or wetlands complexes of following types-

- (a) wetlands categorized as 'wetlands of international importance' under the Ramsar Convention
- (b) wetlands as notified by the Central Government, State Government and Union Territory Administration

Section 4 of the rule elaborates Restrictions of activities in wetlands

2.1.11. The Motor Vehicle Act, 1988 & Motor Vehicles Rules 1989 and subsequent amendments

The Act regulates all aspects of road transport vehicles. It provides in detail the legislative provisions regarding licensing of drivers/conductors, registration of motor vehicles, control of motor vehicles through permits, traffic regulation, insurance, liability, offences and penalties, etc. This Act will be applicable for all construction equipment/plant and machinery including vehicles deployed during implementation. Motor Vehicles Rules, 1989 mandates Pollution Under Control (PUC) certificate for motor vehicles/construction equipment.

2.1.12. Regulations related to Waste Management

Table 2: Applicability of waste management regulations

Nature of Waste	Rules	Relevance
Municipal Solid Waste	Solid Waste Management Rules, 2016	MoEF&CC under the provisions of the Environmental Protection Act, 1986 issued the Solid Waste Management (SWM) Rule, 2016 on 8th April 2016 for management of Solid Waste.
Construction and Demolition	Construction and Demolition Waste Management Rules,	"construction and demolition waste" mean waste comprising of building materials, debris and rubble resulting from construction, re-modelling, repair and demolition of any civil structure.



Nature of Waste	Rules	Relevance
Waste	2016	As per rule- Every waste generator shall prima-facie be responsible for collection, segregation of concrete, soil and others and storage of construction and demolition waste generated, as directed or notified by the concerned local authority in consonance with these rules ((Rule 4 sub-rule (1)) there should be no littering or deposition of construction and demolition waste to prevent obstruction to the traffic or the public or drains (Rule 4 sub-rule (4))
Plastic Waste	Plastic Waste Management Rules, 2016	MoEF&CC under the provisions of the Environmental Protection Act, 1986 and in in supersession of the Plastic Waste (Management and Handling) Rules, 2011 issued the Plastic Waste Management Rules, 2016 to give thrust on plastic waste minimization, source segregation, recycling and disposal effectively. These rules shall apply to every waste generator, local body, Gram Panchayat, manufacturer, Importers and producer.
Hazardous Waste	Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016	These rules classify used mineral oil as hazardous waste under the Hazardous Waste, that require proper handling and disposal. The requirements for disposal of used mineral oil as per the rules are: a. The used oil can be sent / sold for re-refining to registered recyclers, if it meets the specification in Schedule –5. b. The waste oil which is not suitable for re-refining (i.e. does not meet the specifications listed in Schedule-5), can be used in furnaces if it meets the specifications laid down in Schedule –6 c. Any waste oil which does not meet the specifications in Schedule–6 shall not be auctioned or sold but shall be disposed of in a hazardous waste disposal facility. Used mineral oil generated at the AEGCL substations meets the requirements of Schedule 5 of the above-mentioned Rules. AEGCL will seeks authorisation for disposal of hazardous waste from concerned State Pollution Control Boards (SPCB) as and when required (Refer Appendix 2). The oil can be auctioned to authorised/registered re-refiners and information to the respective SPCB.
E-Waste	E-Waste Management Rules, 2016	MoEF&CC under the provisions of the Environmental Protection Act, 1986 and in in supersession of e-waste (Management and Handling) Rules, 2011 issued e-Waste Management Rules, 2016. These rules shall apply to every manufacturer, producer, consumer, bulk consumer, collection centres, dealers, e-retailer, refurbished, dismantler and recycler involved in manufacture, sale, transfer, purchase, collection, storage and processing of e-waste or electrical and electronic equipment listed in Schedule I of the rule, including their components, consumables, parts and spares which make the product operational.
Used Batteries	Batteries (Management and Handling) Rules, 2001	By notification dt. 16th May 2001 under Sections 6, 8 and 25 of the Environment (Protection) Act 1986, the MoEF&CC has put certain restrictions on the disposal and handling of used batteries. Thus, it is the responsibility of the bulk consumer (AEGCL) to ensure that the used batteries are deposited with the dealer, manufacturer or registered recycler for handling and disposal.

2.1.13. The Building & Other Construction Workers (Regulation of Employment & Conditions of Service) BOCW Act 1996



As per the Act, the employer is required to provide safety measures at the building or construction work site along with other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation etc. to the workers.

2.1.14. The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013

The Act that safeguards and mitigates the adverse impacts on the affected persons caused due to land/asset acquisition for a project. It is aimed to regulate land acquisition process and to lay down the process and procedures for granting adequate compensation for the loss of land/asset, rehabilitation and resettlement of project affected persons in a fair and transparent way.

2.1.15. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act 2006

The Act grants legal recognition to the rights of traditional forest dwelling communities, partially correcting the injustice caused by the forest laws. Makes a beginning towards giving communities and the public a voice in forest and wildlife conservation.

The definitions of forest dwelling STs, forest land, forest rights, forest villages, etc. have been included in Section 2 of the Act. The Union Ministry of Tribal Affairs is the nodal agency for implementation of the Act. While field implementation is the responsibility of the government agencies, AEGCL is committed to abide by the provisions of the act, if any portion of a transmission line passes through any forest land to which the Act applies.

2.1.16. Electricity Act 2003

Subsection 3,4 and 5 of Section 67 of the Act states that

(3) A licensee shall, in exercise of any of the powers conferred by or under this section and the rules made thereunder, cause as little damage, detriment and inconvenience as may be, and shall make full compensation for any damage, detriment or inconvenience caused by him or by any one employed by him.

(4) Where any difference or dispute [including amount of compensation under sub-section (3)] arises under this section, the matter shall be determined by the Appropriate Commission.

(5) The Appropriate Commission, while determining any difference or dispute arising under this section in addition to any compensation under sub-section (3), may impose a penalty not exceeding the amount of compensation payable under that sub-section.

Subsection 5 and 6 of Section 68 of the Act states that

(5) Where any tree standing or lying near an overhead line or where any structure or other object which has been placed or has fallen near an overhead line subsequent to the placing of such line, interrupts or interferes with, or is likely to interrupt or interfere with, the conveyance or transmission of electricity or the accessibility of any works, an Executive Magistrate or authority specified by the Appropriate Government may, on the application of the licensee, cause the tree, structure or object to be removed or otherwise dealt with as he or it thinks fit.

(6) When disposing of an application under sub-section (5), an Executive Magistrate or authority specified under that sub-section shall, in the case of any tree in existence before the placing of the overhead line, award to the person interested in the tree such compensation as he thinks reasonable, and such person may recover the same from the licensee. Explanation. - For the purposes of this section, the expression “tree” shall be deemed to include any shrub, hedge, jungle growth or other plant.

2.1.17. MoP guidelines 2015 for payment of compensation toward damages regarding RoW



Ministry of Power (MoP) vide its order No. 3/7/2015-Trans dated 15th April 2015 constituted a Committee comprising representatives of various State Govt., MoP, Central Electricity Authority (CEA) and POWERGRID under the chairmanship of Special Secretary, MoP to analyze the issues relating to Right of Way (RoW) for laying of transmission lines in the country and to suggest a uniform methodology for payment of compensation on this account. Based on recommendation of the Committee, the MoP vide its notification dated 15th October 2015 has issued guidelines for payment of compensation for damages in regard to RoW. It has also written to all the States for taking suitable decisions regarding adoption of these guidelines considering that acquisition of land is a State subject. The said guidelines were adopted by Govt. of Assam vide its notification dated 10th March 2017 for implementation which is applicable to transmission lines supported by tower base of 66 kV and above but not for sub-transmission and distribution lines below 66 kV.

2.1.18. Indian Treasure Trove Act 1878, amended in 1949

Section 2 of the Act defines ‘treasure’ as anything of any value hidden in the soil, or in anything attached thereto. Section 4 states whenever any treasure exceeding in amount or value ten rupees is found, the finder shall, as soon as practicable, give to the Collector notice in writing.

2.1.19. Protection of Civil Rights Act 1955.

An Act to prescribe punishment for the [preaching and practice of – “Untouchability”] for the enforcement of any disability arising there from for matters connected therewith.

2.1.20. SC/ST (Prevention of Atrocities) Act 1989

An Act to prevent the commission of offences of atrocities against the members of the Scheduled Castes and the STs, to provide for Special Courts for the trial of such offences and for the relief and rehabilitation of the victims of such offences and for matters connected therewith or incidental thereto.

2.1.21. Panchayats (Extension to Scheduled Areas) Act 1996 or PESA

This law was enacted to cover the “Scheduled (under Fifth Schedule) areas” with predominance of tribal population, which are not covered in the 73rd amendment or Panchayati Raj Act of the Indian Constitution. The Act enables Panchayats and Gram Sabhas to implement a system of self-governance with respect to a number of issues such as customary resources, minor forest produce, minor minerals, minor water bodies, selection of beneficiaries, sanction of projects, and control over local institutions.

2.1.22. National Tribal Policy (Draft) 2006³

Ministry of Tribal Affairs had prepared a draft National Tribal Policy in 2006, with objective of providing Regulatory Protection and Socio- Economic Empowerment of STs in the country. A key provision would be the prevention of alienation of land owned by STs and restoring possession of wrongfully alienated lands. However, this policy has not been finalized as invited recommendations are yet to be incorporated.

2.1.23. Relevant Policies

The policy framework is contained in the following:

1. National Forest Policy, 1988
2. National Conservation Strategy and Policy Statement on Environment and Development, 1992
3. Policy Statement for Abatement of Pollution, 1992
4. Wildlife Conservation Strategy 2002-15

³ Source: PIB Delhi 15 July 2019



5. National Environment Policy (NEP), 2006
6. National Action Plan for Conservation of Migratory Birds and their Habitats along Central Asian Flyway (2018-2023) in 2018

2.2. State Level Laws/Regulations/Policies

2.2.1. Assam Forest Policy 2004⁴

The principal aim of this policy is to ensure progressive sustainable development of the forests of Assam, to meet the twin objectives of environmental stability and ecological balance together with improved livelihood support system for her people. The Management Paradigm as envisaged in the policy given below.

- The mega-biodiversity existence in Assam will be protected and developed with the active involvement of the communities.
- Without compromising the basic tenets of forest conservation-the forestry sector will be selectively opened to the people of Assam for income and employment generation.
- The Forest cover of Assam will be progressively increased and maintained through scientific sustainable forest management practices giving emphasis on the traditional knowledge and understanding of the ethnic communities of Assam.

2.2.2. Assam Biodiversity Rules 2010

These rules are established in exercise of the powers conferred by Section 63 of the Biological Diversity Act, 2002 (Central Act 18 of 2003), the Government of Assam.

As per the act Indian entities or non-Section 3(2) (as prescribed under Biological Diversity Act, 2002) entities, prior intimation to the concerned SBB is required and for activities pertaining to commercial utilization, or bio-survey and bio-utilization for commercial utilization.

2.2.3. Wildlife Protection (Assam Amendment) Act 2009

Under this Act hunting outside the boundary of a national park or wildlife sanctuary is also included as offence punishable under section 51 of the Wildlife Protection Act; and penalties have been made more stringent.

2.2.4. Assam (Control of Felling & Removal of trees from Non-forest Land) Rules 2002

The rule regulates felling permission and transit of timber derived from non-forest areas. The Rule mandates permission for felling of various species of trees from Department of Environment and Forest.

2.2.5. Assam Rhinoceros Preservation Act 1954

This Act aims at protection of the Indian Rhinoceros, Assam's state animal; and enables legal action against killing, injury and capture of the animal.

2.2.6. Assam land and Revenue Regulation (Amendment) Act, 1947

This Act of 1947 was to amend Assam Land and Revenue Regulation 1886, and insert Chapter X, which is aimed at protecting land-ownership rights of tribal people of Assam.

2.2.7. Assam Land (Requisition and Acquisition) Act 1964

⁴ <http://asbb.gov.in/Downloads/Assam%20Forest%20Policy%202004.pdf>



An Act to amend and consolidate the law for requisition and speedy acquisition of premises and land for certain public purposes such as accommodation, transport, communication, irrigation, flood control and anti-erosion measures.

2.2.8. Indian Rhino Vision (IRV) 2020⁵

This is a collaborative programme, developed and implemented by the Assam Forest Department, Bodoland Territorial Council, WWF, and International Rhino Foundation with support from US Fish and Wildlife Service, for long-term conservation of the one-horned rhinoceros (*Rhinoceros unicornis*) in Assam. IRV 2020 aims at increasing rhino populations in seven protected areas of Assam to 3000 by 2020. This is being achieved through increased protection and translocations of rhinos from source populations in Kaziranga and Pobitora. Between 2008-2012, 18 rhinos were translocated to Manas from Pobitora and Kaziranga and four from the Centre for Wildlife Rehabilitation and Conservation as part of rehabilitation programme of WTI and the Government of Assam. All 22 rhinos survived the translocations.

2.2.9. Project Elephant

Project Elephant (PE) was launched by GoI in the year 1991-92 as a Centrally Sponsored Scheme with the objectives of protecting elephants, their habitat and corridors, addressing issues of man-elephant conflict, and welfare of domesticated elephants. The implementation of PE is through the C.S.S. Plan Scheme with the grant to State Governments at 90:10 for North East including Assam.

2.3. Indian Legal and Regulatory Framework

The major Indian laws, regulations and policies which are relevant to the Project are listed illustratively in **Table 3**.

Table 3: Relevancy of Key Environmental and Social Legislation

S. No	Law / Regulation / Guidelines	Applicability (Yes/No)	Clearance/Consent to be obtained (Yes/No)	Relevance	Implementing Responsible Agency ⁶
1.	The Environmental (Protection) Act, 1986, and the Environmental (Protection) Rules, 1987-2002 (various amendments)	Yes	No	Umbrella Act for Protection and improvement of the environment. Under this act rules have been specified for discharge/emission of effluents and different standards for environmental quality	MoEF&CC, State Department of Environment & Forest, Central Pollution Control Board (CPCB) and State Pollution Control Board (SPCB)
2.	The EIA Notification, 2006 & subsequent amendments	To be identified at sub-project level during detailed E&S assessment	No	The construction of Substation and Transmission line project does not come under purview EIA Notification 2006 and its subsequent amendments.	State EIA Authority (SEIAA)/MoEF&CC

⁵ source: www.savetherhino.org, www.wwfindia.org

⁶ Regulatory permissions such as Forest Clearance (if applicable) to be obtained by AEGCL. Whereas the applicable consents with respect to E&S activity are to be obtained by the contractors, PMC will extend its support in guiding the contractor for obtaining the regulatory consents.



Environmental and Social Management Planning Framework

S. No	Law / Regulation / Guidelines	Applicability (Yes/No)	Clearance/Consent to be obtained (Yes/No)	Relevance	Implementing Responsible Agency*
				However, project associated activity like creation of borrow area (if any) for the project will require prior Environmental Clearance.	
3.	Wildlife Protection Act, 1972	To be identified at sub-project level during detailed E&S assessment	Yes (If identified during detailed E&S assessment)	If subproject site is located within or close to protected area	National Board for Wildlife (NBWL), State Board for Wildlife (SBWL)
4.	Forest (Conservation) Act, 1980 and subsequent amendments	To be identified at sub-project level during detailed E&S assessment	Yes (If identified during detailed E&S assessment)	If diversion of forest land is involved in the subproject	State Environment and Forest Department, MoEF&CC
5.	Ancient Monuments and Archaeological sites & Remains Act 1958	To be identified at sub-project level during detailed E&S assessment	Yes (If identified during detailed E&S assessment)	If any archaeological site in the vicinity of subproject site	Archaeological Survey of India, State Dept. of Archaeology
6.	The Water (Prevention and Control of Pollution) Act, 1974	Yes	Yes (Consent to be obtained for utilization of water from ground water board)	Measure to be taken during project cycle especially construction phase towards prevention of water pollution	State Pollution Control Board, CPCB
7.	The Air (Prevention and Control of Pollution) Act. 1981	Yes	No (However, Ambient Air quality standards to be followed and record to be maintained)	Measure to be taken during project cycle especially during construction phase towards prevention of air pollution	State Pollution Control Board, CPCB
8.	Noise Pollution (Regulation and Control) Act, 1990 and subsequent amendments	Yes	No (However, Ambient Noise level to be followed and record to be maintained)	Construction machineries and vehicles to conform to the standards for construction. Measure to be taken during project cycle especially during construction phase towards prevention of air pollution	State Pollution Control Board, CBCB
9.	Wetlands (Conservation and Management) Rules, 2017	To be identified at sub-project level during detailed E&S assessment	Yes (If identified during detailed E&S assessment)	Permission is required if any wetland notified by the Central Government, State Government falls	Wetland Authority; MoEF&CC



Environmental and Social Management Planning Framework

S. No	Law / Regulation / Guidelines	Applicability (Yes/No)	Clearance/Consent to be obtained (Yes/No)	Relevance	Implementing Responsible Agency*
				within project site	
10.	Assam (Control of Felling & Removal of trees from Non-forest Land) Rules, 2002	To be identified at sub-project level during detailed E&S assessment	Yes (If identified during detailed E&S assessment)	If felling of trees as defined in Assam (Control of Felling & Removal of trees from Non-forest Land) Rules, 2002 is involved	Environment and Forest Department, Assam
11.	The Motor Vehicle Act. 1988 and subsequent amendments	Yes	Yes (From State Pollution Control Board for HMTV & LMV)	All vehicles/equipment used for construction will need to comply with the provisions of this act.	State Motor Vehicles Department
12.	Solid Waste Management Rules, 2016	Yes	No	Effective management and disposal of various waste during construction and operation stage	MoEF&CC and various concerned departments
13.	Construction and Demolition Waste Management Rules, 2016	To be identified at sub-project level during detailed E&S assessment	Yes		
14.	Plastic Waste Management Rules, 2016	Yes	No		
15.	Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016	Yes	Yes (During operation stage)	Hazardous wastes are likely to be generated during construction and operation stage in forms of used oil, transformer oil and effective management and disposal to be ensured.	State Pollution Control Board
16.	E-Waste Management Rules, 2016	Yes	No	Effective management and disposal of e-waste during construction and operation stage	MoEF&CC and various concerned department
17.	Batteries (Management and Handling) Rules, 2001	Yes	Yes (During operation stage)	Proper disposal of used batteries	State Pollution Control Board
18.	The Building & Other Construction Workers (Regulation of Employment &	Yes	Yes	Key legislations providing guidelines for onsite labour and worker management and	District Labour Commissioner



Environmental and Social Management Planning Framework

S. No	Law / Regulation / Guidelines	Applicability (Yes/No)	Clearance/Consent to be obtained (Yes/No)	Relevance	Implementing Responsible Agency*
	Conditions of Service) BOCW Act, 1996			welfare during construction	
19.	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013	To be identified at sub project level during detailed Environmental and Social assessment	Yes (In coordination with revenue authorities)	If acquisition of land/asset/loss of livelihood is involved.	GoI and GoA
20.	The STs and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	To be identified at sub project level during detailed Environmental and Social assessment	Yes (If identified during detailed E&S assessment)	Consent of community is required to procure forest clearance for a project if the sub-project requires diversion of forest land where rights of Primitive Tribal Groups or Primitive Agricultural Community may get hampered	Ministry of Tribal Affairs
21.	Electricity Act, 2003	Yes	No	The act assures compensation for any damage, detriment or inconvenience caused by the project	State Power and Electricity Department
22.	MoP guidelines dated 15th October, 2015 for payment of compensation toward damages in regard to RoW	Yes	No	Power and Electricity Dept. of Govt. of Assam defined method for compensation for RoW of Transmission line and Tower Base	GoA
23.	The Antiquities and Art Treasures Act, 1972 and Indian Treasure Trove Act, 1878, amended in 1949	Chance find	Yes (If identified during detailed E&S assessment)	In case of sudden encounter with anything valuable at any stage of project cycle.	District Collector/Commissioner

2.4. International Treaties, Conventions and Declarations

There are 20 major global MEAs, to which India is a signatory. These are listed below:



A. Nature conservation

S. no	Nature Conservation	Relevancy to Project
1	Ramsar Convention on Wetlands	No
2	CITES (Convention on International Trade in Endangered Species of Fauna and Flora)	No
3	TRAFFIC (The Wildlife Trade Monitoring Network)	No
4	CMS (Convention on the Conservation of Migratory Species)	Yes, flyway involved but specific bird routes/wintering sites not identified yet in Assam with plans underway to conduct such exercise.
5	CAWT (Coalition Against Wildlife Trafficking)	No
6	CBD (Convention on Biological Diversity)	No
7	ITTC (International Tropical Timber Organisation)	No
8	UNFF (United Nations Forum on Forests)	No
9	IUCN (International Union for Conservation of Nature and Natural Resources)	No
10	GTF (Global Tiger Forum)	No

B. Hazardous material

S. no	Hazardous material	Relevancy to Project
1	Cartagena Protocol on Biosafety	No
2	SAICM (Strategic Approach to International Chemicals Management)	No
3	Stockholm Convention on Persistent Organic Pollutants (POPs)	No
4	Basel Convention on the Control of Trans-boundary Movement of Hazardous Waste and Their Disposal	Yes, Use of Transformer oil
5	Rotterdam Convention on Prior Informed Consent (PIC) for certain Hazardous Chemicals and Pesticides in International Trade	No

C. Atmospheric emissions

S. no	Atmospheric emissions	Relevancy to Project
1	UNFCCC (United Nations Framework Convention on Climate Change)	No
2	Kyoto Protocol	No
3	UNCCD (United Nations Convention to Combat Desertification)	No
4	Montreal Protocol (on Ozone Depleting Substances)	Yes, Use of SF6

D. Marine environment

S. no	Marine environment	Relevancy to Project
1	IWC (International Whaling Commission)	No

2.5. Applicability of AIIB ESP

AIIB is an international financial organization that provides a multilateral financing and investment platform for infrastructure development and enhanced interconnectivity in Asia. AIIB recognizes that E&S sustainability is a fundamental aspect of achieving outcomes consistent with its mandate to support infrastructure development and enhance interconnectivity in Asia. The objective of AIIB's ESP is to facilitate achievement of these development outcomes, through a system that integrates sound E&S management into Projects.

1. **Environmental and Social Policy** sets forth mandatory E&S requirements for AIIB's investments.
2. **Environmental and Social Standards (Table 4)** include following three associated ESSs,
 - a. ESS 1: Environmental and Social Assessment and Management;
 - b. ESS 2: Involuntary Resettlement; and
 - c. ESS 3: Indigenous Peoples.



Table 4: Environmental and Social Standards of AIIB

Environmental and Social Standards (AIIB)	Objective & Brief Description
ESS 1: Environmental and Social Assessment and Management	<p>ESS1 aims to ensure the environmental and social soundness and sustainability of Projects and to support the integration of environmental and social considerations into the Project decision-making process and implementation. ESS 1 is applicable if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both).</p> <p>The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS 1 provides for both quality environmental and social assessment and management of risks and impacts through effective mitigation and monitoring measures during the course of Project implementation. The ESS 1 defines the detailed requirements of the environmental and social assessment to be carried out for any project to be financed by the Bank.</p>
ESS 2: Involuntary Resettlement	<p>ESS 2 is applicable if the Project's screening process reveals that the Project would involve Involuntary Resettlement (including Involuntary Resettlement of the recent past or foreseeable future that is directly linked to the Project). Involuntary Resettlement covers physical displacement (relocation, loss of residential land or loss of shelter) and economic displacement (loss of land or access to land and natural resources; loss of assets or access to assets, income sources or means of livelihood) as a result of: (a) involuntary acquisition of land; or (b) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers such displacement whether such losses and involuntary restrictions are full or partial, permanent or temporary. The ESS 2 defined detailed requirements of resettlement planning of the projects involving involuntary resettlement.</p>
ESS 3: Indigenous Peoples	<p>The ESS 3 is applicable if Indigenous Peoples are present in, or have a collective attachment to, the proposed area of the Project, and are likely to be affected by the Project. The term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:</p> <ul style="list-style-type: none"> (a) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (b) collective attachment to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories; (c) customary cultural, economic, social or political institutions that are separate from those of the dominant society and culture; and (d) a distinct language, often different from the official language of the country or region.

3. **Environmental and Social Exclusion List:** AIIB decided not to finance Projects that it determines do not comply with the ESP and ESSs. The Bank will not knowingly finance a Project that: (a) either involves or results in forced evictions⁷; or (b) involves activities or items specified in the list set forth in the Environmental and Social Exclusion List of Environmental and Social Framework, February 2016 of AIIB

AIIB determines the Project's category by the category of the Project's component presenting the highest environmental or social risk, including direct, indirect, cumulative and induced impacts, as relevant, in the

⁷ Forced eviction is defined as the permanent or temporary removal, against the will of individuals, families and/or communities, from homes or land (or both) which they occupy, without the provision of, or access to, appropriate forms of legal or other protection (such as the provisions of ESS 2: Involuntary Resettlement). The exercise of eminent domain, compulsory acquisition or similar powers, is not considered to be forced eviction, providing it complies with the requirements of national law and the provisions of ESS 2: Involuntary Resettlement, and is conducted in a manner consistent with basic principles of due process (including provision of adequate advance notice, meaningful opportunities to lodge grievances and appeal, and avoidance of the use of unnecessary, disproportionate or excessive force).



Project area. It assigns each proposed Project to one out of the 4 designated Categories i.e. Category A, Category B, Category C and Category F1.

The Project has been tentatively assigned to Category B, as AEGCL will avoid siting the sub-projects in sensitive areas to minimize E&S impacts to the extent possible.⁸ ESS 1 and ESS 2 will be applicable to the Project. ESS3 will unlikely to be triggered, however, the IPPF is prepared as Appendix 12 for guiding the Project implementation in regard to STs.

2.6. Gap Analysis between National and AIIB Policies and Standards

Table 5: Gap Analysis of National Regulations and AIIB's Policies

S. No.	Project Stage	AIIB ESF 2019 ⁹	National Regulations	Gaps Identified
1.	Project Screening and Categorization	Analyze potential impacts of the project for Screening of each proposed project at the concept stage Projects categorized as A, B, C and FI.	As per EIA notification 2006, All projects and activities are broadly categorized in to two categories - Category A and Category B, based on the spatial extent of potential impacts and potential impacts on human health, natural and manmade resources. Category A projects are those having significant environmental impact. Category B is divided into two categories B1 and B2 based on the potential impact of project. B1 projects require prior Environmental Clearance from State Environmental Impact Assessment Authority (SEIAA) through recommendations of State Environmental Appraisal Committee (SEAC) B2 projects are those which have no or minimal potential impacts.	Power transmission (and distribution) projects are not listed as environmental sensitive projects under EIA notification 2006 and fall in B2 category. However, the ESS of AIIB lists power transmission projects as projects which may have adverse environmental and social impacts (category B)
2.	Conduct Environmental and Social Impact Assessment	Client to undertake an Environmental and Social Assessment of potential physical, biological, socioeconomic and cultural risks and impacts. The type of instrument and level of detail is determined on the basis	As per EIA notification 2006; Category A - Require Prior Environmental Clearance (EC) from Central Government in the MoEF&CC through recommendation of Environmental Appraisal Committee (EAC). Category B – It is divided into two categories B1 and B2.	As per National regulations/ standards (EIA notification 2006) the substation and transmission line projects fall under B2. Category B2 does not require EIA. Only Forest Clearance is required, in case the transmission lines pass through Forest.

⁸ However, the category of the project may change if it is identified at later phase of project that the project/sub-project is likely to have significant adverse environmental and social impacts due to siting of project/sub-project component in sensitive areas.

⁹ <https://www.aiib.org/en/policies-strategies/download/environment-framework/Final-ESF-Mar-14-2019-Final-P.pdf>



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		of project screening and environmental and social categorization. Client to prepare ESIA or ESMP as appropriate	Category B 1 projects require prior Environmental Clearance from State Environmental Impact Assessment Authority (SEIAA) through recommendations of State Environmental Appraisal Committee (SEAC), Category B2 – Does not require EIA, goes directly to Appraisal stage.	The ESS of AIIB lists power transmission projects as projects which may have adverse environmental and social impacts (B) and hence requires ESIA.
3.	Assessment of Alternatives	Assessment of alternatives under ESS 1: Environmental and Social Assessment and Management. Examination to avoid or minimize environmental impacts.	As per EIA notification alternatives to the project's location, design, and technology document rationale or selecting the particular project location, design, and technology needs to take under consideration for Category A and Category B1 if the scoping exercise results in need of alternatives.	As per National Laws analysis of alternatives is not mandatory for sub-station and transmission line projects. However, as per AIIB guidelines, it is mandatory to analyze alternatives.
4.	Prepare Environmental and Social Management Plan (ESMP)	Development and implementation of an ESMP. The ESMP shall include the monitoring plan with budgetary provisions.	the EIA manual for Category 'A' and Category 'B' projects calls for preparation of the EMP for the anticipated impacts. As this project falls under category B1 thus does not require EMP development. The EMP shall include the monitoring plan with budgetary provisions	As per the GoI and GoA guidelines ESMP development and budget allocation is not required. The same is required as per AIIB's guidelines.
5.	Public Consultation and Use of Project- Level Grievance Redress Mechanisms	Client conducts meaningful consultation with Project affected people to facilitate their informed participation in the consultations. Client continues consultation with stakeholders throughout the Project implementation as appropriate. Client to establish a Project-level GRM for PAPs and Workers respectively.	As per EIA notification 2006, all Category A and Category B1 projects or activities are required to undertake Public Consultation with certain narrowly specified exceptions. While, category B2 projects or activities don't require any such consultation. Grievance redress mechanism is not a part of the national regulations.	As per national regulations, sub-station and transmission line project do not need public consultation. EIA notification does not cover the grievance redress mechanism but AIIB guidelines requires a mechanism to receive and facilitate resolution of grievances or complaints



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6.	Information Disclosure	Public disclosure of E&S documents, including ESMP, on Client and AIIB websites as per policy provisions. Local translations of executive summaries of E&S documents should be disclosed as well. Regular disclosure of updated environmental and social information in the Project.	<p>As per the EIA notification, 2006 Information disclosure required to be undertaken through public notice prior to the approval by the MoEF&CC only for Category A and B1 projects and no such disclosure required for category B2 in which sub-station and transmission line projects fall.</p> <p>Under the Environmental Notification, the regulatory authority and the State or Union Territory Pollution Control Board (SPCB or UTPCC) required to make the Draft report available for Category A and B1 projects for inspection and a notified place during normal business hours prior to and up to the date of public hearing and prior to hearing.</p>	As per Indian standards information disclosure is not mandatory for Power Transmission projects whereas the AIIB guidelines requires information disclosure.
7.	Use of Environmental Standards	<p>As a general rule, AIIB bases the project assessment on the regulations that apply in the country in which the project is to be implemented. These regulations must be consistent with international environmental, social, health, safety and labour standards. These include the standards set by the Performance Standards of the International Finance Corporation (IFC) and the Environmental, Health and Safety (EHS) Guidelines of the World Bank Group. Other standards include; IFC Environmental and Social Impact Assessment Guidelines. For pollution prevention, international standards will apply.</p> <ul style="list-style-type: none"> • Environmental, health, and safety general guidelines, 2007 	<p>The Environment (Protection) Rules, 1986</p> <p>Various legislations addressing aspects such as air and water pollution, hazardous substance management, etc.</p> <p>Occupational health and safety standards included in the Factories Act (India) and various India specific Labor Laws.</p>	There are no specific national guidelines on applicability of minimum environmental standards on power sub-station and transmission line. However, IFC's Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution clearly sets minimum environmental limits on air, water, noise and soil quality, which should be followed.



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		<ul style="list-style-type: none"> Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution. 		
8.	Monitoring and Reporting	As per AIIB guidelines, the executing agency and/or the recipient of the funds have/has to agree to certain reporting and notification duties and implement appropriate monitoring tools. If an ESMP including a monitoring plan has been developed, it will be used as a basis for monitoring, together with other elements to be monitored. An E&S monitoring report template is attached as Appendix 7	For Category A and B1 projects post environmental clearance (EC) monitoring is stipulated by the regulations, with half yearly compliance reports to be made available as public documents. Also, latest report displayed on website of regulatory authority. Which is not required for category B2 projects.	As per Indian Standards the power transmission projects do not require any monitoring and reporting whereas as per AIIB guidelines the project requires monitoring and reporting.
9.	Compensation, Resettlement and Rehabilitation	As per AIIB's requirement, regardless of the property title status, solutions on both situations of physical and/or economic displacement should be developed in consultation with the affected people. This may include inter alia measures such as e.g. provision of alternative housing, moving assistance, relocation allowances, compensation or other forms of support in order to improve or at least re-establish the livelihood of the affected people.	<p>Valuation of the land shall be done following the procedure laid down in LARRA, 2013. Value of the land and compensation amount shall be approved by the negotiation committee.</p> <p>The compensation of the damage is governed by the Electricity Act, 2003 and the Indian Telegraph Act, 1885. The compensation towards the damage are provided without the acquisition of land which are assessed/reviewed by the Revenue Authorities.</p>	<p>National Regulations do not cover all displaced persons, such as non-titled on government land.</p> <p>While AIIB's and World Bank mandates compensation for all affected people regardless of property title status</p>



2.7. AEGCL's Environmental and Social Policy and Procedures

AEGCL has worked with MDBs, such as World Bank (WB) and Asian Development Bank (ADB). Under the previous projects, AEGCL developed its Environmental and Social Policy and Procedures (ESPP)¹⁰. As part of ADB funded projects, AEGCL has experience in development and management of E&S instruments per MDBs' requirements. AEGCL's working operation safety manual¹¹ also serves as its commitment towards fulfilling the E&S responsibilities including occupation health and safety.

¹⁰https://www.powergridindia.com/sites/default/files/Our_Business/Domestic_Consultancy/NER_Agreements_and_MoUs/2015/6/ESPPF_ASSAM.pdf

¹¹ https://www.aegcl.co.in/Safety_Manual_AEGCL.pdf



3. Description of Project

3.1. Project Scope

The scope involves constructing new transmission substations and laying new transmission lines with the associated infrastructure. The project will be developed by the Assam Electricity Grid Corporation Ltd (AEGCL), the state-owned transmission company of Assam. The proposed project is expected to be completed in 5 years from financial close (expected project completion by end 2024). The key interventions planned under the initiative, to strengthen power transmission and distribution are:

Construction of 10 new 400 kV, 220 kV and 132 kV grid substations along with the associated (332.945 km) transmission lines, conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS, replacement old existing ground wire by 636km OPGW, Augmentation of 186 km of transmission line (restringing by HTLS conductors), Construction of 3 nos bay extension at existing AEGCL Sub-Station and Augmentation of 14 Existing Substations. The detailed components are as follows,

1. Establishment of 2 no. New 400/220 kV Substations: 400/220/132kV GIS S/S at Rangia (132/33 kV AIS Kumarikata) & 400/220kV GIS S/S at Sonapur
2. Establishment of 7 no. New 220/132 kV Substations: 2x100MVA, 220/33kV GIS S/S at Bihpuria, 2x160MVA, 220/132kV & 2x50MVA, 132/33kV GIS S/S at Khumtai, 2x100MVA, 220/33kV GIS S/s at Jakhlabandha, 2x100MVA, 220/33kV GIS S/s at Chhayagaon, 2x160MVA, 220/33kV GIS S/s at Shankardevnagar, 2x100MVA, 220/33kV GIS S/s at Nagaon-2, 2x160MVA, 220/132kV GIS S/s at Agamoni
3. Establishment of 1 no. New 132/33kV Substations: 2x50MVA, 132/33kV GIS S/s at Burhigaon S/S
4. Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS
5. Construction of 46 km New 400 kV Transmission Lines
6. Construction of 163.684 km New 220 kV Transmission Lines
7. Construction of 123.261 km New 132kV Transmission Lines
8. Augmentation of 14 Existing Substations (Replacement of old transformers with new transformers)
9. Augmentation of 186 km of transmission line (restringing by HTLS conductors)
10. Construction of 3 nos bay extension at 2 substation locations
11. Replacement of ground wire to OPGW for 636 kms of transmission lines and substation equipment's at substations.



3.1.1. Detailed Description of Project

The scope of work involves: Construction of 10 new 400 kV, 220 kV and 132 kV grid substations along with the associated (332.945 km) transmission lines, replacement old existing ground wire by 636km OPGW, Augmentation of 186 km of transmission line (restringing by HTLS), Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS, Construction of 3 nos bay extension at AEGCL existing S/S and Augmentation of 14 Existing Substation. The detailed project description is provided in **Table 6** and the substation location is depicted in **Figure 1** below:

Figure 1: Location of Proposed Substations



Table 6: Detailed Description of Project

S.No.	Scope of Work	Route Length in km
NEW SUBSTATIONS AND ASSOCIATED NEW TRANSMISSION LINES		
1	2x100MVA, 220/33kV GIS S/S at Bihpuria	
1.1	220KV Bihpuria (AEGCL-New) - Sonabil (AEGCL-Existing) D/C Line ** actual route length is 143.324 km. 55km line is completed by AEGCL from Sonabil end. Remaining 88.324 km is to be completed.	88.324
2	2x500MVA, 400/220/132kV GIS S/S at Rangia with 2nos. 80MVA, 400kV Line Reactors & 2 nos. 125MVAR, 400kV Bus Reactors/ 2x50MVA, 132/33kV AIS S/s at Kumarikata	
2.1	400kV LILO of 1 ckt of Balipara (PGCIL)- Bongaigaon (PGCIL) Line at Rangia (AEGCL-New) with ACSR Twin Moose Conductor	21
2.2	220kV LILO of 1 ckt of Rangia - Amingaon (Existing-AEGCL) Line at Rangia (AEGCL-New) with ACSR Zebra Conductor	20
2.3	132kV Kumarikata (AEGCL-New) - Nalbari (AEGCL-Existing) S/C Line on D/C Tower with AAAC Panther Conductor	40
2.4	1 no. 132kV Line Bay Extension at Nalbari S/s for 132kV Nalbari-Kumarikata Line	
3	2x500MVA, 400/220kV GIS S/S at Sonapur with 1 no. 63MVA, 400kV Line Reactors & 2 nos. 80MVAR, 400kV Bus Reactors	
3.1	400kV LILO of 1 ckt of Silchar (PGCIL)-Byrnihat (Meghalaya) Line at Sonapur (AEGCL-New) with ACSR Twin Moose Conductor	25
4	2x160MVA, 220/132kV & 2x50MVA, 132/33kV GIS S/S at Khumtai	

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4.1	220kV LILO of Mariani- Samaguri (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) - Samaguri (AEGCL-Existing) - S/C Line with ACSR Zebra Conductor	10.167
4.2	220kV LILO of Mariani- Samaguri (AEGCL-Existing) S/C Line 2 at Khumtai (AEGCL-New) - Samaguri (AEGCL-Existing) - S/C Line with AAAC Zebra Conductor	10.621
4.3	132kV LILO of Jorhat (W)- Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line with AAAC Panther Conductor	10.198
4.4	132kV Khumtai (AEGCL-New) - Sarupathar (AEGCL-Existing) S/C Line with AAAC Panther Conductor	61.205
5	2x100MVA, 220/33kV GIS S/s at Jakhlabandha	
5.1	220kV LILO of 220kV Samaguri-Mariani line 1 (AEGCL-Existing) at Jakhlabandha(AEGCL-New) S/C line with AAAC Zebra Conductor	2.715
6	2x100MVA, 220/33kV GIS S/s at Chhayagaon	
6.1	LILO of 220kV Azara-Boko (AEGCL-Existing) Line at Chhayagaon with AAAC Zebra	1.619
7	2x160MVA, 220/33kV GIS S/s at Shankardevnagar	
7.1	220kV Line from Shankardevnagr to MISA (PGCIL)	26.457
8	2x100MVA, 220/33kV GIS S/s at Nagaon-2	
8.1	LILO of Samaguri (AEGCL- Existing) - Sarusajai (AEGCL-Existing) 220kV D/C Line at Nagaon-2 (AEGCL-New) with AAAC Zebra Conductor	1.565
9	2x160MVA, 220/132kV GIS S/s at Agamoni	
9.1	220kV LILO of both ckt of Birpara (PGCIL) - Bongaigaon (PGCIL) D/C line at Agamoni (AEGCL- New) with ACSR Zebra Conductor	2.216
10	2x50MVA, 132/33kV GIS S/s at Burhigaon	
10.1	132kV LILO of Rowta- Sipajhar (AEGCL-Existing) S/C Line at Burhigaon (AEGCL-New) with AAAC Panther Conductor	11.858
AUGMENTATION OF TRANSFORMER CAPACITY		
1.	Narengi: 2x50 MVA, in place of 2x25 MVA, 132kV	
2.	Bornagar: 2x50 MVA, in place of 2x25 MVA, 132/33kV	
3.	Moran: 2x50 MVA, in place of 2x16 MVA, 132/33kV	
4.	Gauripur: 2x50 MVA, in place of 2x25 MVA, 132/33kV	
5.	Dibrugarh: 2x50 MVA, in place of 2x31.5 MVA, 132/33kV	
6.	Depota: 2x50 MVA, in place of 2x31.5 MVA, 132/33kV	
7.	Kahilipara: 3x50 MVA, in place of 2x31.5 MVA & 1x30 MVA, 132/33kV	
8.	Rangia: 2x50 MVA, in place of 2x25 MVA, 132/33kV	
9.	Golaghat: 2x50 MVA, in place of 2x25 MVA, 132/33kV	
10.	Sankardebnagar: 2x50 MVA, in place of 2x25MVA, 132/33kV	
11.	Kukurmara: 2x50 MVA, in place of 1x25MVA +1x16 MVA, 132/33kV	
12.	Panchgram: 2x50 MVA, in place of 2x25MVA, 132/33kV	
13.	Boko: 1x160 +1x100 MVA, in place of 1x50 +1x100 MVA, 220/132kV	
14.	Agia: 1x160 +1x100 MVA, in place of 1x50 +1x100 MVA, 220/132kV	
CONVERSION OF ONE EXISTING AEGCL S/S (132/33KV GOHPUR) FROM AIS TO GIS		
TRANSMISSION CAPACITY AUGMENTATION		



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1.	BTPS (Salekati) – Dhaligaon 132kV D/C line	76
2.	Kukurmara – Sarusajai 220kV D/C line	48
3.	Gossaigaon – Gauripur 132kV S/C line	62
	TOTAL	186
PROPOSED BAY EXTENSION		
1	Sarupathar: Two 132 kV line bays for Khumtai-Sarupathar 132 kV D/C Line	
2	Nalbari: One 132 kV line bay for Nalbari-Kumarikata 132 kV S/C Line	
REPLACEMENT OF GROUND WIRE TO OPGW		
1	Fiber Optics on balance transmission lines of AEGCL	636
2	Fiber Optics on Station Equipment's at 18 numbers of Substation (LS)	



3.2. Project Component Features

The equipment and features of 400/220 kV Rangia substation is provided in **Table 7** and **Table 8** below the remaining details of Subproject components are provided in Appendix 11

400/220/132kV Rangia GIS S/S

Table 7: Details of Subcomponents for proposed 400/220kV Rangia Substation

Sl. No.	Equipment	Nos. / Length	Details
1.400kV Inter-Connecting Transformers (ICTs)			
a.	400/220/132kV Rangia GIS S/S, 500	2nos.	500MVA two phase ICTs
2. 400kV Bays			
a.	Transformer Bays	2 nos.	
b.	Feeder Bays	2 nos.	
c.	Tie Breaker	1 no.	
3.400kV Connectivity			
a.	Erection of 400kV DC feeder with Quad Moose Conductor	21 KM	LILO of Balipara (PG) – Bongaigaon (PG) at 400kV Rangia GSS

Table 8: Features of Proposed 400/220 kV Rangia Substation

Sl. No.	Features	Description
1	Area of Land in Ha	7.47 Ha
2	Geographical coordinates	26.6442648, 91.5968102
3	Village / Town	Rangia
4	Ownership of Land	Private
5	Slope / Plain Land	Plain
6	Kind of Land	Barren
7	River/Coast (if any)	No
8	Permanent feature nearby if any	No permanent feature nearby the site
9	Distance from nearest Wildlife Sanctuary / National Park	85.2 km, Via NH 27 105.4 km, Via NH 27 and SH 6 98.1 km, Via Mushalpur - Tamulpur Road

3.3. Associated Facilities

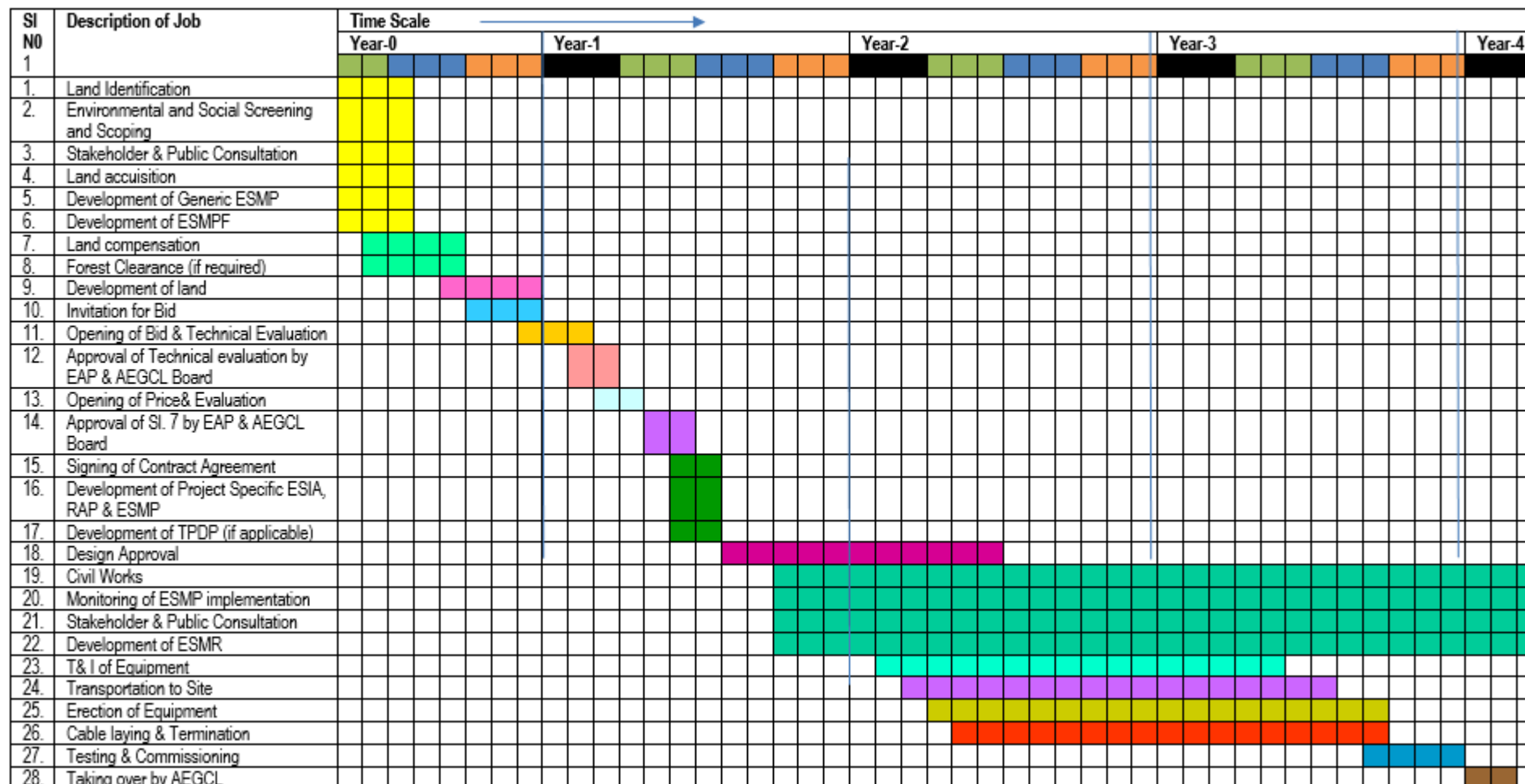
Associated Facilities are activities that are not included in the description of the Project set out in the agreement governing the Project, but which, following consultation with the Client, AIIB determines are: (a) directly and materially related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and would not be constructed or expanded if the Project did not exist.

There are no associated facilities for the project as project will only provide system strengthening for power transmission system in Assam. AEGCL is responsible to design networks with a principle to provide the power evacuation to an intrastate point.

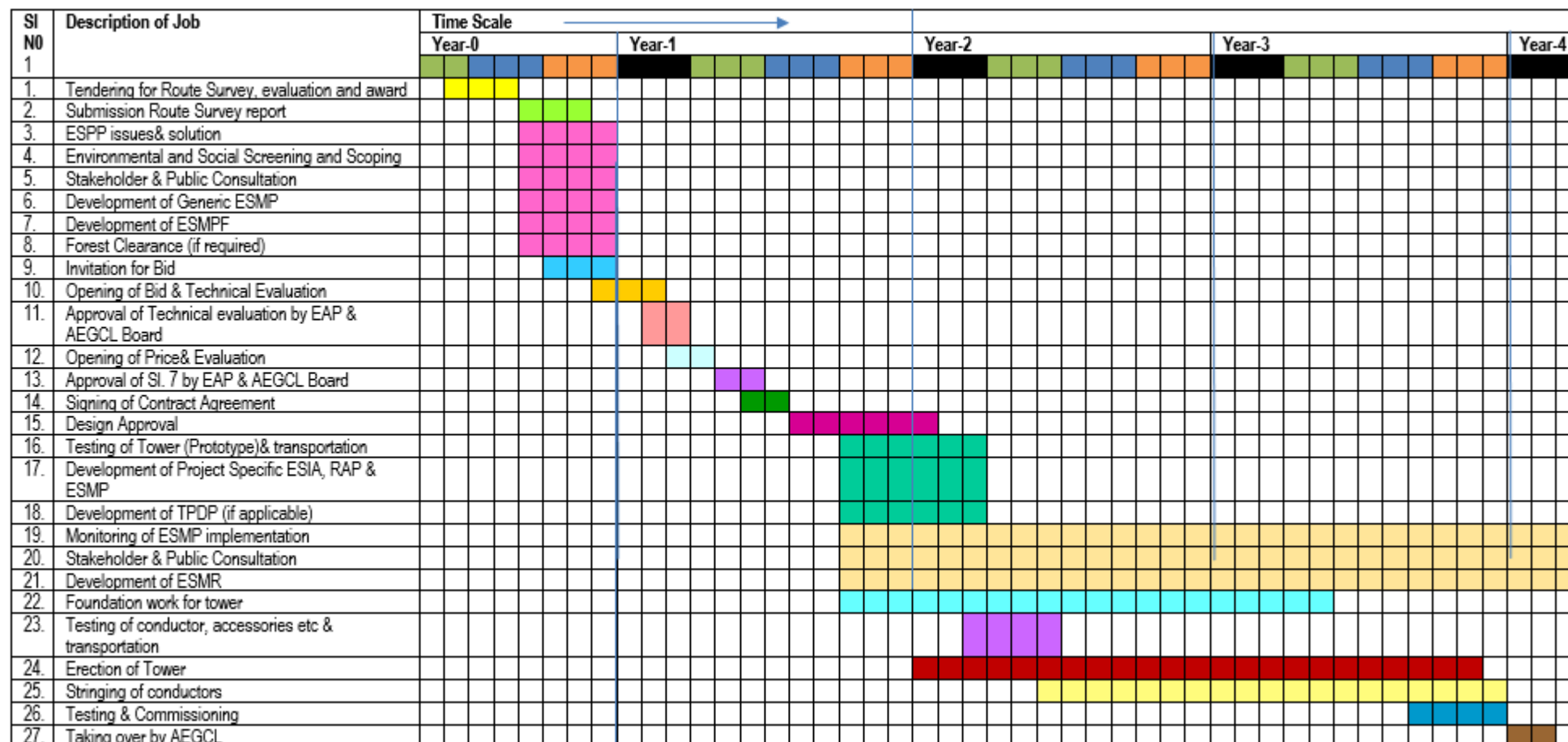


3.4. Project Implementation Schedule

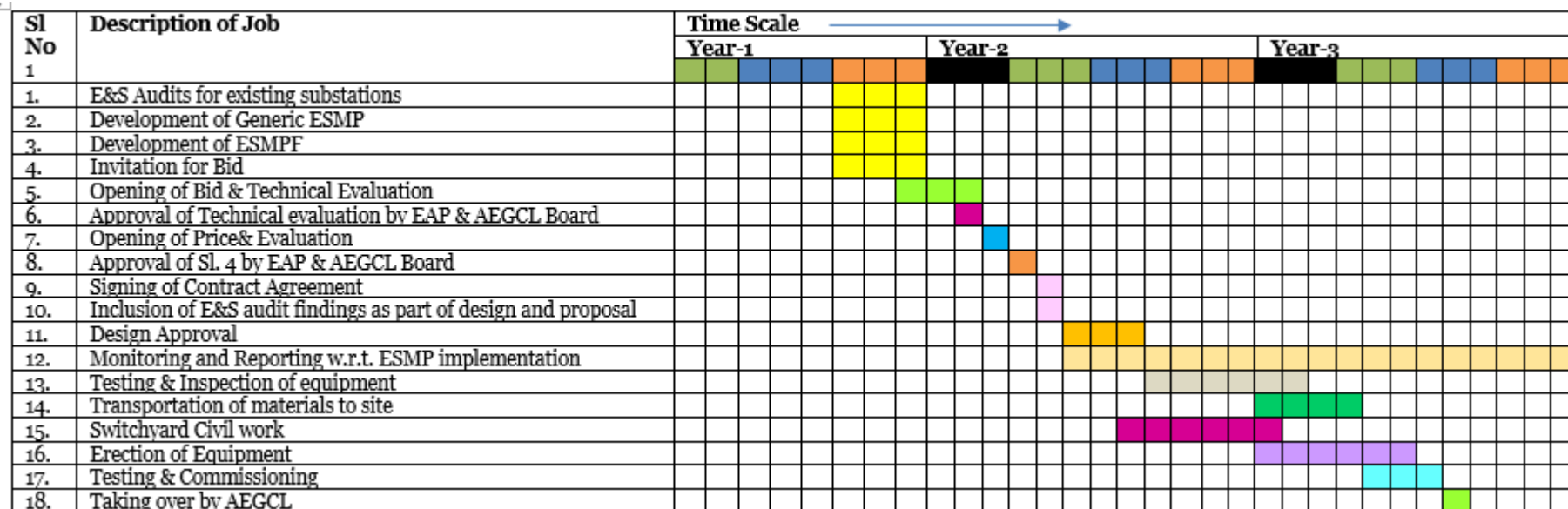
3.4.1. Bar Chart for Construction of New 400/220, 220/132, 220/33, 132/33, 132/11 kV Substations



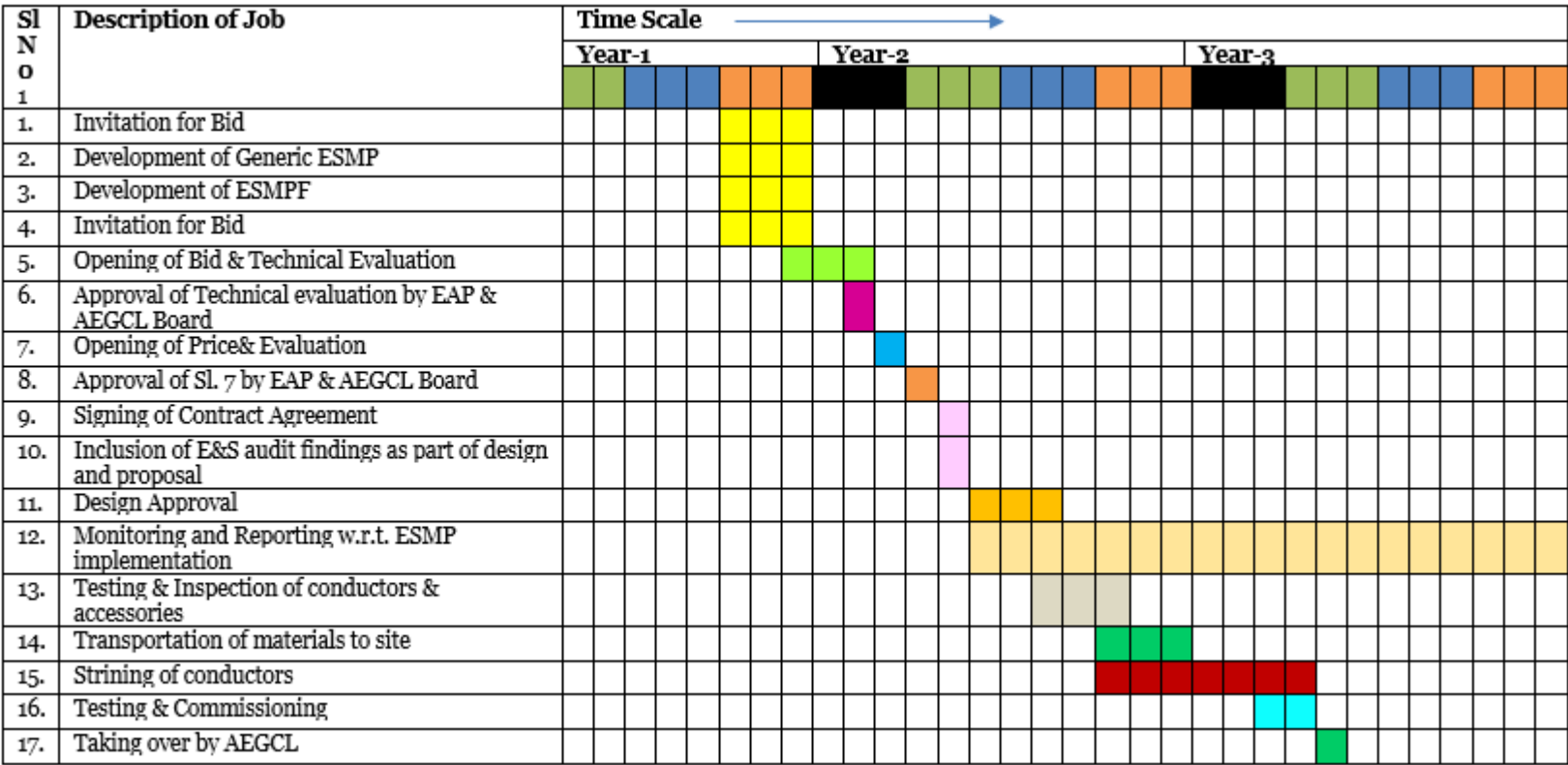
3.4.2. Bar Chart for Construction of New 400kV, 220kV, 132 kV Transmission Line



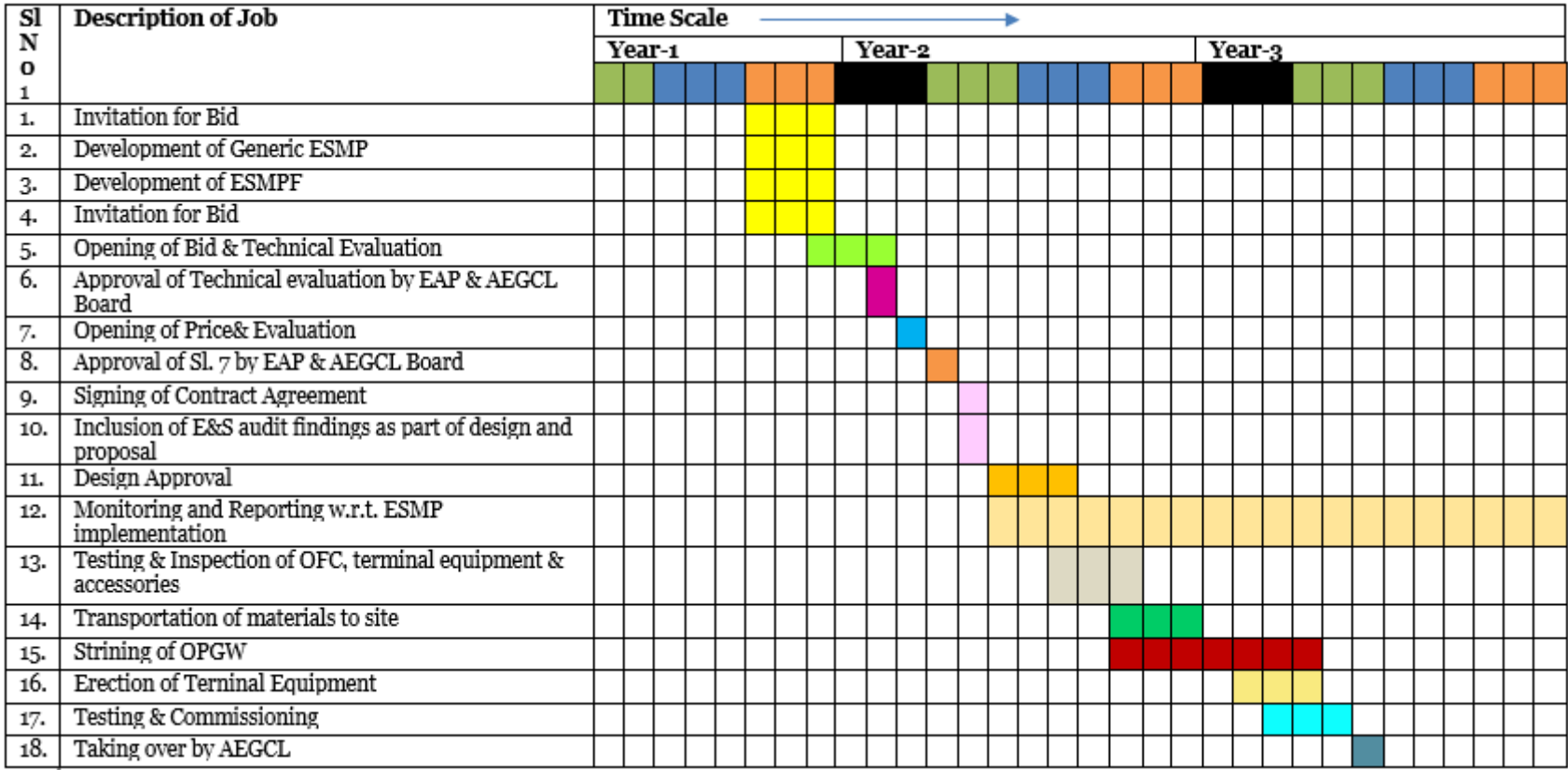
3.4.3. Bar Chart for Capacity Augmentation of Existing Substation



3.4.4. Bar Chart for Capacity Augmentation of Existing Transmission Line



3.4.5. Bar Chart for Installation of Communication System (Fiber Optics)



4. Description of Environmental and Social Baseline Conditions

The Project being spread across different geographical parts of Assam, this chapter establishes a broader level baseline environmental and social condition towards development of the ESMPF. The baseline Environmental and Social conditions of the selected substation sites visited, and Transmission Lines analyzed are included herein.

The baseline information helps in project decision making, environmental management planning and strategizing to minimize any potential impact due to the Project activities on the surrounding environment. The baseline information is furnished for:

- The physical environment (meteorological condition, air, water, land, soil, noise, etc.)
- The biological environment (ecological condition, biodiversity, etc.)
- The socio-economic and cultural environment

4.1. Location and Geography of Assam

Situated between 90-96 degrees East Longitude and 24-28 degrees North Latitude, Assam is bordered in the North and East by the Kingdom of Bhutan. Along the south lies Nagaland, Manipur and Mizoram. Meghalaya lies to the South-West, West Bengal and Bangladesh to the West.

Assam is divided into three geographic zones namely: Lower Assam, Central Assam and Upper Assam. The major subprojects sites are scattered in thirteen districts covering all the three zones within the Brahmaputra Valley.

4.2. Physical Environment

The state Assam, covering an area of 78,438 km², is administratively divided into 33 districts with 80 sub-division, 219 Development Blocks and 2202 Gaon Panchayats, out of which 3 districts with 4 sub-divisions & 16 Development Blocks are under three hill districts of Karbi-Anglong, East Karbi-Anglong and Dima Hasao. Further, four districts with eight sub-divisions are under Bodoland Territorial Council (BTC) area viz Kokrajhar, Chirang, Baksa and Udalguri. Physical Environment

4.2.1. Climate, Rainfall and Temperature

With the 'Tropical Monsoon Rainforest Climate', Assam is a temperate region and experiences heavy rainfall and humidity. The climate of Assam is humid, with a sub-tropical nature, having warm humid summers and cool dry winters. Due to its unique geographical location, along with the presence of varied physiography, Assam has an array of climatic conditions. Assam is situated in the high rainfall zone with annual average rainfall of 2297.4 mm during. The state normally receives 2% of rainfall in Winter Season (January-February), 25% in Summer Season (March-May), 65% in Monsoon Season (June-September) and 7% in Post-Monsoon Season (October-December). However, Assam is prone to floods and sometimes there is also the presence of drought like situations with the lack of rains. Thus, though the State has enough natural potentialities for growing food grains in abundance, it at times faces losses impacting on its contribution and share to the national granary, due to the presence of erratic and unpredictable weather conditions, as experienced specially during the last few years. The State had experienced 2042.20 mm rainfall in 2016 against normal rainfall of 2295.80 mm and the departure was 7% during the year from normal rainfall.

In Assam, the average annual temperature is 23.2 °C . The maximum temperature does not go beyond 32 °C and in winter the plains of Assam have a minimum temperature of about 8°C. From mid-November to mid-February the cold season prevails with the sky becoming clear and temperature going down below 15° C. The weather becomes sultry and temperature stands at 30 - 35° C towards late September.

4.2.2. Physiography and Topography



The State can be broadly divided into 3 physiographic domains: Brahmaputra valley, Central Assam Hills (Mikir Hills in Karbi Anglong and North Cachar Hill districts) and Barak valley. Majority of the areas in Assam State are floodplains of the Brahmaputra and Barak Rivers and the altitude of the plain areas vary from as low as 25 m to as high as 600 m. The eastern plains have an altitude of about 600 m. Cachar plains in the southern part of the state have an altitude of about 25 m. Central and south-central part of the state, comprising North Cachar Hills and Rengma Hills, have an altitude ranging from 300 m to 150 m.

4.2.3. Geology and Soils

The soils of state are mostly alluvial. The northern areas, which are nearer to the Brahmaputra River have new alluvium, while the southern areas or areas near the foothills have old alluvium. The areas with older alluvium are the best sites for the cultivation of tea. Accordingly, the areas with older alluvium are dotted with many tea gardens. The entire area is under humid sub-tropical climate and it receives well-distributed rainfall from May to October. The process of leaching of soils in the undulating piedmont and hilly areas and stagnation and flooding in the areas with gentle slope are very prominent. As per taxonomical classification considering the aspects like soil depth, soil drainage, soil texture, areas of occurrence, slope condition, nature of the exposed surface, vulnerability to erosion and flooding - a taxonomical classification of the soils of Assam has been suggested by the National Bureau of Soil Survey and Land Use Planning (NBSS&LUP). As per this classification, the soils of Assam belong to 4 orders, 9 sub-orders, 15 great groups, 26 sub-groups and 83 family associations. In the context of Assam, it is observed that the Inceptisols are the dominant soils followed by Entisols, Aflisols and Utisols and these occupy respectively 41.4%, 33.6%, 11.3% and 5.6% of the total geographical area of the state (NBSS&LUP, 1993).

4.2.4. Land Use Pattern

Table 9: Land Utilization in Assam

Land Use (Figure 7)	Area (in '000 ha)	Percentage (%)
Total geographical area	7844	
Reporting area for land utilization	7844	100.00
Forests	1853	23.62
Area under non-agricultural uses	1270	16.19
Barren & unculturable land	1190	15.17
Other uncultivated land excluding fallow land	529	6.74
Fallow Land	175	2.23
Net Sown Area	2827	36.04

Source: Directorate of Economics and Statistics, GoA 2014-15

4.2.5. Seismology

The great Assam earthquake of 1897 ($8 < M < 8.1$) is the largest known Indian intraplate earthquake. It raised the northern edge of the Shillong Plateau by more than 10 m, resulting in the destruction of structures over much of the Plateau and surrounding areas and causing widespread liquefaction and flooding in the Brahmaputra and Sylhet floodplains. Shaking intensity data for the earthquake are crucial for estimating future earthquake hazards in NE India and Bangladesh since similar earthquakes will no doubt recur.

The entire Assam state has been placed under seismic Zone V and therefore all districts in which the subprojects are located fall in Zone V that has highest potential for occurrence of severe earthquake. Therefore, all the project sites fall under seismic Zone V and covers areas liable to seismic intensity MM-IX¹² and above.

¹² Modified Mercalli Intensity Scale



This is the most severe seismic zone and is referred to as Very High Damage Risk Zone. The project areas lie in Zone V, where the maximum intensity could reach (MSK)¹³ IX. It must be noted that Bureau of Indian Standards (BIS) estimates the hazard on previously known earthquakes. Since the earthquake database in India is still incomplete, especially with regards to earthquakes prior to the historical period (before 1800 A.D.), these zones offer a rough guide of the earthquake hazard in any region and need to be regularly updated.

4.3. Ambient Environment

4.3.1. Ambient Air and Noise Quality¹⁴

The ambient air quality monitoring data and Noise level monitoring data was collected from Assam Pollution Control Board, the provided data includes the concentration of Sulphur Oxide, Nitrogen Dioxide and Particulate Matter at eleven locations in five districts (Refer **Table 10**) and Noise level data for seven location in one district (Guwahati, Kamrup) (Refer **Table 11**).

Table 10: Air Quality Monitoring Data (SPCB)

Station Code	Sampling Date	Name of Monitoring Station	City	Sulphur Dioxide	Nitrogen Dioxide	PM ₁₀ (µg/m ³)	Remarks
607	22/02/2019	Janiganj, Silchar	Silchar	8	13	59	Clear
567	23/02/2019	Office building of RLO, near Ithkola Market, Ghaniwala road	Silchar	6	12	49	Cloudy
606	05/02/2019	Shivdham, Tinsukia	Tinsukia	9	18	87	Clear
538	28/02/2019	Dibrugarh Office Building, Dibrugarh	Dibrugarh	5	10	34	Rainy
595	28/02/2019	Water Resources Division Office Campus, Christian Patty, near Nagaon College	Nagaon	8	16	138	Clear
603	27/02/2019	Boragaon, Dist.-Kamrup, Guwahati	Guwahati	5	16	94	Clear/Partly rainy
602	25/02/2019	Guwahati University Campus, Dist-Kamrup, Guwahati	Guwahati	6	19	106	Clear
193	29/03/2019	Head Office, Bamunimaidan, Guwahati	Guwahati	20	40	227	Clear
519	29/03/2019	ITI Building, Gopinath Nagar, Guwahati	Guwahati	9	26	273	Clear
541	29/03/2019	Near Pragjyotish College, Santipur, Guwahati	Guwahati	10	19	211	Clear
596	13/03/2019	Khanapara, Central Dairy,	Guwahati	6	16	151	Clear

¹³ Medvedev-Sponheuer-Karnik scale

¹⁴ The Ambient Air quality and Noise Level Standards for India are provided in **Appendix 8**.



Environmental and Social Management Planning Framework

		Guwahati, Dist. Kamrup					
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Source: State (Assam) Pollution Control Board

AQ Parameters 24 hour max content	SO ₂ in ug/m ³	NO ₂ in ug/m ³	TSP PM ₁₀ in ug/m ³	TSP PM _{2.5} in ug/m ³
GoI regulations -24 hour	80	80	100	60
WHO Ambient Air Quality (WB EHS 2007) Guidelines-24 hour	20	40 (Annual)	50	25

Between the GoI regulations and WHO (IFC/World Bank EHS) guidelines, the latter, which is more stringent will be followed for monitoring purposes. Data suggest that several locations would be Degraded Airshed for PM. Careful attention will be paid to dust management in vicinity of receptors for construction phase.

Table 11: Noise Level Monitoring Data (SPCB)

Date	SL No.	Location	L _{min}	L _{max}	Leq dB(A)	RemarksArea Type
28/03/19	01	At GMCH Campus, Bhangagarh	55.7	73.8	61.1	Silence Zone
	02	Assam Sachivalaya, Dispur (Near Main Gate)	67.1	78.7	70.5	Commercial Area
	03	Khanapara, In front of Veterinary college	62.0	90.3	71.0	Silence Zone
	04	Basistha Chariali, N.H-37	70.2	83.2	75.6	Commercial Area
	05	Lokhra Chariali, N.H-.37	74.4	82.0	77.9	Commercial Area
	06	Pachim Boragaon Chowk, N.H-37	65.1	89.9	78.3	Commercial Area
	07	Guwahati University Campus, (Near Environmental Building)	49.9	69.1	56.8	Silence Zone

Source: State (Assam) Pollution Control Board

Ambient Quality Standards in respect of Noise					
Area Code	Category of Area/Zone	CPCB Limits in dB(A)		IFC One Hour LAeq (dBA)	
		Day Time	Nighttime	Day Time	Nighttime
(A)	Industrial area	75	70	70	70
(B)	Commercial area	65	55	70	70
(C)	Residential area	55	45	55	45
(D)	Silence Zone	50	40	55	45

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“A”, in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period.

The more stringent standards among the GoI, IFC/World Bank EHS/WHO guidelines will be followed for monitoring purposes. Data suggest that all locations would have noise levels exceeding the existing limits. Careful attention will be paid to Noise pollution Management in vicinity of receptors during construction phase.



Air Quality and Noise Level status specific to project locations: Site visits were conducted for 10 New Substation sites site visit was conducted at 7 substations and 2 substations locations proposed for Augmentation (out of 14). Based on the secondary information acquired through consultation with local populace and the site reconnaissance survey it was observed that baseline air quality and ambient noise appeared to be within acceptable limits, and air or noise pollution poses little or no threat currently in almost all the sites. This may be attributed to the absence of any industrial establishment or any ongoing construction sites in the surroundings and low road traffic. However, in case of the proposed site for 220KV Sonapur substation (proposed new substation location adjoining 220KV Sonapur GIS substation), an operational cement factory (refer **Figure 2**) was recorded in the vicinity. Significant dust and noise generated by the factory was noticed during the site visit.

Figure 2: Industry identified in the vicinity of 220KV Sonapur Substation



Source: Site Visit

4.3.2. Surface Water Resource¹⁵

Assam is endowed with number of perennial rivers and wetlands (including lakes) locally known as *beel*. The state is drained by the networks of the Brahmaputra and the Barak rivers with a large number of associated tributaries (73 and 11, respectively). The description of Brahmaputra and Barak River Systems is provided in **Table 12** below:

Table 12: River System in Assam

River System	A Glimpse
Brahmaputra River System¹⁶	The Brahmaputra is one of the biggest rivers of the world. The Brahmaputra basin covers an area of 5,80,000 sq. km of which 1,94,413 sq. km falls in India. Brahmaputra is a perennial river, feed by snow as well as by rain. The Brahmaputra rolls down the plain of Assam east to west for a distance of 640 km up to Bangladesh border. Through its course, the river receives innumerable tributaries (about 73) coming out of the northern, northeastern and the southern hill ranges. The mighty river with a well-knit network of tributaries drains an area of 56,480 sq. km of the state accounting for 72 per cent of its total geographical area. Most of the right bank tributaries of Brahmaputra are snow

¹⁵ Bureau of Indian Standards has also recommended water quality parameters for different uses in the standard IS 2296:1992 (**Refer Appendix 8**)

¹⁶ Assam Envis



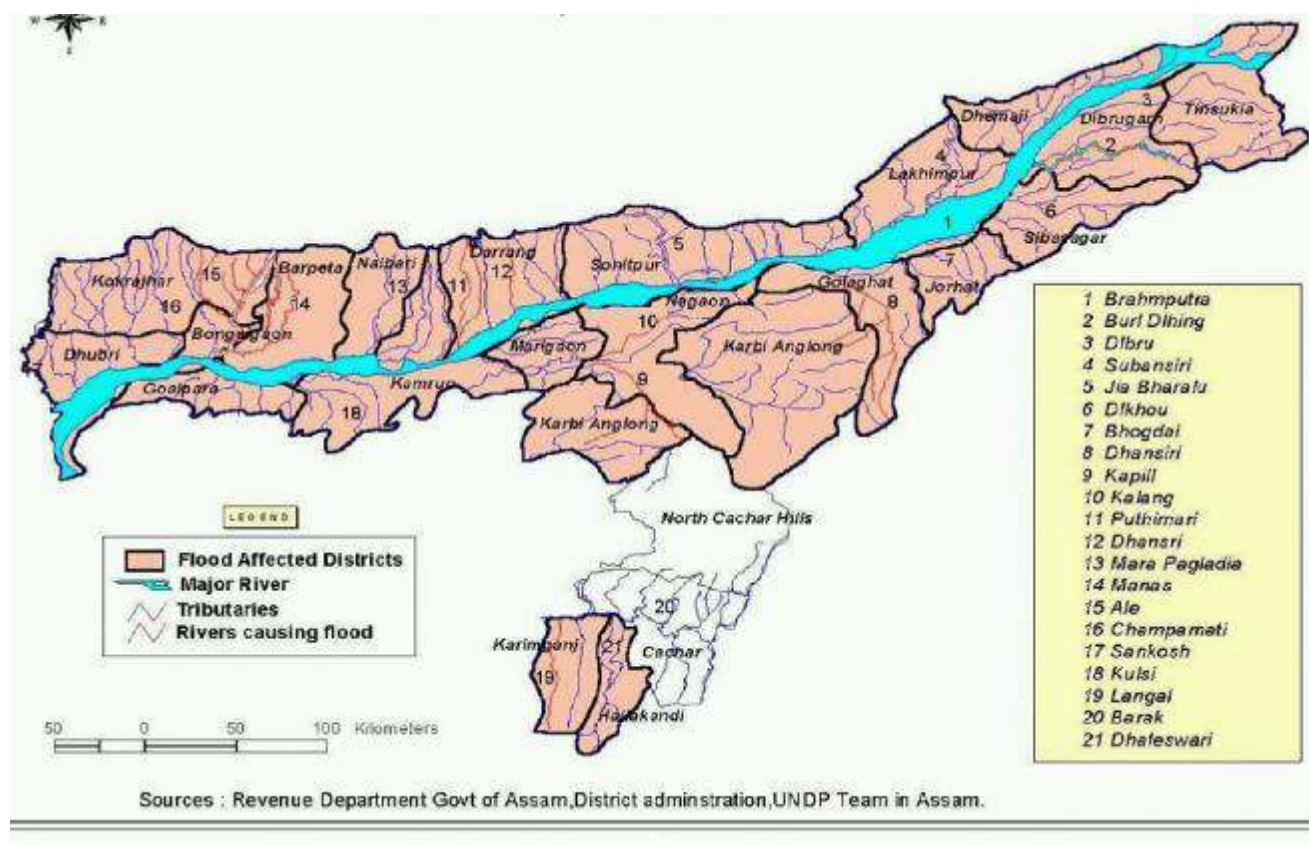
as well rain feed and are perennial. Although the left bank tributaries is mainly rain feed but perennial in nature.

The Barak River System

Barak is the second largest river system in the North East India as well as in Assam. The river with a total length of 900 km from source to mouth drains an area of 52,000 sq. km. In India and traverses a distance of 532 km up to the Indo-Bangla border. Like Brahmaputra, the Barak is also a perennial river of the state. The important north bank tributaries of Barak river are Jiri, Siri, Madhura, Jatinga and Larang, while the important south bank tributaries include Sonai, Ghagra, Katakhal, Dhaleswari, Singla and Longai. The flows of the rivers in Assam decrease considerably during the dry season. They maintained pick flow in summer rainy months.

The River Map of Assam is furnished in **Figure 3** below:

Figure 3: River Map of Assam



Source: ReliefWeb

4.3.3. Ground Water Resources¹⁷

Assam falls among the richest states in terms of potential ground water resources. The Brahmaputra valley, covering more than 70% of the total geographical area of the state, contains prolific aquifer system with water table at 5 m below ground surface. The Barak valley also has good potential for development of ground water. The recoverable recharge of ground water has been estimated at 2-million-hectare meter per year.¹⁸ The lifting of ground water through dug wells, tube wells, shallow tube wells and deep tube wells for irrigation, domestic and industrial use is very common in the state.

According to CGWB, hydro-geologically the state can be divided into three units namely consolidated formation, semi consolidated formation and unconsolidated formation. More than 75% of the state is underlain by unconsolidated formation comprising of clay, silt, sand, gravel, pebble and boulders. The Bhabar belt is about 11 to 15 km wide; the tubewells yield 27 to 59 m³/hr in this zone. The Terai zone follows immediately down slope of the Bhabar zone where the yield of the wells ranges between 80-240 m³/hr. The flood plains follow the Terai in Brahmaputra valley where the shallow tubewells yield between 20-50 m³/hr. and deep

¹⁷ Appendix 8 represents the Ambient Ground water quality standards as per Indian Standard IS: 10500:2012.

¹⁸ Central Ground Water Board (1984), Ground Water Estimation Committee, Ministry of Irrigation.

tubewells between 150-240 m³/hr. In the semi consolidated formations of Cachar district, the yield of the tube well ranges between 50 to 100 m³/hr.

As identified by CGWB, all the blocks spread over 26 districts across the state of Assam are of Safe category. None of the blocks have been reported as 'Semi-Critical', 'Critical', 'Over-exploited' category under district wise categorization of Groundwater Blocks of the state (**Table 13**).

Table 13: District Wise Groundwater Availability of Assam

718	Assam	Baksa	Baksa	Safe
719	Assam	Barpeta	Barpeta	Safe
720	Assam	Bongaigaon	Bongaigaon	Safe
721	Assam	Cachar	Cachar	Safe
722	Assam	Chirang	Chirang	Safe
723	Assam	Darrang	Darrang	Safe
724	Assam	Dhemaji	Dhemaji	Safe
725	Assam	Dhubri	Dhubri	Safe
726	Assam	Dibrugarh	Dibrugarh	Safe
727	Assam	Dima Hasao	Dima Hasao	Safe
728	Assam	Goalpara	Goalpara	Safe
729	Assam	Golaghat	Golaghat	Safe
730	Assam	Hailakandi	Hailakandi	Safe
731	Assam	Jorhat	Jorhat	Safe
732	Assam	Kamrup	Kamrup	Safe
733	Assam	Kamrup Metro	Kamrup Metro (Rural part)	Safe
734	Assam	Kamrup Metro	Urban Area	Safe
735	Assam	Karbi Anglong	Karbi Anglong	Safe
736	Assam	Karimganj	Karimganj	Safe
737	Assam	Kokrajhar	Kokrajhar	Safe
738	Assam	Lakhimpur	Lakhimpur	Safe
739	Assam	Morigaon	Morigaon	Safe
740	Assam	Nagaon	Nagaon	Safe
741	Assam	Nalbari	Nalbari	Safe
742	Assam	Sivasagar	Sivasagar	Safe
743	Assam	Sonitpur	Sonitpur	Safe
744	Assam	Tinsukia	Tinsukia	Safe
745	Assam	Udalguri	Udalguri	Safe

Source: CGWB, 2017

Table 14 presents quality issues pertaining to ground water as identified by CGWB across various district of the state of Assam.

Table 14: Quality problem recorded by CGWB

Contaminants	Districts affected (in part)
Fluoride (>1.5 mg/l)	Goalpara, Kamrup, KarbiAnglong, Naugaon, Golaghat, Karimganj
Iron (>1.0 mg/l)	Cachar, Darrang, Dhemaji, Dhubri, Goalpara, Golaghat, Hailakandi, Jorhat, Kamrup, Karbi Anglong, Karimganj, Kokrajhar, Lakhimpur, Morigaon, Nagaon, Nalbari, Sivasagar, Sonitpur, Bongaigaon, Dibrugarh.
Arsenic (above 0.05 mg/l)	Sivasagar, Jorhat, Golaghat, Sonitpur, Lakhimpur, Dhemaji, Hailakandi, Karimganj, Cachar, Barpeta, Bongaigaon, Goalpara, Dhubri, Nalbari, Nagaon, Morigaon, Darrang and Baksa

Source: CGWB

For any project footprints falling within few hundred meters of waterbody, the water quality data needs to be collected as baseline to compare impacts during construction, using GoI guidelines. The ground water quality standards are provided in Appendix 8.

4.4. Ecological Environment

Assam, one of the biodiversity hotspots occupies a special place in North Eastern India. The floristic richness has prompted many a scholar to describe Assam as the "Biological Gateway" of North East and Cradle of flowering plants. The climatic conditions cause prevalence of not and highly humid weather in this part of country and coupled with heterogenic physiography make possible luxuriant growth of a number of plant communities imparting Assam a distinct identity Phyto-geographically, many a species are endemic to this region and it is also the centre of origin for commercially important plants.



Assam is the land of enchanting aesthetic beauty with lush green hills, pastures, tea gardens, river plains and wilderness. Running and cascading through the entire length and breadth of the State are mighty rivers; the Brahmaputra in the north and the Barak in the south, which along with their tributaries nourish a wide range of precious flora and fauna in the State. The Kaziranga National Park, a UNESCO World Heritage site in the State is home to two-thirds of the world's population of the one-horned Rhinoceros. The one-horned Rhino which was almost extinct in India, with only a dozen left at the turn of last century, now stands restored to scientifically sustainable level. As per the Champion & Seth Classification of Forest Types (1968), the forests of Assam belong to seven Forest Type Groups further divided into 25 different Forest Types. Assam can boast of possessing a host of sensitive, endangered and rare animals including mammals, avian and amphibian species. These include White-winged wood Duck, Lesser Adjutant, White-rumped Vulture, Slender-billed Vulture, Green Peafowl, Tiger, Asian Elephant, Gaur, Greater Adjutant, Swamp Francolin, Bengal Florican, pigmy hog, hispid hare, and Hoolock Gibbon among many others.

Table 15: Areas of Ecological Importance in Assam

S.No.	Category	Number	Remarks
1.	National Park	5	Dibru-Saikhowa National Park, Kaziranga National Park, Manas National Park, Nameri National Park, Rajiv Gandhi Orang National Park
2.	Wildlife Sanctuaries	20	Garampani Wildlife Sanctuary, Laokhowa Wildlife Sanctuary, Bornadi Wildlife Sanctuary, Chakrasila Wildlife Sanctuary, Burachapori Wildlife Sanctuary, Panidehing Wildlife Sanctuary, Hollongapar Wildlife Sanctuary, Pabitora Wildlife Sanctuary, Sonai Rupai Wildlife Sanctuary, Bherjan - Borajan - Padumoni Wildlife Sanctuary, East K. Anglong Wildlife Sanctuary, Nambor Wildlife Sanctuary, Marat Longri Wildlife Sanctuary, Nambor - Doigrung Wildlife Sanctuary, Amchang Wildlife Sanctuary, Dehing Patkai Wildlife Sanctuary, Borail Wildlife Sanctuary, Deepar Beel Wildlife Sanctuary, Bordoibam Bilmukh Bird Wildlife Sanctuary (Proposed), North K. Anglong Wildlife Sanctuary (Proposed)
3.	Tiger Reserves	3	Manas, Nameri, Kaziranga
4.	Biosphere Reserve	2	Dibru Saikhowa, Manas
5.	World Heritage Site	2	Kaziranga, Manas
6.	Ramsar Site	1	Deepor Beel
7.	Important Bird Area (IBA)	46	Spread across the state and includes National Parks and Wildlife Sanctuaries.
8.	Elephant Reserves	5	Chirang-Ripu ER, Sonitpur ER, Dining Patkai ER, Kaziranga-Karbi Anglong ER, Dhansiri-Lungding ER

4.4.1. Forest Cover

Recorded Forest Area (RFA) in the State is 26,832 sq. km of which 17,864 sq km is Reserved Forest and 8,968 sq km is Unclassed Forest (Refer **Table 16**). In Assam, during the period 1st January 2015 to 5th February 2019, only 1 hectare of forest land was diverted for non-forestry purposes under the Forest Conservation Act, 1980 (MoEF & CC, 2019).

Five National Parks (NPs) and 18 Wildlife Sanctuaries (WLSs) constitute the Protected Areas (PAs) network covering 4.87% of its geographical area.

Table 16: Forest cover in Assam (Area in km²)

States	Geographical Area	Forest Cover 2013				Per Cent of GA	Change W.R.T ISFR 2011	Scrub
1	2	VDF	MDF	OF	Total			



Environmental and Social Management Planning Framework

Assam	78,438	2,794.86	10,278.91	15,252.74	28,326.51	35.28	-2	182
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Source: <http://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-assam.pdf>

The district wise spread of forest cover across Assam State is provided in **Table 17**.

Table 17: District Wise Forest Cover (2011 assessment)¹⁹

District	Geographical Area (km ²)	Very Dense Forest (km ²)	Mod. Dense Forest (km ²)	Open Forest (km ²)	Total (km ²)	Percent of GA	Change (2009)	Scrub
Barpeta	3,245	35	179	183	397	12.23	-4	2
Bongaigaon	2,510	33	267	221	521	20.76	3	3
Cachar	3,786	81	975	1,180	2,236	59.06	5	18
Darrang	3,481	12	91	367	470	13.5	-16	2
Dhemaji	3,237	7	124	160	291	8.99	1	10
Dhubari	2,798	21	201	196	418	14.94	1	10
Dibrugarh	3,381	29	165	564	758	22.42	0	0
Goalpara	1,824	1	71	265	337	18.48	1	8
Golaghat	3,502	6	122	397	525	14.99	4	0
Hailakandi	1,327	13	373	400	786	59.23	0	5
Jorhat	2,851	2	113	498	613	21.5	3	0
Kamrup	4,345	68	612	753	1,433	32.98	1	26
Karbi Anglong	10,434	566	3,819	3,554	7,939	76.09	-19	24
Karimganj	1,809	3	318	539	860	47.54	4	48
Kokrajhar	3,169	208	716	220	1,144	36.1	-19	2
Lakhimpur	2,277	4	118	171	293	12.87	5	6
Morigaon	1,704	6	41	86	133	7.81	1	4
North Cachar Hills	4,888	135	1,553	2,562	4,250	86.95	-6	1
Nagaon	3,831	40	353	403	796	20.78	7	8
Nalbari	2,257	4	70	208	282	12.49	0	0
Sibsagar	2,668	8	144	543	695	26.05	2	1
Sonitpur	5,324	56	280	624	960	18.03	7	0
Tinsukia	3,790	106	699	731	1,536	40.53	0	4
Grand Total	78,438	1,444	11,404	14,825	27,673	35.28	-19	182

4.4.2. Forest Types

¹⁹ <https://data.gov.in/resources/district-wise-forest-cover-assam> (Forest Survey of India, 2011)



In the “Revised Survey of Forest Types in India”, Champion and Seth²⁰ categorized as many as 51 different forest types/sub types for the north-east region. However, broadly speaking the forests in Assam can be divided into the following types/sub-types:

Tropical Wet Evergreen Forests are found in the districts of Golaghat, Jorhat, Sivsagar, Tinsukia, Dibrugarh and in a narrow stretch in Lakhimpur and Dhemaji districts along foothills. These forests also occur in the southern part of the state at lower elevations in Borail range and in Loharbund, Sonai, Longai and Dholia Reserve Forests in Cachar and Karimganj districts. Top canopy consists of *Dipterocarpus macrocarpus* (hollong), *Ailanthus integrifolia* (Borpat), *Altingia exelsa* (Jutuli), *Artocarpus chaplasi* (sam), etc. The middle canopy consists of *Mesua ferrea* (Nahar), *Michelia champaka* (Teeta chopra), etc. Third storey is bamboo, etc. Forests in Southern Assam have, however, top canopy consisting of *Dipterocarpus terbinatus* (Garjan), *Palanquium polyanthum* (Kurta), *Diospyros embryopteris* (Kendu), etc. Middle canopy has *Mesua ferrea* (Nahar), *Bischofia javanica* (Urium), *Podocarpus nerifolia* (Jiri), etc. The third storey has bamboo etc.

Tropical Semi Evergreen Forests have mostly medium sized trees with few large trees. Shrubs, lianas, climbers, orchids and ferns grow copiously. At the fringe, bamboos and canes occupy the space. Species association and frequency of their occurrence vary from forest to forest, but the ones commonly found are *Actinodaphnae obovata* (Petarichawa), *Aesculus* species (Ramanbih), *Artocarpus chaplasi* (Sam), *Albizia stripulata* (Siris), *Albizia procera* (Koroi), *Lagerstromia parviflora* (Sida), *Lagerstromia speciosa* (Ajar), *Anthocephalus chinensis* (Kadam), *Duabanga grandiflora* (Khakan), *Castonopsis* species (Hingori, Dhobahingori, Kanchan), *Dillenia indica* (Ou-tenga), *Bauhinia purpurea* (Kanchan), *Magnolia insignis* (Phulsopa), *M.griffithii* (Gahorisopa), *M.bailonii* (Khariksopa), *Terminalia belerica* (Bhomora), *T.chebula* (Silikha), *Terminalia myrocarpus* (Hollock), *Pterospermum acerifolium* (Hati pulia), *Trewia nudiflora* (Bhelkor), etc.

Moist Deciduous Forests can further be described as Sal Forests and Mixed Deciduous Forests. Sal Forests occupy considerable forest area in the Central and Lower parts of the State in the Districts of Nagaon, Morigaon, Kamrup, parts of Nalbari and Barpeta, Darrang, Dhubri, Kokrajhar and Goalpara. In these forests, Sal grows in association with *Lagerstroemia* species (Jarul, Ajar), *Schima Wallichii* (Ghugra), *Stereospermum personatum* (Paruli), *Adina cordifolia* (Haldu), *Artocarpus* species (Sam), *Ficus* species (Bor, Dimoru, Dhupbor, Bot, Athabor, tengabor, Lotadioru, Khongaldimoru), *Bischofia javanica* (Uriam), *Gmelina arborea* (Gomari), *Michelia champaka* (Teeta champa), *Terminalia* species (Hilikha, Bhomora, Bahera), *Toona ciliata* (Poma), etc.

Moist Deciduous Mixed Forests occur at the foothills in Lakhimpur, Dhemaji, Karbi-Angong and N.C. Hills districts. Trees are mostly deciduous with sprinkling of few evergreen and semievergreen species. Important plant species growing in these forests include *Adina cordifolia* (Haldu), *Albizia* species (Siris, Kolasiris, Koroi, Sau), *Alstonia scholaris* (Satiana), *Artocarpus chaplasi* (Sam), *Careya arborea* (Kumbhi), *Dalbergia* species (Sissoo, Medelua), *Ficus* species (Bot, Bor, Dimoru), *Lagerstroemia* species (Jarul, Ajar), *Mallotus* species (Senduri, Joral, Dudhloti), etc. Bordering Moist Deciduous Forests in rain shadow areas are found forests, which have been referred to, as “Dry Forests” by Kanjilal. Important species include, *Aegle marmelos* (Bel), *Albizia* species (Siris), *Cassia fistula* (Sonaru), *Bombax ceiba* (Simul), *Alstonia scholaris* (Satiana), *Ficus bengalensis* (Bor), *Litsea* species (Loban, Bagnola, Mezankori, Honwalu, Digloti) *Melia azedarach* (Neem), *Moringa oleifera* (Sajana), *Oroxylum indicum* (Bhatgila), *Mallotus* species (Senduri), *Terminalia belerica*, *T.chebula*, etc.

Sub-tropical Broad Leaf Hills forests and Sub-tropical Pine forests occur in the districts of Karbi-Anglong and N. C. Hills. Species commonly occurring are *Alseodaphne petiolaris* (Banhanwalu), *Antidesma bunius*, *Betula alnoides*, *Cleidon speciflorum* etc. Higher up pure stands of *Pinus kesiya* (Khasi-pine) are found, particularly in the Hamren sub-division in Karbi-Anglong district.

Grassland and Savannahs are grass dominated biomes and form the major part of vegetation in Kaziranga NP, Orang N.P., Dibru-Saikhowa N.P., Pobitora, Sonai-Rupai, Laokhowa, Barnadi, Burachapori Wildlife Sanctuaries and some parts in Manas National Park. Grasslands support important wildlife population in Assam. Important grasses are *Apluda mutica*, *Phragmatis karka*, *Sclerostachya fusca*, *Saccharum* species, *Arundodonax*, etc. These species grow gregariously at the onset of monsoon and grow even up to 6 m-tall.

²⁰ A Revised Survey of the Forest Types of India, Harry G. Champion and S.K. Seth, Natraj, 2005, Reprint, xxviii, 404 p, tables, figs, ISBN: 8181580613



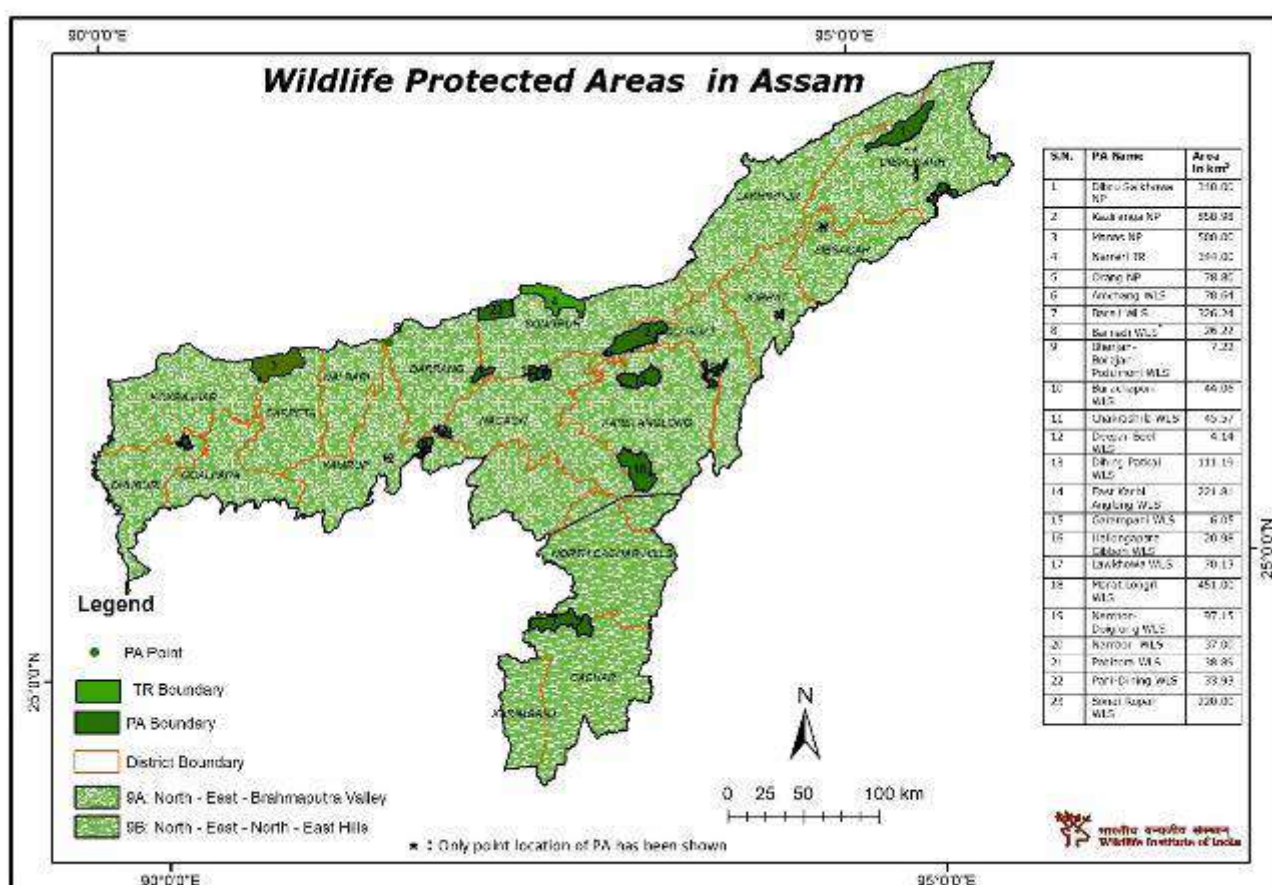
Littoral and Swamp forests have almost lost their identity because of biotic pressure on land. Presently, sedges and grasses form the largest component of vegetation. Important species include *Ageratum conyzoides*, *Alocasia* species, *Alpinia* species, *Amaranthus* species, *Bacopa* species, *Blumea* species, *Bombax* species, *Crotalaria* species, etc.

No subproject falls within Reserve Forest.

4.4.3. Protected Areas

In Assam, the protected areas (PAs) network consists of 5 National Parks, and 20 Wildlife Sanctuaries (including 2 proposed WLSs). All these NPs and WLSs hold a large number of endangered and local species (Refer **Figure 4** and **Table 18**). Assam has five Elephant Reserves (Sonitpur ER (1,420 sq km), Dehing-Patkai ER (937 sq. km), Kaziranga-Karbi Anglong ER (3,270 sq. km), Dhansiri-Lungding ER (2,740 sq. km), and Chirang-Ripu ER (2,600 sq. km) and eight (8) Elephant Corridors connect these Elephant Reserves, PAs and nearby forests located in the neighboring states. No subprojects will fall into the protected areas.

Figure 4: Protected Area in Assam



Source: Wildlife Institute of Assam

Table 18: Protected Areas of Assam

S.No.	National Park/Wildlife Sanctuary	Location (District)	Key Wildlife Species found
1.	Kaziranga National Park	Golaghat, Nagaon & Sonitpur	Rhino, Swamp Deer, Wild Buffalo, Tiger, Elephant, Hoolock Gibbon, Capped Langur, Home to 25 globally threatened and 21 near threatened species of birds
2.	Manas National	Chirang and	Rhino, Elephant, Tiger, Pygmy Hog, Hispid hare, Golden



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S.No.	National Park/Wildlife Sanctuary	Location (District)	Key Wildlife Species found
	Park	Baksa	Langur, Assamese Macaque, Rhesus Macaque, Leopard, Golden Cat, Fishing Cat, Leopard Cat, Jungle Cat, Large Indian civet, Small Indian civet, Toddy Cat
3.	Rajiv Gandhi Orang National Park	Udalguri and Sonitpur	Rhino, Tiger, Elephants, Hog Deer, Wild Pig, Pygmy Hog, 222 species of Birds (Greater Adjutant Stork, Lesser Adjutant, etc.)
4.	Nameri National Park	Sonitpur	Tiger, Leopard, Elephant, Gaur, Wild Pigs, Sambar, Barking Deer, Slow Loris, Capped Langur, White Winged Wood duck, Lesser Adjutant Stork, Greater spotted Eagle, White rumped vulture, Long billed vulture, Black bellied Tern Rufous-necked Hornbill, Wreathed Hornbill, Great Pied Hornbill, etc.
5.	Dibru-Saikhowa National Park	Dibrugarh and Tinsukia	Tiger, Elephant, Leopard, Jungle Cat, Bears, Small Indian Civet, Squirrels, Gangetic Dolphin, Slow Loris, Assamese Macaque, Rhesus Macaque, Capped Langur, Hoolock Gibbon.
6.	Bherjan-Borajan-Padumoni WLS	Tinsukia	Hoolock Gibbon, Capped Langur, Pig-tailed, Macaque, Macaque, Slow Loris and Rhesus Macaque
7.	Panidehing WLS	Sivasagar	Elephants, Lesser Adjutant Stork, Greater Adjutant, Swamp Francolin, Spot-billed Pelican, White-rumped Vulture, Greater Spotted Eagle, Slender-billed Vulture, Pallas's Fish-eagle
8.	Hollongpar Gibbon WLS	Jorhat	7 Primates (Hoolock Gibbon, Stump-tailed Macaque, Capped Langur, Pig-tailed Macaque, Assamese Macaque, Slow Loris and Rhesus Macaque)
9.	Nambor-Doigurung WLS	Golaghat	Gaur, Elephants, Hoolock Gibbon
10.	Garampani WLS	Karbi Anglong	Elephants, White-winged Duck, Lesser Adjutant Stork
11.	Nambor WLS	Karbi Anglong	Gaur, Elephants, Hoolock Gibbon
12.	East Karbi Anlong WLS	Karbi Anglong	Gaur, Elephants, Tiger, Hoolock Gibbon
13.	Marat Longri WLS	Karbi Anglong	Tigers, Leopards, Gaur, Elephants, Hoolock Gibbon
14.	Burhachapori WLS	Sonitpur	Elephants, Aquatic Birds, Tiger, Bengal Florican
15.	Laokhowa WLS	Nagaon	Elephant, Tiger, Asiatic Wild Buffalo, Bengal Florican
16.	Pabitora WLS	Morigaon	Rhino, Leopards, Barking Deer, Lesser Adjutant, Greater Adjutant, White-bellied Heron, Greater Spotted Eagle
17.	Sonai-Rupai WLS	Sonitpur	White Winged wood duck, Elephant, Tiger, Gaur
18.	Barnadi WLS	Udalguri	Hispid Hare, Pygmy Hog, Elephants, Tiger
19.	Chakrasila WLS	Kokrajhar	Golden Langur, Gaur
20.	Dihing-Patkai WLS	Dibrugarh and Tinsukia	Hoolock Gibbon, Elephants, White Winged wood duck, Tiger



S.No.	National Park/Wildlife Sanctuary	Location (District)	Key Wildlife Species found
21.	Borail WLS	Cachar	Serow, Himalayan Black bear, Hoolock Gibbon
22.	Amchang WLS	Kamrup(Metro)	Elephant, Gaur, Leopard
23.	Deepor Beel Wildlife Sanctuary	Kamrup (Metro)	Greater Adjutant Stork, Whistling Teal, Open Billed Stork, egrets, herons
24.	North Karbi Anglong Wildlife Sanctuaries (Proposed)	Karbi Anglong	Tiger, Lesser cats, Elephant, Gaur, Sambar, Bears, Barking deer, Rhesus macaque, Hoolock gibbon, Capped langur, Slow loris
25.	Bordoibam Bilmukh Bird Sanctuaries (Proposed)	Dhemaji and Lakhimpur	Kingfishers, Large whistling Teal, Lesser Adjutant Stork, Spotted Dove, Pheasant tailed Jacana, Bronze winged Jacana, Indian River Tern, Black Headed Gull, White Wagtail, Black Headed Oriole, Purple Moorhen, Openbill Stork

Source: <https://forest.assam.gov.in/>

4.4.4. Wetlands

According to National Wetland Atlas²¹ total 5,097 wetlands have been recorded in the state of Assam. In addition to that, 6,081 small wetlands (of < 2.25 ha) have also been identified. Total wetland area as estimated in the Atlas is 764,372 ha that is around 9.74 per cent of the total geographic area of the state. Natural wetlands dominate the state. The major wetland types are river/stream accounting for 84 % of the wetlands (637,164 ha), lake/pond (51,257 ha), waterlogged (47,141 ha) and ox-bow lake (14,173 ha). There are two reservoir/barrages mapped having total 2,833 ha area, which are the major man-made wetland type. Aquatic vegetation is observed in lake/pond, waterlogged, riverine wetland type. The geographical coverage of various types of wetlands and Wetland map of the state are as follows (**Table 19** and **Figure 5**).

Table 19: Area of wetlands in Assam

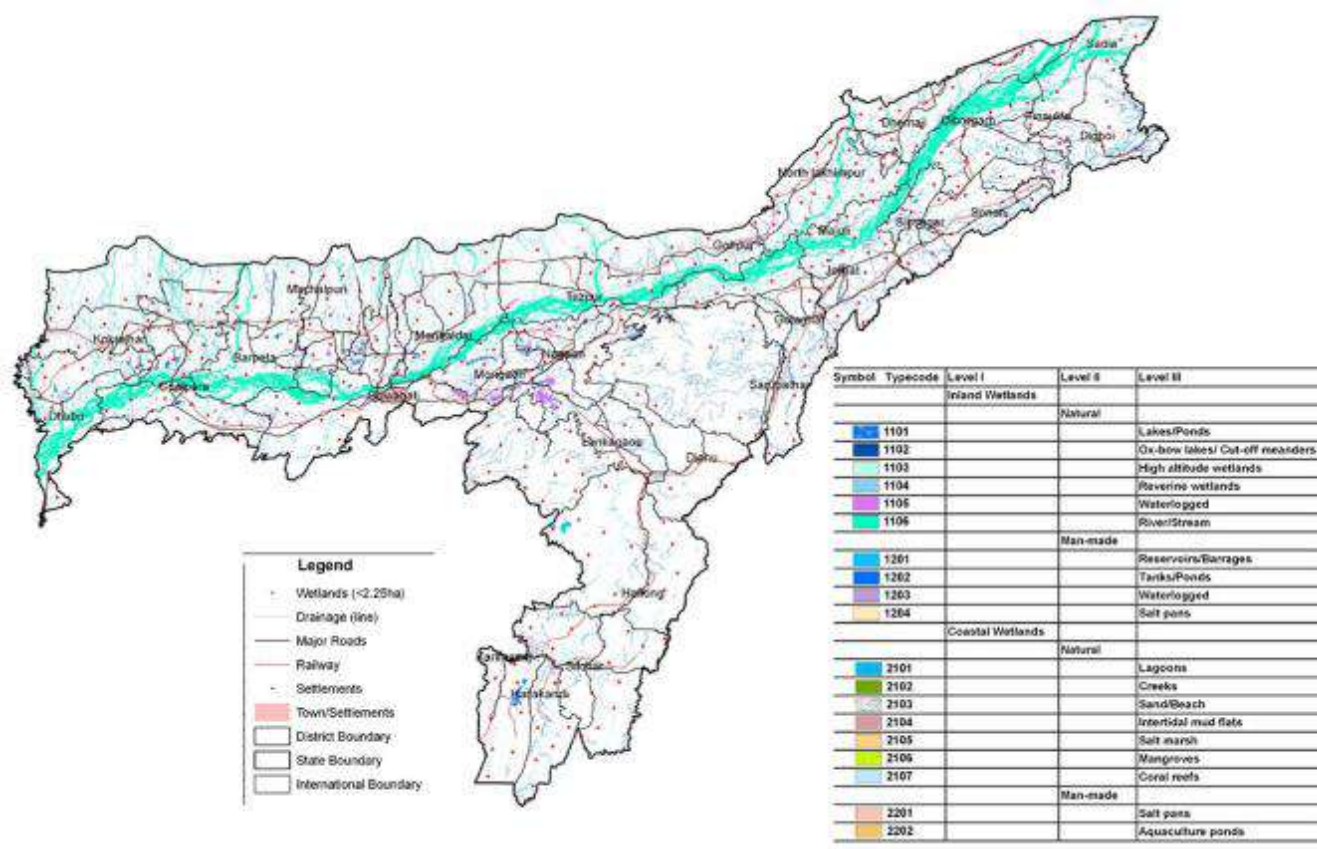
Assam State	Total Geographic Area (sq.km)	Area of Wetlands (in Ha)									
		Lake/Pond	Ox-bow lake Cutoff Meander	Riverine Wetland	Natural Waterlogged	River / Stream	Reservoir Barrage	Tank/Pond	Waterlogged (Manmade)	Wetland of <2.25ha	Total
Area Coverage	78,438	51,257	14,173	4,258	47,141	637,164	2,833	921	544	6,081	764,372
Numbers		1175	873	139	2461	213	2	180	54	6,081	11,178
% of Total Wetland Area		6.71	1.85	0.56	6.17	83.36	0.37	0.12	0.07	0.80	

Source: National Wetland Atlas

²¹ Space Applications Centre (ISRO), Ahmedabad



Figure 5: Wetland Map of Assam



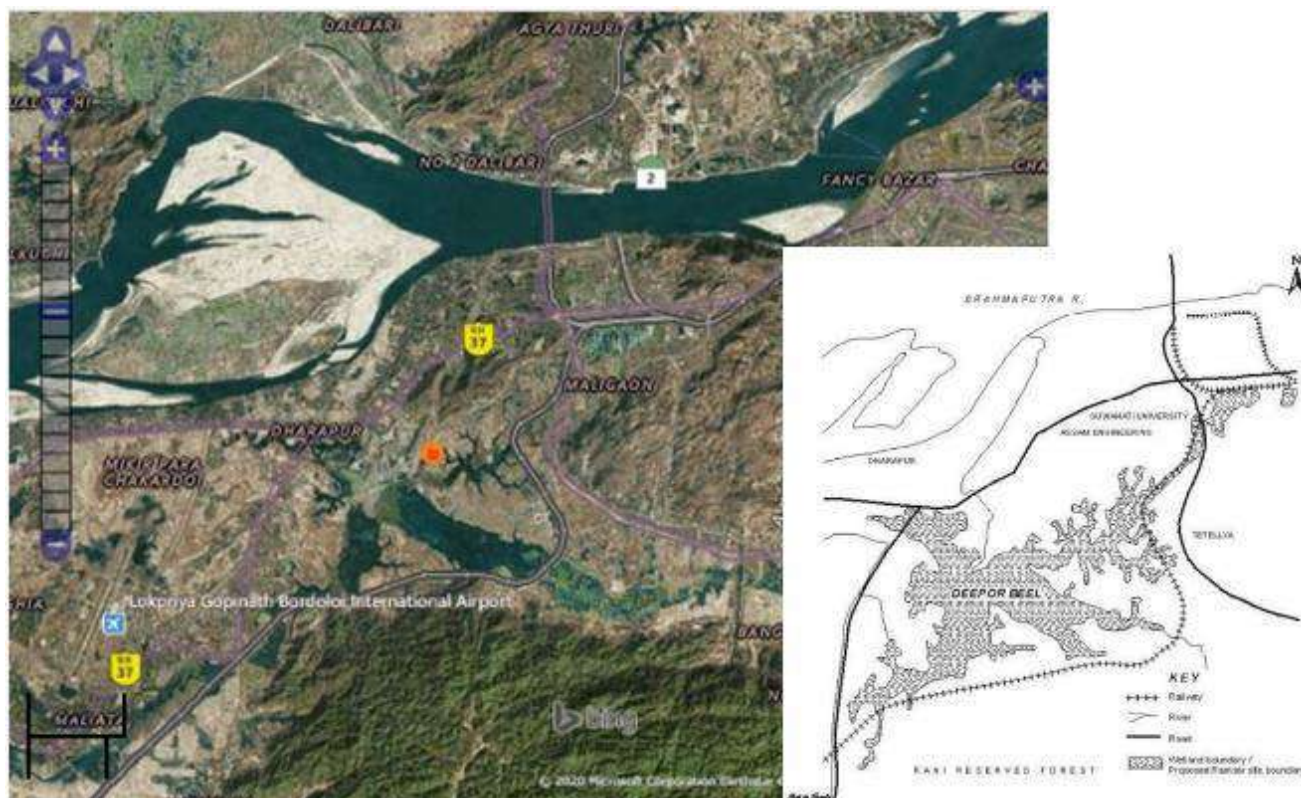
Deepor Beel: The Ramsar Site of Assam²²

The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands, recognizing the fundamental ecological functions of wetlands and their economic, cultural, scientific, and recreational value. There are currently over 2,200 Ramsar Sites around the world and India has 27. Deepor Beel is among these 27 sites and the only Ramsar Site in Assam (Refer **Figure 6**). The site located near Guwahati city is a freshwater lake formed in the abandoned channel of Brahmaputra River. It is a large natural wetland having great biological and environmental importance besides being the only major storm water storage basin for the Guwahati city.

There is no identified migratory route as of now. India's National Action Plan for the Central Asian Highways aims to identify the various migratory bird routes in India including Assam. Pilot studies are in the offing.

²² Ramsar Sites Information System

Figure 6: Location of Deepor Beel



Source: Ramsar Sites Information System

4.5. Social Environment

4.5.1. Demography profile of Assam²³

The Population of Assam according to the 2011 census stands at about 31 million, making it the 14th most populated state in India. The state makes up about 2.5% of the country's population with a growth rate of 16.93%. The state is spread over an area of about 78,000 sq. km. making it the 16th largest state in the country in terms of area. The density of population is almost equivalent to the national average. The state has a growth rate of about 17% which is again very close to the national growth rate of about 17%. The population of the state is rising considerably due to rapid efforts towards development and progress. The literacy rate in the state is about 73% a figure that has improved tremendously in the last few years due to the consistent efforts of the government. The sex ratio in Assam exceeds the national average by a good 30 points and is one of the better states in the country with respect to the sex ratio. The demographic profile of the state is given in **Table 20** below:

Table 20: Demographic profile of Assam state

Description	Status (2011 Census)	Status (2001 Census)
Population	31,205,576	26,655,528
Male	15,939,443	13,777,037
Female	15,266,133	12,878,491
Population growth (in %)	17.07	18.85
Sex Ratio	958	935
Child Sex Ratio	962	965
Density/km ²	398	340
Area (Km ²)	78,438	78,438
Total child population (0-6 years)	4,638,130	4,498,075

²³ http://asmenviis.nic.in/Database/Demography_843.aspx

Male Child Population (0-6 years)	2,363,485	2,289,116
Female child population (0-6 years)	2,274,645	2,208,959
Literacy (in %)	72.19	63.25
Male literacy (in %)	77.85	71.28
Female literacy (in %)	66.27	54.61

Out of the total population of Assam, 14.10% people live in urban regions, whereas 85 percent of the population resides in areas classified as rural. The details of population distribution and average literacy rate in Urban and Rural area of Assam are provided in the **Table 21** below:

Table 21: Rural and Urban distribution of population

Description	Rural	Urban
Population (%)	85.90 %	14.10 %
Total Population	26,807,034	4,398,542
Male Population	13,678,989	2,260,454
Female Population	13,128,045	2,138,088
Population Growth	15.47 %	27.89 %
Sex Ratio	960	946
Child Sex Ratio (0-6)	964	944
Child Population (0-6)	4,187,323	450,807
Child Percentage (0-6)	15.62 %	10.25 %
Literates	15,685,436	3,492,541
Average Literacy	69.34 %	88.47 %
Male Literacy	75.40 %	91.81 %
Female Literacy	60.05 %	79.85 %

Tribal Population in Assam:

In Assam there are as many as 23 tribal communities which constitute 12.82 per cent of the total population of the state. The tribes of Assam may broadly be divided into two categories: plain tribes and hill tribes. The plain tribes mainly inhabit the plain areas of the state and the hill tribes are mainly concentrated in the hilly areas. Bodo Kacharis constitute the largest tribal group in Assam who account for 38 per cent of the total tribal population of the state. Next to the Bodo Kacharis, the Mishings constitute 16.16 percent of the total tribal population.

The district wise breakup of tribal population in Assam shows that in North Cachar Hills district the tribals constitute 65.54 per cent of the total population of the district. In Karbi Anglong district, the tribals constitute 51.56 per cent of the total population of the district. In Dhemaji district, they constitute 43.92 per cent and in Kokrajhar district they constitute 41.15 per cent. A significant percentage of tribal population in the districts of Kamrup, North Cachar Hills, Karimganj, Dibrugarh and Hailakandi are urban. Their percentages are 11.83 (Kamrup), 11.76 (North Cachar Hills district), 8.68 (Karimganj), 7.93 (Dibrugarh) and 6.72 (Hailakandi).

Among the Hill Tribes the Karbi and the Dimasa are the most important groups. The Karbis are concentrated in the Karbi Anglong district and the foothills area of Nagoan and Kamrup districts while the Dimasa Kacharis are mainly found in the North Cachar district. Besides, Hajong, Hmar, Rengma, Naga, Kuki, Garo are also dominant groups inhabited in the hills of Assam. Rest of the tribal groups belong to the plain tribes²⁴.

Among STs, Boro represents nearly half of the total ST population of the state (40.9 per cent). Miri (17.8 per cent), Mikir (10.7 per cent), Rabha (8.4 per cent), Kachari (i.e. Sonowal Kachari) (7.1 per cent), and Lalung (5.2 per cent) are the other major STs each having 5 per cent or above of total STs. Along with Boro they constitute 90 percent ST population of the state. Besides them, Dimasa constitutes 3.4 per cent and Deori 1.2 per cent of the total ST population of the state. The rest of the STs are very small in their population size. The list of STs along with population is provided in **Table 22** below:

Table 22: Scheduled Tribes of Assam

²⁴ Spatial Distribution of Tribal Population and Inter Tribal Differences in Population Growth: A Critical Review on Demography and Immigration in Assam; <http://www.iosrjournals.org/iosr-jhss/papers/Vol3issue3/Do332330.pdf?id=5708>



Environmental and Social Management Planning Framework

Name of the Scheduled Tribe	Total Population	Male	Female	Presence in PA
All Scheduled Tribes in Assam	3884371	1957005	1927366	NA
Chakma	2032	1043	989	NA
Dimasa, Kachari	102961	51832	51129	NA
Garos	25315	12684	12631	NA
Hajong	436	223	213	NA
Hmar	15745	7964	7781	NA
Khasi, Jaintia, Synteng, Pnar, War, Bhoi, Lyngngam	15936	7916	8020	NA
Any Kuki Tribes	33399	17220	16179	NA
Lakher	37	20	17	NA
Man (Tai speaking)	1269	644	625	NA
Any Mizo (Lushai) tribes	880	419	461	NA
Karbi	430452	217758	212694	NA
Any Naga tribes	29767	14905	14862	NA
Pawi	3	1	2	NA
Syntheng	5	2	3	NA
Lalung	18252	9128	9124	NA
Barmans in Cachar	6716	3398	3318	NA
Boro, Borokachari	1361735	682931	678804	NA
Deori	43750	21938	21812	NA
Hojai	642	327	315	NA
Kachari, Sonwal	253344	127692	125652	NA
Lalung	182663	91340	91323	NA
Mech	9883	4968	4915	NA
Miri	680424	345786	334638	NA
Rabha	296189	148887	147302	NA
Dimasa	19702	9738	9964	NA
Hajong	34253	17385	16868	NA
Singpho	2342	1175	1167	NA
Khampti	1106	566	540	NA
Garos	136077	68594	67483	NA



4.5.2. Economic Development

Land Utilization Statistics:

As per the Land Utilization Statistics for the year 2014-15(Provisional), the total reporting area of the State was 78.44 lakh hectares. The various land classifications and their areas are given in **Table 23** below:

Table 23: Land utilization statistics of Assam state

Land Components	Area
Total Reporting Area	78.44 lakh hectare
Net sown area	28.27 lakh hectare
Area under forest	18.53 lakh hectare
Area under Non-agricultural uses	24.60 lakh hectare
Uncultivable area	5.29 lakh hectare
Fallow Land area	2.23 lakh hectare
Land under water	2.15 lakh hectare
Social Forestry	0.11 lakh hectare
Gross cropped area	40.83 lakh hectare

The area sown more than once has decreased from 12.80 lakh hectare in 2013- 14 to 12.55 lakh hectare in 2014-15 while net cropped area increased from 28.20 lakh hectare in 2013-14 to 28.27 lakh hectare in 2014-15. Thus, the ratio of area sown more than once to the net area sown was 44 percent during 2014-15 compared to 45 percent during 2013-14. The ratio of net sown area to gross cropped area, on the other hand, was calculated at 39 percent during the year 2014-15 compared to 68 percent during the year 2013-14

Agriculture:

Assam's economy is primarily based on agriculture. Over 75 percent of the state's population depends on agriculture as farmers, agricultural laborer, or both for their livelihood. Almost 86% of an estimated 26.81 million of the state's population (2011), live in rural areas. As compared to other states of India, Assam is still dependent on the agricultural sector. Total land under cultivation was 2.83 million hectares in 2014-15 which almost 36 percent of total geographical land area of the state.

The average size of land holding per household was only 1.10 hectares during the year 2014-15 and more than 85 percent of farmer families are either small or marginal farmers with average land holding of only 0.63 hectare. However, agriculture as a sector still continues to support more than 75 percent of its population, either directly or indirectly, providing employment and support to more than 50 percent of its total workforce. The average crop yield for individual crops is provided in **Table 24** below:

Table 24: Average Yield of Crop in Assam

Name of Crop	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16 (P)
Rice	1445	1634	1765	1982	1876	2090	2101	2119	2087
Pulses	596	545	557	572	560	597	695	749	757
Rabi Pulses	534	537	550	564	550	588	685	744	752
Cereals	1454	1615	1738	1957	1855	2063	2073	2095	2087
Fiber	1854	1820	1850	1710	1598	1471	1783	2105	2085

Average yield (in kg / hect.)

Horticulture:

Assam is encompassed as one under 14 global bio-diversity hotspots. The State has enough options for farming as well as making investments in horticulture sector. According to the Directorate of Horticulture and Food Processing Assam, the growth rate of Area, Production and Productivity of Horticulture sector has been assessed at 50.32 percent, 91.0 percent and 20.31 percent respectively.



Industrial profile:

The industrial scenario of the State is confined within the growth of employment-oriented SSI Sector. Assam is still making efforts desperately for gearing up industrial activities by harnessing the un-tapped resources available in the State through various growth-inducing factors as well as by removing the infrastructure inadequacies primarily in the power sector.

Despite existence of constraints, a favorable industrial climate is gradually being created in the State as discernible from the increasing interest shown by investors both from within the State as well as from outside the State. Assam's new "Industrial and Investment Policy of Assam, 2019" aims at industrial expansion in the state through a slew of incentives w.e.f from 2019 for a period of five years for new units. In addition to tax and financial subsidies, the state Govt. will arrange power supply to all Industries, Industrial Parks, etc. adequately as per their requirement and assured quality power to the industries. The Policy will provide (i) Power Subsidy @ Rs.2 per unit for a period of 5 years subject to a maximum of Rs.50 lakh per annum and (ii) 50% Generating set subsidy subject to a ceiling of Rs. 20 lakh. Investment in generation of power in both conventional and non-conventional and proposed to provide all necessary assistance to the investors in power sector. To implement the above provisions, the onus falls on the govt. to support additional power generation and distribution capacity. To this effect the proposed AIIB project will help to augment the power supply and reliability in the state.

Fishery:

Fishery sector has been recognized as a powerful sector for its role in economic development, income generation and scope for generation of employment opportunities throughout the State, especially for rural youths through fish production and its related activities, besides providing food and nutritional security to the people of the State. The State's vast water resources includes its two major river systems – the Brahmaputra and the Barak with its 53 tributaries. These covers water spread area of 4820 sq. km. Besides, there is wetlands, low-lying areas, derelict water bodies, *beels*, tanks, ponds etc., which all add up to its vast potential for fish production covering an area of 2.86 lakh hectares of water resources. Fish production in the State has reached a level of 3.07 lakh metric tonnes during 2016-17 against the estimated nutritional demand of 3.42 lakh metric tonnes. The contribution of the Fishery sector to the State Domestic Product (at constant 2011-12 prices) was Rs.475816 lakh as per provisional estimates 2015-16, with average growth rate of 4.7% per annum during the period.

Tea Industry:

The Tea industry occupies an important place in Assam and plays a very special role in the State economy. Assam Tea has maintained its international reputation and commands significant share in the World Tea Market. The total area under tea cultivation in Assam is accounting for more than half of the country's total area under tea. In addition to existing big & large tea gardens owned by reputed both Indian and multinational Companies, the profession of tea plantation in the State has been taken up by common people as business venture at present, especially by unemployed youths. The tea industry in Assam also provides average daily employment to more than 6.86 lakh persons in the State, which is more than 50 percent of the total average daily number of labour employed (on an average 11.1 lakh labour employed per day) in the country as a whole under tea industry. According to the Tea Board of India, there are about 68.5 thousand registered small tea growers [STG] in Assam producing about 106881 thousand KG in 88674 hectares of land in Assam. Assam alone produces more than half of India's tea production. The estimated production of tea in Assam was 642.0 thousand tone in 2016 which is being produced in a 304 thousand hectare of land.

Work profile of the state:

Census of India defines all persons engaged in 'work' as participation in any economically productive activity with or without compensation, wages or profits are workers. The year preceding the date of enumeration is taken as the reference period for determining a person as worker or non-worker. The Census of India collects information on economic activity of an individual and classifies workers into two groups namely, Main workers who had worked for the major part of the reference period i.e. 6 months or more and Marginal workers who had worked less than six months.

The Ministry of labor and Employment, Govt. of India has entrusted the task of conducting Employment and Unemployment surveys on regular basis to the labor Bureau, Govt, of India. The result of the Fifth Annual Employment Unemployment Survey, 2015-16 conducted by the labor Bureau reveals that



- The Labor Force Participation rate in respect of the age-group 15 years and above according to usual status approach for both principal status (ps) and subsidiary status (ss) in Assam is 53% in rural areas, 50% in urban areas and 53% taking urban and rural areas as a whole against the all India rate of 56%, 44% and 52% respectively.
- The total employment in the public and private sector establishments under Employment Market Information Program in 2016 was 15.49 lakh, showing increase by 33% in 2016 over 2015.
- During 2016 female employment was 26% of the total employment against 34% in 2015.
- Out of the total 5.83 lakh employment in public sector, share of local bodies was 1.64% and share of State Quasi Government was 9.18% during the year.
- The small-scale industries (SSI) and Micro, Small and Medium Enterprise (MSME) sectors have a major contribution towards creating employment in the State. There are 45509 numbers of SSI/ MSME units in Assam providing employment to 268500 persons till the end of 2016-17 as compared to 43332 units with employment of 249145 persons in 2015-16.
- The size of the educated job seekers is considerably high, which is a challenge before the growing economy of the State. From the records of the live register of Employment Exchanges, the registered educated job seekers stood at 1642718 during 2016 against 1523531 during 2015 thereby showing an increase of 7.82% during 2016. The percentage of educated job seekers constitutes about 82% of the total jobseekers.

The worker's profile of Assam, as per the Census of 2011 is provided in the **Table 25** below:

Table 25: Worker's profile in Assam

Workers	Person	Male	Female
Total workers	11969690	8541560	3428130
Main workers	8687123	7034642	1652451
Marginal workers	3282567	1506918	1775649
Cultivators	3138554	2698384	440170
Agricultural laborer's	903294	705306	197988
Household Industries workers	242071	146566	95505
Other workers	4403204	3484386	918818
Non workers	19235886	7397883	11838003

Table 26: Average Daily Wages (Rs) in Assam 2016-17

Workers	Female	Male
Field Labour (Agriculture)	227	275
Skilled labour	Not available	318

Source: Agricultural Wages in India 2016-17, Directorate Of Economics And Statistics, Department Of Agriculture, Cooperation & Farmers Welfare, Ministry Of Agriculture & Farmers Welfare GoI

Table 27: Minimum wages prescribed by Govt. of Assam

Class of Employment	Total Per Day (Rs)	Total Per Month (Rs)
Unskilled	274.00	8220.00
Semi-Skilled/Unskilled Supervisory	317.77	9533.28
Skilled/clerical/ITI	383.63	11508.90



Class of Employment	Total Per Day (Rs)	Total Per Month (Rs)
Skilled (Non ITI)	405.55	12166.44
Highly Skilled	504.20	15126.12

Source: GoA, Office of The Labour Commissioner Assam, April 2019

4.5.3. Social Infrastructure

In Assam, social sector development bears the essence of overall economic development and human development in the State. This sector includes education, health and family welfare, safe drinking water, sanitation, welfare program for women/ children/ SC & ST development of marginalized groups and backward areas/Char areas, etc. Development in these sectors has built up strong edifice of a stimulating economy in terms of rising income and employment opportunities, productivity, technology advancement and finally has enhanced the quality of life in the State. The Government has given emphasis for development of these sectors for overall development of the State.

Elementary and Higher Education:

As per the provision of free and compulsory education to all children up to the age of 14 years the state Government is implementing the 'Right to Education Act 2009' as "Assam Right of Children to Free and Compulsory Education Rules, 2011". The Directorate of Elementary Education (DEE), Assam is functioning under the act to achieve the goal of universalization of elementary education in the State to provide useful and relevant elementary education to all children in the age group of 6-14 years of age. It aims in bridging all gender and social category gaps at primary stage with focus on elementary education of satisfactory quality. All schemes for elementary education are implemented through Sarba Shiksha Abhiyaan (SSA). The table shows below the number of Government schools functioning under DEE. The Directorate of Higher Education and Directorate of Secondary Education is established to give primary focus on expansion and promotion of Higher Education by granting financial assistance to the needy educational institutions besides implementing various programmes for development of general education and assisting for infrastructure development in general with special focus to rural and backward areas. The numbers of Higher Educational institutions in Assam is given in **Table 28** below:

Table 28: Government Schools under DEE, Assam

Items	Lower Primary	Upper Primary	Upper Primary with
Schools	40465	11741	1853
Teachers	109558	76210	13013

Source Directorate of Economics and Statistics (2017-2018)

Table 29: Educational Institutes in India

Institutions	Numbers
Universities (including private and Deemed University)	14
Government Colleges	5
Provincialized Colleges	300
Non-Govt. Colleges	43
Provincialized Sanskrit & Pali Tools	97
Literary & Voluntary Organization	19
Govt. Law College	1
Non-Govt. Law Colleges	19

Status of Health Infrastructure in the State:

The status of Health infrastructure in the State is improving over the years. At present there are 25 Civil Hospitals, 14 Sub-Divisional Civil Hospitals, 1014 PHCs, 62 FRUs, 162 CHCs and 4621 Sub Centers with 18886 numbers of total beds in the State at the end of 2016. The number of Medical and Paramedical staff in the state was 5004 including Ayurvedic and Homeopathic doctors in 2016.



The Government of Assam has taken various steps for improvement of maternal health and reduction of infant mortality as a measure of human and social development. The Maternal Mortality Ratio of the State during 2011-13 has shown a little improvement over the period of 2010-12. During the period 2011–2013 MMR of Assam has come down to 300 from 328 while in India it is 167 which came down from 178. Due to improvement in the field of Medical Science and various Social Security measures adopted. Infant Mortality Rate in Assam is 44 against 34 in India during 2016 which is still very high as compared to national level. Similarly, in Rural area it is 46 while in urban area it is 22 at State level. At the national level, IMR at Rural is 38 and 23 in Urban area during 2016.

Construction workers are vulnerable to communicable diseases such as mosquito -borne diseases, including malaria, Japanese encephalitis (JE), lymphatic filariasis and dengue; diarrhoea, cholera, dysentery, etc. given their occupation mobility. Sites for construction are potential breeding grounds for mosquitoes and workers spend much time in these places. Among these, malaria and JE are the predominant infections and are spread across Assam and are great concern. In addition, sexually transmitted diseases and HIV/AIDs also pose a threat. The National Health Mission envisages to address the health concerns of the vulnerable groups through outreach services (community and target-based health workers, etc. and strengthening of the health infrastructure. The state govt.'s efforts under Building & Other Construction Workers(RE&CS) Act,1996 and Building & Other Construction Workers Welfare Cess Act,1996, and Assam Building & Construction Workers Welfare Board include registration of 69657 Construction workers as beneficiaries, of financial support for medical care, in case of death, disability, educational assistance for their families, etc.

4.5.4. Historical, Cultural and Archaeology Sites/Places

None of the project sites will impact places of cultural importance including archaeological sites. The Ancient Monuments and Archaeological Sites and Remains Act, 1958 (ACT No. 24 of 1958) and Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010 ensures the preservation of ancient and historical monuments and archaeological sites and remains of national importance, for the regulation of archaeological excavations and for the protection of sculptures, carvings and other like objects. The list of ancient and historical monuments, archaeological sites and remains which have been declared by the Ancient and Historical Monuments and Archaeological Sites and Remains (Declaration of National Importance) Act, 1951 in Assam, falling under governance of Central Government is mentioned in **Table 30** below:

Table 30: Archaeological sites notified and protected by ASI

S. No.	Name of The Monuments/Sites as Per Gazette Notification	District
1.	Cachari Ruins, viz: - a) A small unfinished dwelling house, b) The Snan Mandir, c) The Singh Darwaza, d) The Temple of Ranachandi, e) The Baradwari, f) & g) Two Small Temples, h) The East Wall, 128 yards in length and 2½ yards in length situated to the north-east corner of the ruins	Cachar
2.	Bordole Temple, Grave of Lieutenant Lewis, Grave of Lieutenant Thomas Kennedy, The Rock known as “Bishwanath Sivalinga”, The Rock known as “Sukreswar”, Dhandi Temple, Ruins	Sonitpur
3.	Masonry remains on the Bamuni Hills, The Mound and Ruins of the stone temple at Parbatiya, The rock on the bank of the Brahmaputra about 2 miles below Tezpur and the inscription thereon, Sculptures in the Chummery Compound	Tezpur
4.	Shri Surya Pahar Ruins, Tomb of Lieutenant Cresswell, Monument over the grave of Mr. B.J. stow	Goalpara
5.	Ancient tombs	Bongaigaon
6.	Idgah on the Rangamati Hill with its enclosure walls and a space of 16’-20’ around there, Rangamati Mosque and the ablution tank attached thereto.	Dhubri
7.	The Carvings, inscriptions and pillar on the Urbasi island, The Rock-cut sculptures representing Vishnu (with adjoining figures of Surya, Ganesha, Devi, etc) locally known as Vishnu Janardan, The stone inscription inside “poa Mecca Mosque”., Shri Hayagriva Madhava Temple, Shri Kedar Temple, Shri	Kamrup



S. No.	Name of The Monuments/Sites as Per Gazette Notification	District
	Ganesh Temple, Shri Kameshwar Temple, Duargarila Rock Inscription, Rock-Cut Figures In The Nilachal Hill{(a) Figures of Ganesa-2, (b) Siva-Lingas – 12, c) Four-handed Bhairabi – 1, d) Miniature Sikhara Shrines – 4, e) Figures of ‘Narakasur’ – 1, f) Two-handed ‘ Bhairabi’ – 1, g) Stone gateway – 1, h) Dancing Bhairava (locally known as Bala-bhairava) engraved on rock – 1}	
8.	Group of four Maidams, Gurhgaon Raja’s Palace, Bisnudur, Sivadul, Devidol, Gaurisagar Tank, Bishnudur, Devidol, Ghanashyam’s House, Golaghar or Magazine, The Karenghar of the Ahom Kings, Ranghar Ruins., Sivadul, Ranganath Dol, Vishnu Dol, Sivasagar, DeviDol, Sivasagar, SivaDol, Sivasagar, Eight Cannons of the Ahom period on the bank of the Sibsagar tank	Sivasagar
9.	Monoliths, Sivadul at Negriting	Golaghat
10.	Rock-cut Temple, Two inscribed stones, Bolosan Group of Monoliths, The Derebara group of Monoliths, The Khartong Group of Monoliths, The Kobak Group of Monoliths	N.C. Hills
11.	The gun of Emperor Sher Shah, The two swivel guns belonging to the Mughal Nawwara	Tinsukia

The List of Archaeological sites and monuments of Assam and protected monument, under the “The Assam Ancient Monument and Records Act, 1959” and “The Assam Ancient Monument and Records Rules 1964” in **Table 31 and Table 32** as follows:

Table 31: Archeological Sites notified under “The Assam Ancient Monument and Records Rules 1964”

Sl No.	Name of The Monuments/Sites as Per Gazette Notification	District
1.	Magazine House, Panbari, Panbari Ruins, Panbari, Moterjhar Temple, Moterjhar	Dhubri
2.	Mahadev Parvat, Sri SriSurya Pahar, Paglatek Ruins, Paglatek, Raush Monument, Kachari Road, Tukreswari Temple, Krishnai, Siva Than, Pancharatna	Goalpara
3.	Kakaijana Archaeological Site, Kakaijana, Ganesa Mandir, Abhayapuri,	Bongaigaon
4.	Billeswar Temple, Belsor, Balilecha Kali Mandir, Nalbari,	Nalbari
5.	Ambari Archaeological Site, Ambari, Umananda Temple, Umananda, Chatrakar Temple, Uzan Bazar, Manikarneswar Temple Archaeological Site, North Guwahati, Kanai Borosibowa Rock Inscription, North Guwahati, Asvakraanta Temple Archaeological Site, North Guwahati, Dirghesvari Devalaya, North Guwahati, Chiling Rock Inscription, Gauripur, Rudreswar Temple, North Guwahati, Chandrasekhar Temple, Umananda, Hara-Gauri Temple, Umananda, Na-Math, Kamakhya, Umachal Rock Inscription, Nilachal hill, Persian Rock Inscription, Kamakhya, Pingaleswar Archaeological Site, Karara, Chandar Merghar Archaeological Site, Chhaygaon, Siddheswar Temple Archaeological Site, Sualkuchi, Madan Kamdev Archaeological Site, Baihata Chariali, Karbi Memorial, Dakshinbam, Sonapur, Vasistha Temple, Guwahati, Bhairabeswari temple, Rangia, Nazirakhat Archaeological Site, Sonapur, Bagheswari Peeth, Mirza, Kajalichaki Archaeological Site, Chandrapur	Kamrup (M)
6.	Baman Ruins, Bamangaon, Narikoli Ruins, Khandajan, Rudreswar Devalaya, Maharipara, Jaljali Archaeological Site, Jaljali,	Darrang
7.	Jorpukhuri Ruins, Hatigarh, Tamreswar Archaeological Site, Khairabari	Udalguri
8.	Sculptures at Chummery Compound, Tezpur, Biswanath Temple, Biswanath Chariali, Christian Cemetery, Kalabari, Vasudev Doul, Kalabari, Garhdoul Archaeological Site, Kalugaon, Bamgaon Ruins, Biswanath Chariali, Nandikeswar Devalaya, Jamugurihat, Surya Image, Golchepa	Sonitpur
9.	Rock Inscription, Burha Mayong, Silchang Archaeological Site, Silchang, Matharbari Archaeological Site, Baropujia, Rajbari Group of temples, Rajbari, Sankhadevi Archaeological Site, Jogijan, Mahadeosal Archaeological Site, Mahadeosal, Kawaimari Archaeological Site, Kampur, Hatimura Temple, Jakhalabandha, Na-Nath, Archaeological Site, Kenduguri, Maudanga Ruins,	Nagaon



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Sl No.	Name of The Monuments/Sites as Per Gazette Notification	District
	Maudanga, Warigadeng Archaeological Site, Sibpur Ruins, Sibpur, Gachtal Archaeological Site, Dabaka, Mikirati Archaeological Site, Dabaka, Akashiganga Archaeological Site, Parokhowa, Kenduguri Archaeological Site, Kenduguri, Devasthan Archaeological Site, Devasthan, Amtala Archaeological Site, Hojai, Gosaijuri Archaeological Site, Dabaka, Bundura Archaeological Site, Kampur, Basundhari Archaeological Site, Basundhari	
10.	Maghnawa Temple, Narayanpur, Baghar Chukar Dou, Dhakuakhana, Gosaipukhuri Ruins, Laluk	North Lakhimpur
11.	Ghuguha Dou, Dhemaji	Dhemaji
12.	Deoparvat Archaeological Site, Numaligarh, No. 1 Dubarani Archaeological Site, Borpathar, Alichiga Tengani Archaeological Site, Barpathar	Golaghat
13.	Grave of Bahadur Gaon Burha, Jorhat Town	Jorhat
14.	Na-Pukhuri Siva Temple, Rudreswar, Visnu Dou, Namti, Devi Dou, Namti, Sa-Dhowa Pukhuri, Sukafa Nagar, Phakuwa Dou, Joysagar, Hara Gauri Temple, Joysagar, Gorokhiya Dou, Nazira, Barpatra Gohain Dol Pukhuri Archaeological Site, Bethbari, Piyali Phukanar Dou, Geleki, Thoura Dou, Rajmai, Visnu Dou, Kalugaon, Jagaddhatri Dou, Kalugaon, Borpatra Tank, Kalugaon, Gallows Site of Piyali Phukan, Sivasagar, Charaideo Maidams, Sukafa Nagar, Bogi Dou, Meteka, Golaghar, Garhgaon, Lunkuri Dou, Doulbagan, Darika Silsako, Simaluguri, Kenduguri Silsako, Kenduguri, Barbarua Maidam, Lukwa, Bhojo Warfare Site, Sonari, Gargaon Rampart, Nazira, Gaurivallabh Devalaya, Lithapana Maidams,	Sivasagar
15.	Raidongia Dou, Kalakhowa, Moiramora Dou, Khamtighat, Bezor Dou, Dimou	Dibrugarh
16.	Borganga Rock Inscription, Dokmoka, Ruins at Sarthe Rangphir Gaon, Phuloni, Burhagosain Than, Dokmoka, Rock-cut Durga, Tilapara, Langhin, Rock-cut Ganesa, Boga Dou, Langhin, Metha-long-e, Donkamokam, Ruins at Chikari Rongpi Gaon, Langlokso	Karbi Anglong
17.	Tanks and Rampart, Maibong, Shiva temple, Shivila	North Cachar
18.	Old Brick Building, Moina	Karimganj

Table 32: Newly Discovered Archaeological Sites 2015/2016

Sl No	Name of The Site	District
1.	Megaliths at Nonjirong I, Hamren, Megaliths at Nonjirong II, Hamren, Megaliths at Nonjirong III, Hamren, Huge Dolmen at Nonjirong, Hamren, Megalithic site at Tapat, Megalithic site at Rongali, Tika, Bichikri Tank at Bichikri	Karbi Anglong
2.	Raja Pukhuri, Rani Pukhuri, Raja Pukhuri Naojan, Kalioni Banglung Stupa, Cheringia Maidam	Golaghat
3.	Pratima Garh, Chapakhuwa, Sadiya, Juriya Maidam, Chapakhuwa, Sadiya, Borpukhuri, Chapakhuwa, Sadiya, Tinkunia Pukhuri, Bengmara Pukhuri, Godha Barua Garh, Selukia Pukhuri, Lemtem Pukhuri, Bator Pukhuri, Na-Pukhuri, Rupohi Pukhuri	Tinsukia
4.	Doloi Sonari Tank, Ligiri Pukhuri, Pehi Pukhuri, Gajpuri Pukhuri, Netai Pukhuri	Sivasagar
5.	Lungmailai Stone Jar Site, Kobak Megalithic site, Stone Jars at Bolasan (Nchubunglu), Stone Jars at Dubungling(Derebore)	Dima Hasao



5. Model ESIA and Environmental & Social Impacts and Mitigation

This Chapter presents the potential impacts that may occur during the pre-construction, construction and operation phases, and further suggests the mitigation measures to avoid or minimize such impacts.

The environmental and social baseline for the Project has been presented in Chapter 4 of this report. The state level data were also used for ascertaining the baseline meteorological data, from secondary sources. The baseline for biodiversity was collated from secondary data collected from Integrated Biodiversity Assessment Tool (IBAT) and Assam Environment and Forest department. The socio-economic baseline was established on the of district-wise census data that the TLs pass through. All of these were supplemented by public consultations and spot interactions by AEGCL officials at Divisional offices and Head Quarters. Impacts of a natural disaster were studied from state's hazard risk maps which illustrate the impacts of hazards such as foods and earthquakes and the proposed design measures to address these impacts. In the absence of primary data for ambient air quality, water quality & noise quality, it is suggested that the full set of information is to be collected prior to contractors' mobilization and documented in the E&S monitoring report as part of the monitoring scheme.

Site specific, primary data including E&S components associate with individual subproject ranging from land status, presence of protected area, ecological sensitive area, water bodies, indigenous population, etc. is listed under section 5.1. The data obtained for study area comprises information collected within the vicinity of 1 km of respective substations and within the RoW of the associated transmission lines. However, for ecologically sensitive receptors, the study area is expanded to 5km, and for waterbodies, a 200m-diameter was considered as the influence of area. In addition, all the social and ecological aspects within RoW (either side of the proposed transmission line) have been considered to assess the environmental and social impacts, if any.

5.1. E&S profile of the Sites Visited

Introduction:

The baseline profiling of subproject at early stage of project cycle follows ESP's approach for E&S management through identifying actions to avoid, minimize, mitigate, offset or compensate for environmental and social impacts of Projects. This requires assessing different alternatives line routes for the selection of the least impactful route to avoid affecting forests/ biodiversity/Eco-sensitive zone including animal/bird path, protected areas, human habitations, cultural and historic sites etc. to the extent practical from Project conceptualization & Planning Stage. This also helps in establishing the grounds for proposal of tall towers to avoid/minimize the impact at the beginning of the project. The baseline assessment will also identify the need of additional studies required by independent agencies to ascertain the impacts and to plan management measures to minimize/mitigate such impacts.

Selection of Site:

Out of 10 proposed new substations and 16 associated transmission lines, substation location is finalized for all proposed substations and primary route survey is completed for 10 new proposed transmission lines. Site visit and consultations were carried out at 7 substations (70% of the locations) to establish the E&S baseline. The assessment of alternative routes identified as part of primary route survey is completed for all 10-transmission line. The established baseline profile is further profound with continuous discussion with the AEGCL officials.

Adopted Methodology:

Mapping potential footprints with IBAT²⁵: The outcomes of assessment conducted during IBAT for new proposed substations and transmission lines is as follows (**Table 33**):

²⁵ The assessment was carried out using Bee lines of transmission lines. The detailed IBAT assessment is present in **Appendix 9**.



Table 33: Outcomes of IBAT assessment for new proposed substations and transmission lines

SL NO	SCOPE OF WORK	Result of IBAT Assessment ²⁶
1.	Establishment of new 220/132 kV (2 X 160 MVA) and 132/33 kV GIS (2 X 50 MVA) S/s at Khumtai	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	220 kV:	
	LILO of Mariani-Samaguri (AEGCL-Existing) S/C Line 1 at Khumtai (AEGCL-New) - Samaguri (AEGCL-Existing) - S/C Line	Key IBAs and protected area not identified within 5 km of RoW for the BEE line.
	LILO of Mariani-Samaguri (AEGCL-Existing) S/C Line 2 at Khumtai (AEGCL-New) - Samaguri (AEGCL-Existing) - S/C Line	Key IBAs and protected area not identified within 5 km of RoW
	132 kV:	
	LILO of Jorhat (W)-Bokakhat (AEGCL-Existing) at Khumtai (AEGCL-New) S/C Line	Key IBAs and protected area not identified within 5 km of RoW
	Khumtai (AEGCL-New) - Sarupathar (AEGCL-Existing) S/C Line	The BEE Line for 132 kV LILO line Khumtai-Sarupathar passes from Garampani Nambor and Nambor-Doigrung WLS for a distance of about 5 km, which is key IBA as per IBAT assessment Alternative route assessment was carried out post BEE line study to ensure that all the angle points (tower footings) as well as conductors does not transverse from protected area (Garampani Nambor and Nambor-Doigrung WLS). The proposed alternative route for Khumtai-Sarupathar 132kV LILO line does not pass from Protected Area.
2.	Establishment of new 220/33 kV (2 X 100 MVA) GIS S/s at Bihpuria	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	220 kV:	
	220KV Bihpuria (AEGCL-New) - Sonabil (AEGCL-Existing) D/C Line ** actual route length is 143.324 km. 55km line is completed by AEGCL from Sonabil end. Remaining 88.324 km is to be completed under this project	Key IBAs and protected area not identified within 5 km of RoW for the BEE line.
3.	Establishment of new 220/33 kV (2 X 100 MVA) GIS Substation at Jakhlabandha	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	220KV:	
	LILO of 220kv Samaguri-Mariani line 1 (AEGCL-Existing) at Jakhlabandha (AEGCL-New) S/C line	Key IBAs and protected area not identified within 5 km of RoW for the BEE line.
4.	*Establishment of new 220/33 kV (2 X 100 MVA) GIS Substation at Chhaygaon	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	*220 kV:	
	LILO of 220kV Azara – Boko (AEGCL-Existing) line at Chayygaon	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
5.	Establishment of new 132/33 kV (2 X 50 MVA) GIS Substation at Burhigaon	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area

²⁶ The Result of IBAT assessment is only for the BEE lines and not linked with the actual identified route of line in absence of the final route survey reports.



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SL NO	SCOPE OF WORK	Result of IBAT Assessment ²⁶
6.	132 kV: LILO of Rowta-Sipajhar (AEGCL-Existing) S/C Line at Burhigaon (AEGCL-New)	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
	*Establishment of new 220/33 kV (2 X 100 MVA) GIS Substation at Nagaon-2	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	220 kV: LILO of Samaguri (AEGCL- Existing) –Sarusajai (AEGCL-Existing) 220kV D/C Line at Nagaon-2 (AEGCL-New)	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
7.	Establishment of new 400/220/132 kV (2 X 500 MVA) GIS Substation at Rangia	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	400 kV: LILO of 1 ckt of Balipara (PGCIL)-Bongaigaon (PGCIL) Line at Rangia (AEGCL-New)	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
	220 kV: LILO of 1 ckt of Rangia - Amingaon (Existing-AEGCL) Line at Rangia (AEGCL-New)	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
	Rangia (AEGCL-Existing)-Rowta (AEGCL-New) D/C Line	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
	Establishment of new 400/220 kV (2 X 500 MVA) Substation at Sonapur	The substation premise doesn't fall under Key Biodiversity Areas but Amchang WLS, also a key IBA, is located at a distance less than 1 km from proposed substation site.
8.	400 kV: LILO of 1 ckt of Silchar (PGCIL)-Byrnihat (Meghalaya) Line at Sonapur (AEGCL-New)	The proposed line doesn't fall under Key Biodiversity Areas but Amchang WLS i.e. key IBA, is located at a distance less than 1 km from BEE line.
	*Establishment of new 220/132 kV (2 X 160 MVA) GIS at Agomoni	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	220 kV: *LILO of both ckt of Alipurduar (PGCIL) - Bongaigaon (PGCIL) D/C line at Agomoni (AEGCL-New)	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
9.	Establishment of new 220/132 kV (2 X 160 MVA) GIS Substation at Shankardevnagar	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
	220 kV: Shankardevnagar (AEGCL-New) - Misa (AEGCL-Existing) D/C Line	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
	Shankardevnagar (AEGCL-New) - LKHEP (APGCL) D/C Line- (Other Source)	Key IBAs and protected area not identified within 5 km of RoW for the BEE line
	Establishment of new 132/33 kV (2 X 50 MVA) AIS Substation at Kumarikata	The proposed substation location does not fall within 5 km radius of Key IBA of Protected Area
10.	132 kV: Kumarikata (AEGCL-New) - Nalbari (AEGCL-Existing) S/C Line on D/C Tower	Key IBAs and protected area not identified within 5 km of RoW for the BEE line

The adopted methodology for establishing the baseline data involves collection of data for existing conditions on physical, ecological, economic and social aspects, together with the anticipated environmental and social



impacts and proposed mitigation measures. The assessment of physical, biological and social features along the proposed transmission route and substation also involved data collection from secondary sources and has been done to support the findings of the field survey.

A baseline study was conducted to assess the environmental and socio-economic conditions within the substation premises and adjoining areas and in the surroundings of the proposed transmission line corridor. The baseline data generation was supplemented with field observations, survey reports and interaction with the community and project personnel. The detail of the baseline conditions of Substation along the transmission line corridor is presented in the **Table 34** and **Table 35**, respectively in the following sub sections.



Table 34: E&S profile of the Proposed Substation Sites visited

S.No.	Location	Location (District)	Status of Land	Details
1.	400/220 kV (2 X 500 MVA) GIS Substation at Sonapur	Sonapur, Assam	AEGCL Land	<ul style="list-style-type: none"> The proposed land parcel falls under the existing premise of 220/132/33 kV Sonapur S/S (GIS). The proposed location is present next to Star brand cement factory. Amchang Wildlife Sanctuary located at a distance of approx. 2 km Some temporary structures of brick kiln workers present at 600 m (approx.) from boundary wall of substation. Temporary ponds nearby (created due to excavation by brick kiln industries) Demolition of Abandoned Quarters may be required. The village area comprises mixed population, inclusive of SC/ST (No negative impacts are envisaged on Indigenous people, however, the IPPF is prepared as Appendix 12) The approach for existing 132/33 kV substation is currently from Star cement factory. AEGCL officials informed that the same route will be used for proposed substation. However, the provision of dedicated approach, directly connecting to public road is under review by project authorities.
2.	new 220/33 kV (2 X 100 MVA) GIS Substation at Nagaon-2 and associated lines	Nagaon, Assam	AEGCL Land	<ul style="list-style-type: none"> 3.35 ha of land belonging to Assam State Electricity Board (ASEB), boundary is already demarcated. The layout plan for substation is yet to be finalized. Some temporary encroachments and cultivation being done currently by local residents. These residents have their own land parcels nearby, therefore no economic displacement is envisaged. Abandoned 33/11 KV S/S and some abandoned staff quarters and, control room in the premises.
3.	new 220/33 kV (2 X 100 MVA) GIS Substation at Jakhalabandha & associated lines	Jakhalabandha, Nagaon, Assam	AEGCL Land	<ul style="list-style-type: none"> Located on existing AEGCL land, adjacent to existing 33/11 kV S/S. Tree cutting is envisaged. Completely empty land parcel free of habitation or cultivation. 2.80 ha of B or AEGCL One (1) Secondary school and residential structures within 1.5 km of the selected site. The provision for 6 outgoing 33kV feeders will be provisioned, however the survey is yet to be undertaken. The incoming line is around 3 km from the S/S site, majorly passing through agricultural



S.No.	Location	Location (District)	Status of Land	Details
				farmland, with no railway or river crossing
4.	Establishment of new 220/132 kV (2 X 160 MVA) and 132/33 kV (2 X 50 MVA) GIS S/s at Khumtai and associated lines	Khumtai, Golaghat, Assam	Tata Tea Estate/A amalgamated Plantations. Valuation of land completed.	<ul style="list-style-type: none"> 6.82 ha of land belonging to Amalgamated Plantations Private Limited (Tata Tea Estate). The land comprises tea plantations and shade trees. There is no habitation or permanent structure on the land, therefore no loss of private properties or displacement is expected. The total area of tea estate is more than 1471.57 ha, as the Tea estate is currently facing shortage of labour thus, no impact on the T.E. workers is envisaged because of the land being proposed for substation construction. Elephant Corridor within 5 kms of the S/s site. Not a declared corridor, but gleaned through interactions. One of the feeders from the proposed S/s will be dedicated to the Numaligarh Bio-Refinery (NRL), which is looking towards expansion plans and opening a second plant in the vicinity. This could be a potential place for generating livelihood in the long run.
5.	220/33 kV (2 X 100 MVA) S/s GIS at Bihpuria and associated lines	Jarabari Village, North Lakhimpur, Assam	Government Land (Khas Patta)	<ul style="list-style-type: none"> 2.00 ha of Govt. Khas land is transferred to AEGCL. The land is located adjacent to NH (50 m) in Jarabari Village, Lakhimpur. Some temporary cultivation is being done currently by local residents on the land parcel. The selected land parcel is free of any structure but has two houses in the adjacent plot.
6.	Establishment of new 400/220/132 kV Rangia GIS Substation & associated lines	Rangia, Kamrup Rural, Assam	Government and Private Land (Demarcation of Land is completed; Valuation is in progress)	<ul style="list-style-type: none"> Approximately 8.70 ha of suitable land is identified by the Tamulpur Revenue Circle, adjacent to PGCIL 800 kV T/L. The land involves 2.80 ha of Govt. Land, 4.90 ha of Khas Patta and 0.94 ha of Annual Patta land. The identified land parcel is adjacent to the NH. As per discussion with the Patta owners, the land is subject to temporary flooding in rainy season. Will require a lot of levelling work, construction materials to be purchased from licensed vendors. The proposed land is adjacent to burial ground.
7.	3. Establishment of new 220/132 kV (2 X 160 MVA) GIS Substation at	Sankardev Nagar, Karbi Anglong,	AEGCL Land	<ul style="list-style-type: none"> The proposed location is within the existing boundary of 132kV AEGCL substation. No major impact identified.



S.No.	Location	Location (District)	Status of Land	Details
	Shankardevnagar and associated lines	Assam		



Baseline assessment of proposed Transmission Lines

The assessment involved analysis of three alternative routes proposed as a part of preliminary route survey. Following parameters were considered as part of Environmental and Social assessment to establish the baseline for associated E&S risks.

- i. If the proposed route passes through a plain or marshy and low-lying area, river beds and earth slip zones. The line should be easily accessible during construction and operational phases.
- ii. Risk for negative impact on Eco sensitive Zone, Protected Areas, Reserve Forest, etc.
- iii. Risk for negative impact on to waterbody (River/wetland/lakes/canals, etc.).
- iv. Risk for negative impact on sensitive receptors (school/hospital/colleges, etc.).
- v. Risk for negative impact on any restricted areas such as civil and military airfields etc.
- vi. Risk for negative impact on residential structures or other permanent structures in the proposed corridor.
- vii. Risk for negative impact on private agriculture field/tea garden/waste land, etc.

Analysis of Alternatives:

A. 132KV D/C TRANSMISSION LINE FROM GOLAGHAT TO PROPOSED KHUMTAI S/S

Description	Alternative-I (Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
Route Length (in Kms.)	61.205	26.157km	29.096km	21.200 km
Angle Point	200	42	37	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	2 (Dhansiri River)	7	2	2
Forest (Reserved Forest& Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden(Affected Route length)	9.500Km	4.500Km	18.000Km	4.500Km
Low Land Area	NIL	15.000Km	NIL	NIL
Affected Permanent structure	Yes	Yes	Yes	Yes
Pile Foundation	NIL	NIL	NIL	NIL

B. LILO OF 132 KV S/C JORHAT WEST - BOKAKHAT AT PROPOSED KHMUTAI S/S.



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Description	Alternative-I(Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
Route Length (in Kms.)	10.198 km	10.430km	10.564km	7.500 km
Angle Point	33	15	18	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	3 (Dhansiri River)	3	3	1
Forest (Reserved Forest& Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden(Affected Route length)	3.50Km	3.50Km	3.50Km	1.50Km
Low Land Area	NIL	NIL	NIL	3.20Km

C. LILO OF 220KV S/C SAMAGURI - MARIANI LINE-I AT KHMUTAI S/S.

Description	Alternative-I(Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
Route Length (in Kms.)	10.167 km	10.127km	10.593km	7.450 km
Angle Point	35	20	25	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	1 (Dhansiri River)	3	1	1
Forest (Reserved Forest& Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden(Affected Route length)	3.50Km	3.50Km	3.50Km	1.00Km
Low Land Area	NIL	NIL	NIL	NIL

D. 220KV D/C TRANSMISSION LINE FROM PABHOI TO PROPOSED BIHUPURIA S/S

Description	Alternative-I(Optimum/Proposed)	Alternative-II.	Alternative-III.	Bee Line
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	Route)			
Route Length (in Kms.)	88.324km	99.906km	80.767km	71.500 km
Angle Point	293	140	131	NA
River Crossing (Major)	2	2	2	2
River Crossing (Minor)	16 ²⁷	18	17	NIL
Forest (Reserved Forest& Protected Forest)	NIL	NIL	17.5Km	22Km
Tea Garden(Affected Route length)	10.906Km	7.809Km	13.256Km	NIL
Low Land Area	NIL	NIL	NIL	NIL
Effectuated Permanent structure	No	Yes	No	Yes
Pile Foundation	2Nos.	4Nos.	2Nos.	NA

E. SINGLE CIRCUIT LILO OF 220 KV D/C SAMAGURI ~ JAWAHAR NAGAR AT PROPOSED NAGAON-2(LAWGAON) S/S

Description	Alternative-I (Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
Route Length (in Kms.)	1.565 km	1.604 km	1.579 km	0.900 km
Angle Point	6	4	5	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	NIL	NIL	NIL	NIL
Forest (Reserved Forest& Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden (Affected Route length)	NIL	NIL	NIL	NIL
Low Land Area	NIL	NIL	NIL	NIL
Existing Tower Dismantled	1	1	1	1

²⁷ Burigang River, Barigang River, Sukhan Kuti River, Korang River, Borou River, Changelijan River, Branbhajan River, Tupungian River, Balijan River, Hingorajn River, Satrang River, Gorgori River, Kulenge River, Dubia River, Changmara River, Sonapechola River, Pechola River, Pechola River.



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F. LILO OF 220 KV S/C SAMAGURI ~ MARIANI LINE-I AT PROPOSED JAKHLABANDHA S/S.

Description	Alternative-I (Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
Route Length (in Kms.)	2.715 km	3.654 km	4.627 km	2.300 km
Angle Point	11	13	15	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	NIL	NIL	NIL	NIL
Forest (Reserved Forest & Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden (Affected Route length)	NIL	NIL	NIL	NIL
Low Land Area	NIL	NIL	NIL	NIL

G. LILO OF 220 KV BOKO ~ SARUSAJAI AT PROPOSED CHAYGAON S/S

Description	Alternative-I (Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
Route Length (in Kms.)	1.619 km	2.211km	1.946km	1.200 km
Angle Point	9	9	9	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	NIL	NIL	NIL	NIL
Forest (Reserved Forest & Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden (Affected Route length)	NIL	NIL	NIL	NIL
Low Land Area	NIL	NIL	NIL	NIL

H. LILO OF 132 KV S/C SIPAJHAR ~ ROWTA AT 132KV PROPOSED BURHIGAON S/S

Description	Alternative-I (Optimum/Proposed Route)	Alternative-II.	Alternative-III.	Bee Line
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Route Length (in Kms.)	11.858 km	11.987km	14.982km	10.200 km
Angle Point	45	37	39	NA
River Crossing (Major)	NIL	NIL	NIL	NIL
River Crossing (Minor)	1 (Tagnijhora River)	1	3	1
Forest (Reserved Forest& Protected Forest)	NIL	NIL	NIL	NIL
Tea Garden (Affected Route length)	NIL	NIL	NIL	NIL
Low Land Area	NIL	NIL	NIL	NIL



Table 35: E&S profile of the Proposed Transmission Lines²⁸

S. No.	Name of Transmission Line	Associated Features
1.	132 kV D/C Transmission Line from Sarupathar to Proposed Khumtai S/S	<ul style="list-style-type: none"> Total length of selected route is 61.205km. This route passes through Telgaram, Mohkhuti, Dholaguri, Miri Pathar, Telia Gaon, Sarar Gaon, Dhulia Gaon, Salmoratup, Moinapara and Tetelital villages. This route is free from Reserved/protected areas land. The proposed route passes through 9.50km Tea Garden areas. About 55% of the land which is plain is used for the cultivation purpose and balance is under tea plantation. The proposed route crosses one minor river (Dhansiri river). There are a few water bodies, drains, and canal in this route.
2.	132 kV S/C Jorhat West - Bokakhat At Proposed Khmutai S/S	<ul style="list-style-type: none"> The length of selected route is 10.198 km (Approx.). This alternative route passes through the villages of Barahigaon, Sarkalagaon, Barguriagaon and Khumtai. This route does not pass through any forest land and is also free from any type of permanent structures. About 50% of the land which is plain is used for the cultivation purpose and the remaining under Tea Gardens. The proposed route crosses 'Dhansiri' river thrice at various places. In addition, there are some water bodies, drains, canals in this route.
3.	220 kV S/C Samaguri - Mariani Line-I At Khmutai S/S.	<ul style="list-style-type: none"> The length of this route is 10.167 km (Approx.). The proposed route passes through the village Helochi Gaon, Khumtao Na Gaon, Leteku Chapori and Khumtai. About 50% of the land which is plain is used for the cultivation purpose and the remaining under Tea Gardens. This route does not pass through any forest land and is also free of permanent structures. The identified alignment will cross the Dhansiri River near Leteku Chapori village.
4.	220kv D/C Transmission Line from Pabhoi To Proposed Bihupuria S/S	<ul style="list-style-type: none"> Total Length of this route is 88.324 km. This route passes through Pabhoi, Kamal Pur, Babu Jhar, 3no Police Point, 1no Police Point, Gingia, Uttar Gingia, Solmari, Borgang, Seherlia Kuhiar Bari, Hatimara, Shealbari, Non K Kolaguri, Bihupara, Bihmari, Mahanpur, Rakhalkuthi, Gosala, Halibari, Singlijan, Toton Bari, 1no Jogi Bari, Itapara, Jalauk Bari, Gupsar, Bholaguri, Magani Hatimota, Prub Bari, Dalhoushe, Mohanigaon, Balitika, Kamala Pathor, 1no Kokila Guri, Kumar Kata, 2 No Kumar Kata, 3 No Kumar Kata, Changmara, Changmara Guri, Major Dolani, Khaliha Mari, 1 No Khaliha Mari, 2 No

²⁸ The Bee line assessment was carried out for remaining proposed transmission lines using IBAT. The detailed assessment is present in **Appendix 9**.



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S. No.	Name of Transmission Line	Associated Features
		<p>Khaliha Mari, Petwa Gusani Than, Dhalpur, Khana Pichona, Sarai Dholani, Derguwa, 3 No Tatibahar and Jara Bari villages.</p> <ul style="list-style-type: none"> The main crop being grown in the corridor is paddy with some extent under vegetable cultivation. About 85% of the land which is plain is under cultivation. This route free from any type of permanent structures as well as Reserved/protected Forest land. This route passes through 10.906 km Tea Garden areas. The identified/suitable route crossed minor rivers at 16 locations and major river (Bargang and Barai Rivers) at two locations.
5.	Single Circuit Lilo of 220 kV D/C Samaguri ~ Jawahar Nagar At Proposed Nagaon-2(Lawgaon) S/S	<ul style="list-style-type: none"> The length of this route is 1.565 km (Approx.). This alternative route passes through the villages of Holemare and Lawgaon. The main crops being grown in the corridor are paddy and vegetables. The entire land is under cultivation. This route does not pass through any forest land and is also free of permanent structures.
6.	220 kV S/C Samaguri ~ Mariani Line-I At Proposed Jakhlabandha S/S	<ul style="list-style-type: none"> The length of this route is 2.715 km (Approx.). This alternative route passes through the villages of Seconee Pathar, Seconee Barhola and Barholagaon. This route does not pass through any forest land and is also free of permanent structures. About 60% of the land which is plain is under cultivation with main crops being paddy and vegetables. The proposed route does not cross any major/minor river but there are a few water bodies, drains and canal in this route.
7.	220 kV Boko ~ Sarusajai At Proposed Chaygaon S/S	<ul style="list-style-type: none"> The length of this route is 1.619 km (Approx.). This alternative route passes through the village 2 No Jamabri. About 90% of the land is under cultivation with paddy and vegetables as dominant crops. This route is free from any type of forest land as well as permanent structures. The proposed route does not cross any water body
8.	132 kV S/C Sipajhar ~ Rowta At 132kv Proposed Burhigaon S/S.	<ul style="list-style-type: none"> The length of this route is 11.858 km (Approx.). This alternative route passes through the villages of Barbari, War Para, Barduanaga, Punia, Simlaguri, Tangani, Kamarpara, Kumari pukhuri No 2, Barangaban, Kamarpara, and Burhigaon. About 90% of the land is used for cultivation of paddy, potato, jute, wheat, mustard, chili, and vegetables. This route is free from any type of forest land as well as permanent structures.



S. No.	Name of Transmission Line	Associated Features
		<ul style="list-style-type: none"> No major river available through in this route but the proposed route crosses a minor River 'Tagnijhora' once. There are a few water bodies, drains, canal in this route.

5.2. E&S Audit of the Existing Substations

The baseline information on existing substations was provided by AEGCL officials for 16 locations where augmentation of transformer capacity and Bay line Extension is proposed. **The detailed baseline condition of existing substations is provided in Appendix 3 and the key points are discussed in Table 36 below:**



Table 36:E&S Audit of existing substations

S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
1.	Narengi, 132/33 kV Substation	Narengi, Guwahati	New 2x50 MVA 132/33 kV in place of old 2x25 MVA transformers.	<ul style="list-style-type: none"> Transfer oil drums being used for storage of transformer oil Oil Leakage absent Sf₆ gas circuit breaker PPE's are available and being used. Monthly safety training being conducted on 26th of each Month Firefighting equipment refilling is being done yearly 	<ul style="list-style-type: none"> Thin gravel, improvement required As current practice Usage of Sump pit for Oil Disposal. Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Development of separate storage facility for oil drums is required. GRM plan to be communicated and implemented
2.	Bornagar, 132/33kV Substation	Bornagar, Nalbari	New 2x50 MVA 132/33 kV in place of old 2x25 MVA transformers.	<ul style="list-style-type: none"> Oil switchgears are not present Fire protection (Sand Buckets and Fire Extinguisher) are present in switchyard Oil leakage is not observed Sf₆ gas circuit breaker Extra gravels not required PPE's available 	<ul style="list-style-type: none"> Labelling of oil drums to be practiced. Development of separate storage facility for oil drums is required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. GRM plan to be communicated and implemented. Respiratory equipment's to be made available Ear Plugs to be provided Labelling of oil drums and other storage material needs strengthening
3.	Moran, 132/33 kV Substation	Moran, Dibrugarh	New 2x50 MVA 132/33 kV in place of old 2x16 MVA transformers.	<ul style="list-style-type: none"> Fire protection equipment's include (sand buckets and fire extinguisher) Sf₆ gas refilling is being done from time to time in circuit breakers Extra Gravels are not required First Aid Kits are available in control 	<ul style="list-style-type: none"> As current practice sump pit being used for transformer oil disposal. Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required.



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
				room	<ul style="list-style-type: none"> Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Development of separate storage facility for oil drums is required. Repair of slabs are required to avoid any accident. Ear plugs to be provided. GRM plan to be communicated and implemented
4.	Gauripur, 132/33kV Substation	Gauripur, Dhubri	New 2x50 MVA 132/33 kV in place of old 2x25 MVA transformers.	<ul style="list-style-type: none"> Fire protection equipment's include (sand buckets and fire extinguisher) Oil leakage is not reported Sf6 gas circuit breakers Sf6 retrieval arrangements available Storage facility is available Oil Leakage is not observed Fire detection system is not available, needs installation First Aid Kits are available in control room 	<ul style="list-style-type: none"> Sump pit being used for transformer oil disposal as a current practice. Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Repair of slabs are required to avoid any accident. Ear plugs to be provided. GRM plan to be communicated and implemented Training program to be developed and training sessions to be initiated Lightening needs improvement in existing substation Warning signage boards need strengthening HSE training required Waste management and scrap management training required Drainage system need strengthening Extra Gravels required PPE's are available (only hand gloves and helmet), thus requires strengthening. Incident related to electrocution observed in past 1 year, training related to chances and safety in relation to



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
					electrocution required.
5.	Dibrugarh, 132/33kV Substation	Dibrugarh, Assam	New 2x50 MVA 132/33 kV in place of old 2x31.5 MVA transformers.	<ul style="list-style-type: none"> • Fire protection equipment's include (sand buckets and fire extinguisher) • Oil leakage is not reported • Sf6 gas circuit breakers • Sf6 retrieval arrangements available • Storage facility is available (Dike Pole) • Oil Leakage is not observed • PPE's are available 	<ul style="list-style-type: none"> • Sump pit being used for transformer oil disposal. Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. • Installation of fire detection system and fire alarm system required. • Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. • Strengthening of drainage system is required • Ear plugs to be provided. • GRM plan to be communicated and implemented • Training program to be developed and training sessions to be initiated • HSE training required
6.	Depota, 132/33kV Substation	Kunderbari, Tezpur	New 2x50 MVA 132/33 kV in place of old 2x31.5 MVA transformers.	<ul style="list-style-type: none"> • Fire protection equipment's include (sand buckets and fire extinguisher) • Sf6 gas circuit breakers • Sf6 retrieval arrangements available • Extra Gravels not required • Fire detection system is not available, needs installation • First Aid Kits are available in control room 	<ul style="list-style-type: none"> • Sump pit not available for transformer oil disposal. Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. • Installation of fire detection system and fire alarm system required. • Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. • Ear plugs to be provided. • GRM plan to be communicated and implemented • Drainage system need strengthening • Training program to be developed and training sessions to be initiated • PPE's are available but needs strengthening (eye, face and hearing gears not available), thus needs strengthening. • HSE training required



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
					<ul style="list-style-type: none"> • Respiratory equipment's required • Disposal of contaminated soil with transformer oil as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 • Broken/missing slabs observed and need improvement • Warning signage boards need strengthening • Waste management and scrap management training required
7.	Kahilipara, 132/33kV Substation	Guwahati, Assam	New 3x50 MVA 132/33 kV in place of old 1x31.5 + 2x30 MVA transformers.	<ul style="list-style-type: none"> • Oil switchgear not available • Fire protection equipment's include (sand buckets and fire extinguisher) • Sf6 gas circuit breakers • Storage facility is available • Extra Gravels not required • Available toolbox, 1kV & 5kV meger, thermovisio camera, earth resistance tester • Smoke detectors available inside Kiosks • First Aid Kits are available in control room • Disposal being done by auction 	<ul style="list-style-type: none"> • Sump pit not available for transformer oil disposal. Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. • Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. • Ear plugs to be provided. • GRM plan to be communicated and implemented • Training program to be developed and training sessions to be initiated • HSE training required • Waste management and scrap management training required • Disposal of contaminated soil with transformer oil as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 • Sf6 retrieval arrangements to be made available • Drainage system needs strengthening • PPE's are available but needs strengthening (e.g. Helmet Shortage & eyeglasses) • Respiratory equipment's required • Lightening needs augmentation • Warning signage boards need strengthening



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
8.	Rangia, 132/33kV Substation	Rangia, Kamrup Rural	New 2x50 MVA 132/33 kV in place of old 2x25 MVA transformers.	<ul style="list-style-type: none"> Oil switchgear not available Fire protection equipment's include (sand buckets and fire extinguisher) Oil leakage is not reported. Sf6 gas circuit breakers Extra Gravels not required PPE's are available First Aid Kits are available in control room Disposal being done at suitable place 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Development of storage facility for transformer oil drums required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Ear plugs to be provided. GRM plan to be communicated and implemented Training program to be developed and training sessions to be initiated HSE training required Sf6 retrieval arrangement required Drainage system need strengthening Respiratory equipment's required Warning signage boards need strengthening
9.	Golaghat, 132/33kV Substation	Tetelital, Golaghat	New 2x50 MVA 132/33 kV in place of old 2x25 MVA transformers.	<ul style="list-style-type: none"> Oil switchgear not available Fire protection equipment's include (sand buckets and fire extinguisher) Sf6 gas circuit breakers First Aid Kits are available in control room 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Development of storage facility for transformer oil drums required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Ear plugs to be provided. GRM plan to be communicated and implemented Training program to be developed and training sessions to be initiated



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
					<ul style="list-style-type: none"> HSE training required Disposal of contaminated soil to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 Sf6 retrieval arrangement required Drainage system need strengthening Extra Gravels required Respiratory and earplugs equipment's required Warning signage boards need strengthening Boundary wall and fence needs strengthening Drinking water system needs renovation Training required for labelling, handling and waste management and disposal
10.	Shankardev nagar, 132/33kV Substation	Shankerdev Nagar, Kharbi Anglong	New 2x50 MVA 132/33 kV in place of old 2x25 MVA transformers.	<ul style="list-style-type: none"> Oil switchgear not available Fire protection equipment's available (sand buckets and fire extinguisher) No oil leakage reported Sf6 gas circuit breakers Sf6 retrieval arrangements available Extra Gravels not required (PCC and gravelling in switchyard is in progress) Monitor for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc. needs improvement. Guard Kiosk under construction First Aid Kits are available 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Development of storage facility for transformer oil drums required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Ear plugs to be provided. GRM plan to be communicated and implemented Training program to be developed and training sessions to be initiated HSE training required Drainage system need strengthening Respiratory, face shield and earplugs equipment's required Warning signage boards need strengthening Boundary wall and fence needs strengthening



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
					<ul style="list-style-type: none"> • Drinking water system needs renovation • Lightning needs strengthening • Training required for labelling, handling and waste management and disposal • Broken and missing slabs needs installation • HSE training and circulation of training materials required
11.	Kukurmara, 132/33 kV Substation/	Kukurmara, Kamrup	New 2x50 MVA 132/33 kV in place of old 1x25+ 1x16 MVA transformers. 220kV Line Bay for Azara – Boragaon 220kV line	<ul style="list-style-type: none"> • Oil switchgear not available • Minor oil leakage reported and rectified • Sf6 gas circuit breakers • Monitor for radiation and field levels and equipment integrity being done by MRT team • Fire detection system is available in control Kiosk • First Aid Kits are available 	<ul style="list-style-type: none"> • Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. • Fire protection equipment's available (sand buckets and fire extinguisher), refilling is required • Fire detection system is available in control Kiosk • No labelling is done at site, the quantities of drums are recorded in price stores ledger. Labelling needs improvement. • Development of storage facility for transformer oil drums required. • Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. • Ear plugs to be provided. • GRM plan to be communicated and implemented • Sf6 retrieval arrangements required • PPE's are available, needs strengthening • Respiratory equipment's, face shield, helmets and Earplugs required • HSE training and circulation of training materials required • Training required for labelling, handling and waste management and disposal
12.	Panchgram, 132/33kV Substation	Panchgram, Hailakandi	New 2x50 MVA 132/33 kV in place of old 2x25	<ul style="list-style-type: none"> • Oil switchgear not available • Fire protection equipment's include (sand buckets and fire extinguisher) 	<ul style="list-style-type: none"> • Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016.



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
			MVA transformers.	<ul style="list-style-type: none"> Sf6 gas circuit breakers Sf6 retrieval arrangements not available Fire detection system is available in Kiosk First Aid Kits are available in control room 	<ul style="list-style-type: none"> Installation of fire detection system and fire alarm system required. Development of storage facility for transformer oil drums required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Open drain available, needs improvement Ear plugs to be provided. GRM plan to be communicated and implemented Disposal of contaminated soil to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 Sf6 retrieval arrangements required Replacement of old gravels required PPE's are available, needs strengthening Respiratory equipment's and Earplugs required HSE training and circulation of training materials required Training required for labelling, handling and waste management and disposal.
13.	Boko, 220/132 kV Substation	Bhalukghat a, Boko	New 1X100MVA+1x16 0 MVA 220/132 kV in place of old 1x50 MVA transformers.	<ul style="list-style-type: none"> Oil switchgear not available Fire protection equipment's available (sand buckets and fire extinguisher) Lined pits are available for the emergency oil leakage situation Sf6 gas circuit breakers Sf6 retrieval arrangements available Small storage facility/shed available inside switchyard (containment/dikes/berms) Oil leakage from transformer was observed in 2018-2019, now rectified 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Development of storage facility for transformer oil drums required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Ear plugs to be provided. GRM plan to be communicated and implemented Drainage system needs improvement



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
				<ul style="list-style-type: none"> No extra gravels required First Aid Kits are available 	<ul style="list-style-type: none"> PPE's are available, needs strengthening Respiratory equipment's, earplugs, Gum boots required HSE training and circulation of training materials required Drinking water system needs renovation Training required for waste management and disposal
14.	Agia, 220/132 kV Substation	Agia, Goalpara	New 1x160 MVA 220/132 kV in place of old 1x50 MVA transformers.	<ul style="list-style-type: none"> Oil switchgear not available Fire protection equipment's available (sand buckets and fire extinguisher) Pits are available at transformer pads Sf6 gas circuit breakers Sf6 retrieval arrangements available Small storage facility/shed available inside switchyard (containment/dikes/berms) Oil leakage from transformer was observed in 2018-2019, now rectified Extra Gravels is under progress 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016. Installation of fire detection system and fire alarm system required. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Ear plugs to be provided. GRM plan to be communicated and implemented PPE's are available, needs strengthening Respiratory equipment's and earplugs not available Broken slabs need strengthening HSE training and circulation of training materials required Drinking water system needs renovation Training required for waste management and disposal Open drainage system needs strengthening.
15.	132/33KV Grid Sub-Station, Nalbari, Sariahtali	Sariahtali, Dist: Nalbari, Assam	132kV line Bay for Nalbari – Kumarikata 132kV S/C Line	<ul style="list-style-type: none"> Oil switchgear not available Storage shed is available. Fire protection equipment's available (Nitrogen injection fire protection system, fire extinguishers/sand buckets) are available. Oil Leakage not reported. Sf6 gas circuit breakers Shed type storage facility available inside the complex. 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 Sf6 retrieval arrangements to be made available Extra Gravels are required. Fire detection system/NIFPS to be installed. Hearing (earmuffs), Respiratory aids are to be made available Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated.



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
				<ul style="list-style-type: none"> PPE such as Gloves, gum boots, safety helmet etc are available Workplace signage, warning and caution signs are adequate Lighting (including security lights) are adequate First Aid Kit Available in Control Room Fence is adequate to ensure the enclosure of area. Safety inspection, testing and calibration is being done regularly. Safety training being carried out periodically. Disposal and management of waste being carried out adequately. 	<ul style="list-style-type: none"> GRM plan to be communicated and implemented
16.	132kV Sarupathar GSS	Sarupathar Golaghat	Two 132 kV line bays for Khumtai – Sarupathar 132kV D/C line	<ul style="list-style-type: none"> Oil switchgear not available Storage shed is available. Oil pits are available at transformer pad Fire protection equipment's available (Nitrogen injection fire protection system, fire extinguishers/sand buckets) are available. Oil Leakage not reported. Gas insulation switch gears are under construction Sf6 retrieval arrangement are available Shed type storage facility available inside the complex. Switchyard is under construction. Fence is adequate to ensure the enclosure of area. 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 Safety inspections to be maintained Fire detection system/NIFPS to be installed. As switchyard is under construction availability of PPE such as Gloves, gum boots, safety helmet, Hearing (earmuffs), Respiratory aids are to be ensured. Installation of Workplace signage, warning and caution signs and Lighting (including security lights) to be ensured. First Aid Kit to be made available. Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. Safety training to be carried out periodically. Training on disposal and management of waste to be



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S. No.	Substation	Location	Proposed Augmentation	E&S Compliance Status	E&S risks noticed
					<p>conducted.</p> <ul style="list-style-type: none"> GRM plan to be communicated and implemented
17.	132kV Gohpur GSS	Gohpur, Biswnath	AIS to GIS	<ul style="list-style-type: none"> Oil switchgear not available Storage shed is available. Oil Leakage not reported. Sf6 retrieval arrangements not available Fire protection equipment's available (sand buckets and fire extinguisher). Fence is adequate to ensure the enclosure of area. First Aid Kit Available in Control Room. PPE such as Gloves, gum boots, safety helmet etc are available. Workplace signage, warning and caution signs are adequate. Safety inspection, testing and calibration is being done regularly. Safety training being carried out periodically. Disposal and management of waste being carried out adequately. No extra gravels required. 	<ul style="list-style-type: none"> Transformer oil disposal to be carried out as per Hazardous and Other Wastes (Management & Trans boundary Movement) Rules, 2016 Sf6 retrieval arrangements to be made available Fire detection system/NIFPS to be installed. Hearing (earmuffs), Respiratory aids are to be made available Periodic baseline monitoring for Air quality, Water Quality and Noise Level to be initiated. GRM plan to be communicated and implemented



5.3. Environmental and Social Impacts

Environmental impacts can be classified as primary or secondary. Primary impacts are those, which are attributed directly to the project while secondary impacts are induced by / associated with primary impacts. The following assessment was undertaken to identify the impacts and risks.

- Identify and assess the range of potential impacts and the extent of severity
- Suggest viable mitigation measures for the identified impacts
- Develop an Environment and Social Management Plan based on the proposed mitigation measures

Environmental impacts involve air and noise emissions, ground and surface water contamination, impacts on local biodiversity, disposal of construction waste and demolishing waste, etc. Social impacts are related to possible loss of property/ income of the land owners, impact of accessibility and irrigation drainage system and the other impacts such as better availability of power supply. Further impact evaluation has been done based on proposed project activities including pre-construction, construction and operational stages.

In addition to above, AEGCL, while executing any project takes all necessary precautionary measures to ensure that project should not affect any E&S parameters. It will ensure that the detailed survey of transmission route and development of master plan for substations will re-identify potential environmentally and socially sensitive site/ area/ issues, to avoid or minimize impact of any kind. During execution of work, if AEGCL comes across any unexpected environmental and social issues, it will take prompt action by implementing mitigation measures in consideration of the best technical solutions and document in the E&S monitoring reports.

5.3.1. Significance of Impact

The significance of each potential impact is established using the impact significance matrix shown in **Table 37**.

Table 37: Significance of Impact Criteria

Magnitude of Impact ²⁹	Sensitivity of Receptors ³⁰			
	Very High	High	Medium	Low
Major	Critical	Major	Moderate	Minor
Moderate	Major	Major	Moderate	Minor
Minor	Moderate	Moderate	Minor	Minimal
Minimal	Minimal	Minimal	Minimal	Minimal

5.3.2. Impacts Matrix

The subprojects are largely situated on or/and pass through plain terrain under single/double crop cultivation, Tea plantations or waste land areas at few places. Substation location or RoW portion of transmission line does not fall under any protected areas/ reserved forests or wildlife corridors as notified by GoI

The identified suitable routes for various transmission lines crosses major and minor rivers at multiple locations, which will require additional design specification for towers as used by AEGCL in previous projects, to avoid tower footings in the rivers. No Resettlement and Rehabilitation issues are identified at this stage of project. Compensation of standing crop and trees is proposed be provided to affected people as per Electricity Act, 2003. The overall E&S risks associated with the project will be insignificant, whereas the project will contribute to major economic development in the relevant areas.

A detailed analysis of E&S impacts as identified as part of baseline assessment is described in a matrix format in **Table 38** below, for project pre-construction, construction and operation stages.

²⁹ The magnitude of impacts have been categorized as major, moderate, minor or minimal, based on consideration of parameters such as: (i) duration of the impact; (ii) spatial extent of the impact; (iii) reversibility; (iv) likelihood; and (v) legal standards and established professional criteria.

³⁰ The sensitivity of E&S receptors (a parameter that may be affected by the project) has been determined based on review of the local population (including proximity/numbers/vulnerability) and presence of features at the project sites or the surrounding area.



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Table 38: Environmental and social impacts matrix

Sr. No.	Project Activity	Potential Environment & Social Impact	Impact (Positive/Negative)	Nature (Temporary/Permanent)	Significance
Pre - Construction Phase					
1	Substation location and design	Exposure to noise. Disturbance to the adjacent lands and the people due to cut and fill operations	Negative	Temporary (during pre-construction activity only with medium sensitivity to receptors)	Minor
2	Location of transmission towers and transmission line alignment and design	Exposure to safety related risks. Impact on residences, railway, road, other utility for safe clearances	Negative	Temporary (w.r.t construction and tower footing with high sensitivity to receptors)	Moderate
3	Equipment specifications and design parameters	Release of chemicals and harmful gases in receptors (air, water, land)	Negative	Temporary (equipment to be stored or used as per specifications of manufactures/ supplier with medium sensitivity to receptor)	Minor
4	Encroachment into sensitive ecological areas	Loss of ecological values/ damage to protected species	Negative	Temporary	Minor
5	Explosions/ Fire	Hazards to life due to improper storage of combustible or flammable material	Negative	Temporary (Limited to Substation only and modern fire control systems/ fire protection walls is to be considered as part of design specifications. If occurs, sensitivity toward receptor will be high)	Moderate
6	Substation Land	Most of the selected land parcel is government land. Where <i>Patta</i> land or private land is considered, applicable compensation to be paid as per law of land.	Negative	Permanent impact with high sensitivity	Moderate
Construction Phase					
7	Removal or disturbance to other public utilities	Public inconvenience	Negative	Temporary (Limited to construction period only with high sensitivity to receptor)	Moderate
8	Temporary use	Loss of agricultural	Negative	Temporary	Minor



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Sr. No.	Project Activity	Potential Environment & Social Impact	Impact (Positive/Negative)	Nature (Temporary/Permanent)	Significance
	of cultivable lands	productivity		(Limited to construction period only with medium impact, considering the compensation as per the law of land)	
9	Temporary outage of the electricity	Loss of power supply to the local community when distribution lines are switched off due to crossing the new transmission line	Negative	Temporary (Limited to construction period only and medium sensitivity)	Minor
10	Equipment layout and installation	Noise and vibrations	Negative	Temporary (Limited to Substation premise and as per prescribed guidelines with high receptibility)	Moderate
		SF ₆ leakage during storage and erection of Switchgear			
11	Substation construction	Loss of soil	Negative	Temporary (Limited to construction period only, considering the presence of canals/channels, water bodies near to proposed route of TL the sensitivity will be high)	Moderate
		Interference in drainage of rain and waste water at site			
		Water pollution			
12	Construction schedules	Noise nuisance to neighboring properties	Negative	Temporary (Limited to construction period only with medium sensitivity to receptors)	Minor
		Nuisance to wildlife if the line construction crosses their migratory path			
13	Provision of facilities for construction workers	Contamination of receptors (land, water, air)	Negative	Temporary (Limited to construction period only with high sensitivity to receptors)	moderate
14	Surplus soil/earthwork	Runoff to cause water pollution, solid waste disposal	Negative	Temporary (Limited to construction period only with high sensitivity to receptors)	Moderate
15	Air Pollution	Loose dust might blow in the area causing dusty conditions	Negative	Temporary (Limited to construction period only with medium sensitivity to receptors)	Minor



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Sr. No.	Project Activity	Potential Environment & Social Impact	Impact (Positive/Negative)	Nature (Temporary/Permanent)	Significance
16	Wood/Vegetation harvesting, cut and fill operations	Loss of vegetation and deforestation	Negative	Temporary (Limited to construction period only, low sensitivity to receptor in presence of regulations)	Minor
		Effect on fauna			
17	Site clearance	Vegetation	Negative	Temporary (Limited to construction period only, considering manual site clearance sensitivity will be low)	Minor
		Soil erosion and surface runoff			
18	Mechanized construction	Noise, vibration and operator safety, efficient operation Noise, vibration, equipment wear and tear	Negative	Temporary (Limited to construction period only, with limited mechanized construction sensitivity will be low. However, in case of demolishing of structure which are generally not RCC it can be considered medium)	Minor
19	Construction of roads for accessibility	Increase in airborne dust particles Increased land requirement for temporary accessibility	Negative	Temporary (Limited to construction period only with medium sensitivity to receptors)	Minor
20	Transportation and storage of materials	Nuisance to the general public	Negative	Temporary (Limited to construction period only and within specific area with medium sensitivity to receptors)	Minor
21	Trimming/cutting of trees within RoW	Fire hazards Loss of vegetation and deforestation	Negative	Temporary/permanent (Only before commissioning of assets with high sensitivity to receptors)	Moderate
22	Occupational & General Health and safety, GBV	Injury of workers and members of the public to be mitigated with adequate safety measures.	Negative	Temporary/Permanent (Limited to construction period only with high sensitivity to receptors)	Moderate
23	Nuisance to nearby properties	Losses to neighboring land uses	Negative	Temporary (Limited to construction period)	Minor



Environmental and Social Management Planning Framework

Sr. No.	Project Activity	Potential Environment & Social Impact	Impact (Positive/Negative)	Nature (Temporary/Permanent)	Significance
				only with low sensitivity to receptors)	
24	Adverse effect to Bird species due to collision or electrocution	Death or injury to the birds due to collision with transmission lines in highlighted areas, to be mitigated through appropriate preventive equipment installation	Negative	Temporary/Permanent (Project is not affecting any ecological/ bird areas with high sensitivity to receptors)	Major
25	Work execution into farmland	Loss of agricultural production	Negative	Temporary (Limited to construction period only with high sensitivity to receptors)	Moderate
26	Interference with drainage patterns/ Irrigation channels	Temporary blockage/ loss of agricultural production	Negative	Temporary (Limited to construction period only with high sensitivity to receptors)	Moderate
Operation and Maintenance Phase					
27	Electric & Magnetic Field (EMF) Effects	Health impact to the workers and general public, however mitigated by virtue of maintaining RoW clearance	Negative	Temporary/Permanent (EMF effects are far below than the exposure limit with Low sensitivity)	Moderate
28	Noise generation	Nuisance to the community around the site	Negative	Temporary (within prescribed limits with low sensitivity to receptors)	Minor
29	Soil Erosion	Removal of top soil	Negative	Temporary with low sensitivity to receptors	Minor
30	Maintenance of Substation and Transmission line	Exposure to electromagnetic interference	Negative	Temporary (within prescribed limits with low sensitivity to receptors)	Minor
31	Oil spillage	Contamination of land/ nearby water bodies	Negative	Temporary/Permanent (within substation boundaries with high sensitivity to receptors)	Major
32	Operation of Switchgear	Leakage of SF ₆ gas	Negative	Temporary (within prescribed limits with low sensitivity to	Minor



Sr. No.	Project Activity	Potential Environment & Social Impact	Impact (Positive/Negative)	Nature (Temporary/Permanent)	Significance
				receptors)	
33	Occupational & General Health and safety	Injury to workers and members of the general public	Negative	Temporary/Permanent with high sensitivity to receptors	Major
Positive Impacts brought from the Project					
1	Revenue/income Generation	Sale/purchase/procurement of construction material, selling of power, etc.	Positive	Temporary/Permanent	Major
2	Increase in socio-economic activities	Availability of improved and reliable quality power	Positive	Permanent	Major
3	Creation of Employment	Employment Opportunities for skilled/ unskilled labourers	Positive	Temporary/Permanent	Major

5.4. Impact Mitigation Strategy

The impact mitigation strategy will follow the hierarchy of **avoid, remedial, and compensate/offset**. It is clearly evident from the alternative route studies that the first step is to avoid impacts to the farthest extent possible.

In the consideration of the substation site, the following parameters were observed:

- Avoidance of settlement clusters or villages habitation sites.
- Distance to be maintained from villages and cultivable lands.
- Avoid inclusion of waterbodies, marshy land, etc. for selection of sites.
- Avoid ecological sensitive areas and proximity of sensitive receptors (school, hospitals, etc.)
- Government wasteland to be sought for the establishment of the substation site, where unavoidable, compensation to be paid to private owners as per applicable laws.

As specified in the survey report and discussion with AEGCL authorities, while considering the transmission line routes, alternative route assessments were conducted taking into account the following parameters.

- Avoiding Forestland: The route selection considered the best option to avoid forest land/PAs as far as possible.
- Avoiding Habitation: The key considerations in selecting the corridor route included avoiding clustered settlements, common access routes and pathways, markets, community structures and private land to the extent possible.
- Length/Crossings: The route identified ensures the most feasible one after considering the environmental, ecological and social impacts of the same.
- The alignment of the Transmission Line should be most economical from construction and maintenance point of view.
- The number of angle points to be kept to a minimum.
- The distance between the terminal points specified to be kept shortest possible and consistent with the terrain that it encounters.
- Marshy and low-lying areas, river beds and earth slip zones to be avoided to minimize the risk to the foundations.
- It would be preferable to utilize level ground for the alignment.
- Crossing of power lines should be kept to minimum. Alignment should be kept at a minimum distance of 250 meters from power lines to avoid induction problems on the lower voltage lines.



- Crossings of communication lines should be minimum and should be preferably at right angles. Proximity and parallelism with telecommunication lines should be eliminated to avoid danger of induction between them.
- Areas subject to flooding such as channels, drains, canals should be avoided.
- Restricted areas such as civil and military airfields should be avoided including aircraft landing approaches.
- All alignments should be easily approachable in dry and rainy seasons to enable maintenance throughout the year.
- Areas that will present the problems of “Right of Way” and “Way Leave” during construction and maintenance should be avoided.
- Effort should be made to keep the route at a distance from mining areas.

Depending on the magnitude of the impact, the next sequence would be to provide remedial measures for the identified impact. Wherever required, suitable remedial measures are considered for the incurred impact as part of design alternations. Wherever remedial measures are not possible, compensatory mechanisms to be followed for suitable compensation and payment for the losses incurred. The last sequence in the hierarchy, with foremost attention being paid to avoiding as many of the impacts as possible by conducting awareness programs and safety Audits as part of the mitigation strategy.

Awareness Programs: Some of the safety awareness activities such as:

- Public awareness by meeting with villagers, builders, transporters, schools, NGOs/CBOs, and putting up safety posters, safety slogan and advertisement in print and electronic media.
- District commissioner/ electrical inspector/ police department/local authority approached for removal/ prevention of unauthorized construction nearby EHV transmission lines violating Electricity Act 2003.
- Education to workers on Personal Protective Equipment (PPE), safety tools and prevention of GBV risks.

Safety Audits: Safety inspections to be undertaken by Environmental and Social Specialist of PMU and PMC as a regular practice. Steps needed to follow:

- Checking of safety tools - Availability and its present condition; Utilization and testing.
- Safety awareness and identifying hazards for various maintenance activities in the switchyard and the transmission lines.
- Precaution to be taken while issuing permit for the work.
- Operation of portable fire extinguishers and their healthiness.
- Ensuring electromagnetic field (EMF) is minimized at all transmission lines using proper design criteria as per Indian Electricity Act rules.

5.5. Potential Environmental & Social Impacts and Proposed Mitigation Measures

In this section, environmental and social issues arising from a typical Substation and Transmission Lines project are discussed. AEGCL has the experience in managing these issues and their applicability in various phases of project cycle is presented in as follows.

Pre-Construction Stage:

The initial phase of construction usually begins with a mobilization or preconstruction phase during which the site is prepared for construction.

Project Conceptualisation: During this stage of the proposed project, environment and social screening process assist in identifying potential environment and social issues that may require evaluation and implementation during project development. The environmental screening and scoping report form an integral part of project feasibility study and is tabled to the internal management committee for appraisal. At this stage, Funding Agencies (FA) may separately appraise the project.



Project Planning: Under this stage, tentative locations for substation sites are identified, and environment and social screening is conducted. Preliminary transmission route for the project is finalized at this stage based on environmental baseline information and other engineering parameters. Following this, substation/s are identified through screening and scoping exercise, and Generic Environmental and Social Management Plan is prepared.

Construction Phase:

This phase will include major civil works such as land clearing and excavation, construction of substations, tower footing, stringing of conductors, access road construction or improvement, construction of worker accommodation (and use of temporary accommodations), arranging for adequate security systems and technical measures at the accommodation and construction sites. This is often the period of the greatest E&S impact. It is critical that the correct documents, training, procedures, and systems are in place to ensure the impacts are addressed and managed properly.

Operational Phase:

Between the end of construction and the beginning of its operation, there is a substantial transition period where most, if not all, of the professionals who designed, installed, and verified the initial condition of the transmission line and substation cease to be involved. A new team of people begins to run the asset, taking on the phase with far greater costs and environmental impact. This shift in personnel presents one of the greatest risks to the parties' ability to bridge the gap from construction to efficient operations. The ESMP helps understand the identified impacts that can result during the operation of substations and transmission lines and further implementation of the mitigation measures to reduce impacts.

Impact Assessment:

This section presents a summary of the environmental, socio- economic, demographic and cultural context in which the proposed subprojects are to be implemented and made operational. This has been done by establishing the environmental and social baseline for the project area. While identifying the key features, the section also discusses the type and range of impacts likely to result from the different project activities, measuring its extent and severity. The specific purpose of this section is to

- Identify and assess the range of potential impacts and extent of their severity;
- Explain the ways in which the project might affect environment, ecology, socio-economic resources, demographics, livelihoods, cultural patterns, as well as access and infrastructure issues;
- Suggest viable mitigation measures for the identified impacts; and
- Develop a management plan based on the proposed mitigation measures.

These impacts have been identified through field surveys, consultation and assessment of secondary information. Discussions with stakeholders including project proponents, district officials, village representatives and local inhabitants also were undertaken along the study area.

A. Impacts on Physical Environment and Mitigation Measures

a) Project location and design

Impacts: Environmental impacts of transmission projects and substations are not far reaching and are mostly localized to the RoW and the substation boundary. However, transmission projects have some effects on natural and socio-culture resources. The decision on project location and design will be directly in relation with the chances of potential

- Impacts on terrestrial habitat including (i) Forest Fire; (ii) Avifauna and bat collision and electrocutions.
- Impact on eco-sensitive areas (like national parks, wildlife sanctuaries etc.)
- Impact on socio-economic, historical and cultural resources



Mitigation Measures: These impacts can be minimized by careful route selection. In order to get latest information and further optimization of route, modern survey techniques/tools such as GIS, GPS and drones can be applied. Introduction of GIS and GPS in route selection results in access to updated/latest information, through satellite images and further optimization of route having minimal environmental impact. Moreover, availability of detailed information pertaining to topographical and geotechnical constraints, forest and environmental factors, etc. help in planning effective mitigation measures including engineering variations depending upon the site situation/location. Selection of an optimum route primarily avoiding:

- Human settlements and grazing land.
- Environmental sensitive locations such as school, colleges, hospitals, religious structures, monuments, etc.
- Notified Eco-sensitive locations and dense plantation.
- Socially, Culturally, Archaeologically sensitive area.

B. Social and Labour Impacts and Mitigation Measures:

a) Resettlement and Loss of Standing Crop

Impacts: For transmission line no permanent acquisition is envisaged but private agricultural lands sometimes get acquired for the construction of substations, this may result in loss of livelihood to the concerned cultivators and agricultural workers. Land for tower and RoW is not acquired as agricultural activities can continue after the construction phase but Installation of transmission towers may reduce the price of the property. Moreover, Foundation and erection of towers and stringing of transmission lines involves movement of machinery. This may cause damage to the standing crops in agriculture field resulting in negative impact on cultivators' livelihoods.

Mitigation Measures: As discussed with the AEGCL, all preventive measures are undertaken by it during the line routing stage, to avoid both rural and urban settlements to the extent possible. Also keeping in mind that no permanent acquisition of land is involved for tower foundation as per existing law, the proposed subprojects will not require any resettlement of people/persons. However, some temporary damages/ disturbances can happen, which will be compensated as per the law of the land and applicable/prevaling guidelines. The assessment of baseline information for transmission lines where preliminary route survey is initiated specifies that the proposed transmission lines will largely traverse through agricultural lands and tea estates. AEGCL follows the principle of Avoidance, Minimization and Mitigation in the construction of transmission line in agricultural field having crop due to inherent flexibility in phasing the construction activity and tries to defer construction in cropped area to facilitate crop harvesting. However, if it is unavoidable and is likely to affect project schedule, compensation is given at market rate for standing crops. All efforts will be ensured by AEGCL to minimize the crop damage to the extent possible in such cases. AEGCL will avoid damages to crop/trees by taking up the construction activities during lean period or post-harvest season. As per the prevailing norms farming activity allowed after the construction work is completed. However, compensation for the loss of crops/trees/any structure etc. is paid to Affected Persons (APs) for the area damaged to mitigate the impacts prior to foundation work, tower erection & stringing as per the prevailing situation.

The Right to Fair Compensation in Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013' (RFCT in LARR, 2013) effective from 1st January 2014 represents a significant milestone in the development of systematic approach to address land acquisition, rehabilitation and resettlement collectively in India. The Act require social impact assessments for projects involving land acquisition, although it would set minimum threshold of people affected for this provision to apply. The Act also expands compensation coverage of the principal act by requiring that the value of trees, plants, or standing crops damaged must also be included and solatium being 100 percent of the all amounts inclusive. The Act furthermore ensures that all compensation to be paid prior to project taking possession of any land.

b) Historical/cultural monuments/value or Temporary loss of access to common property resources

Impacts: During construction phase of transmission lines, access to common property resources for the local community may be temporarily limited. The local communities use common property resource lands for various purposes such as religious services, celebrations, observations of holidays, grazing ground for their



cattle and sourcing biomass for cooking fuel. Acquisition of these lands for construction of substation results in loss of common cultural and natural resources of the local community that could affect their socio-economic condition. The temporary impacts for CPRs can be linked with the utility shifting during the construction phase.

Mitigation Measures: As per the policy of route selection, only that route alignment is finalized which avoids all the historical and cultural monuments. The preliminary assessment for the finalization of route alignment reveals the absence of such monuments in the proposed route alignments. Moreover, utmost care shall be taken during detailed survey to avoid such structures or any impact in relation to utility shifting or disturbance to access route for CPRs

c) Chance Finds of Cultural Resources:

Impacts: All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the Government and shall be dealt with as per provisions of the relevant legislation. The chances of damage to remains of archaeological interest is higher in absence of pre-defined procedures for dealing with such articles or things.

Mitigation Measures: It will be ensured that the Contractor takes the reasonable precautions to prevent his/her workers or any other persons from removing and damaging any such article or thing. He/She will, immediately upon discovery or thereof and before removal acquaint the Environmental Specialist – PMU/PMC of such discovery and carry out the PMU/PMC instructions for dealing with the same, awaiting which all work shall be suspended. The PMU/PMC will seek direction from the Archaeological Survey of India (ASI) before instructing the Contractor to recommence the work in the site. The Archaeological structures identified along the route alignment should be protected/ preserved or enhanced as per the law.

During excavation, if any treasure, archaeological artifacts are found the same will be intimated in writing to District Collector or Commissioner/Archaeology department as per the provisions of Section-4 of “Indian Treasure Trove Act, 1878 as amended in 1949”. The construction activity will be suspended temporarily during this process.

d) Visual aesthetics

Impacts: Erection of transmission towers and lines affects the aesthetics of the area. Concerns regarding impairment or impact on visual aesthetics due to the project were not raised in any of the consultations.

Mitigation Measures: The project authorities will avoid proposing transmission line routes and substation in the vicinity of tourist spots or any area of cultural and social importance.

e) Occupational Health and Safety

Impacts: Major occupational health and safety hazards specific to power substation and transmission primarily include:

- Live power lines: Workers may be exposed to occupational hazards from contact with live lines during operation & maintenance activities.
- Working at height: Workers may be exposed to occupational hazards when working at elevation during operation & maintenance activities.

During construction physical injury can result from workers slipping along the slopes; road accidents, accident to workers during erecting of towers and other occupational hazards. Stringing activity around low tension/ high tension wires and other electrical units can be a potential hazard if proper planning is not followed. Workers at times are not accustomed to use of Personal Protection Equipment (PPE), their attitude to avoid PPE may result in accident/hazard.

Mitigation Measures: To overcome/ prevent such occurrence, AEGCL has prepared its Safety Manual on Transmission System, which is required to be followed during constructions and operations. Salient features of the Safety Manual & Instructions are as under:

- Safety rules for working or testing on, or near to, MV and LV equipment
- Safety rules for working or testing on, or near to mechanical equipment
- Safety during operation of equipment



- Demarcation of working and testing areas
- General rules to be observed for safety of employees in construction and maintenance works of transmission lines
- Safety instruction for switching, Earthing and safety documentation procedure
- Safety during work on conductors between towers
- Raising and lowering phase conductors at suspension towers, fitting repair sleeves/joints to phase conductors
- Safety precautions for low voltage and medium voltage equipment
- Safety precautions for adding/removing equipment's (new/old) to & from EHV/HV system
- Safety instruction for station storage battery
- Safety instructions for Sf6 gas filled equipment
- Safety instructions for fire protection areas
- Safety procedure for hot line work.

AEGCL's Safety manual is available at all divisional offices and is also available on weblink: https://www.aegcl.co.in/Safety_Manual_AEGCL.pdf

Almost all of the environmental, health and safety aspects of the projects are very well governed by Indian standards, rules and guidelines, wherever such standards are not available, international standards and guidelines such as Environmental, Health, and Safety General Guidelines and Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution from International Finance Corporation (IFC) to be referred (<https://www.ifc.org/wps/wcm/connect/7b65ce6b-129d-4634-99dc-12f85c0674b3/Final%2B-%2BElectric%2BTransmission%2Band%2BDistribution.pdf?MOD=AJPERES&CVID=jqeI4Rs&id=1323162154847>).

f) Labour

Impacts: The risk for sexually transmitted disease and other communicable disease from other states in case of migratory labour will be higher due to lack of skilled labour in Assam, as discussed with AEGCL. The sanitation conditions of the labour camps and availability of basic health care facility can also result in off spread of disease and safety issues. The project will also involve Safety and security concerns of women and other population around the construction site. The chances for violation of labour laws (No child labour, minimal wages, equal labour wages, migratory labour license, labour license, Insurance etc.) are minimal considering the contractual binding but cannot be left unaddressed. However, to keep a check on the compliance weekly monitoring of compliance towards contractual clauses as well as legal requirements is highly recommended by local officials of AEGCL as well Project Management Consultancy.

Mitigation Measures:

- Contractor will follow labour standards as per applicable laws such as minimum wages, equal pay for equal work, no child labour, etc.
- Provision of welfare measures such as canteens, first aid facilities, housing accommodation for workers near the work place etc. will be made available by the contractor.
- Contractor and PMC consultant will disseminate information at worksites on risks of sexually transmitted diseases and HIV/AIDS as part of health and safety measures for those employed during construction
- Contractor will follow and implement legally mandated provisions on labor (including equal pay for equal work), health, safety, sanitation, working conditions like proper amenities at all labour camps such as safe drinking water, toilets facilities at substations, waste management at sites, day care for children staying in camps etc.
- Dedicated GBV/SE measures to be included
- Workers' camp management

g) Electric and Magnetic fields

Impact: Electric and magnetic fields (EMF) are invisible lines of force emitted by and surrounding any electrical device (e.g. power lines and electrical equipment). Electric fields are produced by voltage and increase



in strength as the voltage increases. Electric field strength is measured in kilo volts per meter (kV/m). Magnetic fields result from the flow of electric current and increase in strength as the current increases. Magnetic fields are measured in units of gauss (G) or tesla (T), where 1T equals 10,000 G. Electric fields are shielded by materials that conduct electricity, materials. Magnetic fields pass through most materials and are difficult to shield. Both electric and magnetic fields decrease rapidly with distance. Power frequency EMF typically has a frequency of 50 Hertz (Hz), and is considered Extremely Low Frequency (ELF) (**Table 39 & Figure 7**).

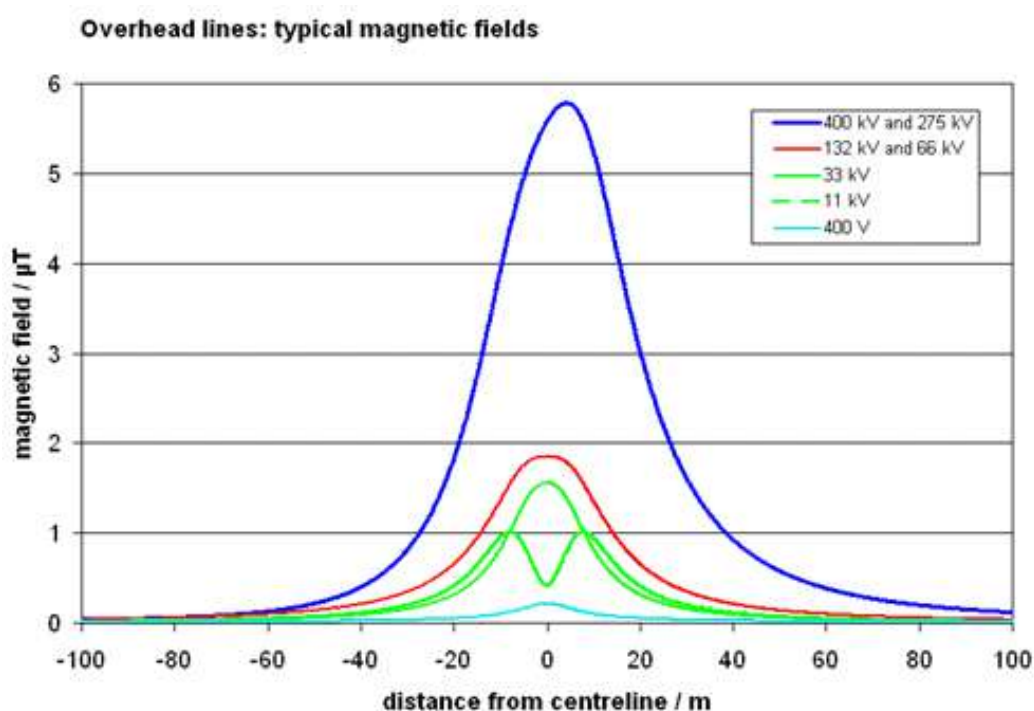
Although there is public and scientific concern over the potential health effects associated with exposure to EMF there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmissions lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.

World Health Organization (June 2007) recommends using exposure guidelines published by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). The ICNIRP (2010) has set the limits at 50 HZ for the public exposure as: (1) electric field strength (kV per meter) is 5 kV/m, and (2) magnetic field strength (micro tesla) is 200 μ T (equivalent to 160 A/m); while for the occupational exposure as: (1) electric field strength is 10 kV/m and (2) magnetic field strength is 1000 μ T.

Table 39: EMF exposure limits of ICNIRP

Exposure	Electric Field (kV/m)	Magnetic Field (μ T)
Public	5	200
Occupational	10	1000

Figure 7: EMF cross section diagram



Source: EMFs. Info

From the above given cross section figure it can be surmised that, the typical electromagnetic field of a 400 kV 275 kV transmission line at 17.5 m (i.e. the RoW on one side of the 220 kV transmission line) is of the magnitude of 2 μ T, which is far below than the permissible safe level of 200 μ T and EMF level of lower voltage class lines i.e. 220 KV. Based on the above analysis no further environmental and occupational health impacts

due to EMF generation are considered under this study. Based on the literature review,³¹ the maximum electrical field generated by the 400 kV double circuit line is estimated at 5 kV/m, around the distance of 11 m from axis of line, equivalent to the 5 kV/m safe limit for public specified by ICNIRP. The RoW of 400 kV DC line is 52 m, which is wide enough to maintain 11 m.

Mitigation Measures: The EPC contractor shall ensure the design to be compliant with above mentioned international standards and the EMF along the transmission line will be complaint with international standards. This will minimize the community based health risks associated with 400 kV and below transmission lines.

C. Ecological Impacts and Mitigation Measures

a) Transmission lines crossing into sensitive ecological areas

Impacts: As per survey reports and selection of sites for substations, necessary precautions have been taken to avoid routing of line through forest and Protected Areas (national park/sanctuaries); None of the proposed transmission line routes diverse from any reserve forest of protected area. However, some of the transmission line fall within 5km aerial distance of Key IBAs. However, these transmission does not pass from any notified protected area by GoI:

1.. 132kV Khumtai (AEGCL-New) - Sarupathar (AEGCL-Existing) S/C Line: The proposed line and substation premise doesn't fall under Key Biodiversity Areas but is present within 3km radius of Garampani Nambor and Nambor-Doigrung WLS.

. 400kV LILO of 1 ckt of Silchar (PGCIL)-Byrnihat (Meghalaya) Line at Sonapur substation: The proposed line and substation premise doesn't fall under Key Biodiversity Areas but Amchang WLS is present at a distance less than 1 km from proposed substation and BEE line.

A width clearance of 3 m is presently allowed below each conductor for the movement of tension stringing equipment. The looping of tress for stringing and maintenance of RoW will result in felling, pollarding and pruning of trees for electrical clearance. Lopping and felling of trees can open up forest canopy allowing penetration of sun light to the bottom, resulting in edge effect and allowing for proliferation of socio-phytic weeds, particularly in context to North East India with presence of semi green and evergreen biotopes.

Mitigation Measures: Suitable management measures as specified such as minimizing RoW requirement, maintaining required ground clearance, use of existing tower, use of tall or extended tower, underground cabling if line is through PA, etc. wherever feasible will be undertaken to minimize the loss of vegetation as well as protection of wildlife. The project authority (AEGCL) will take the requisite statutory clearance and approval from concern authorities before starting work in such case. As the administrative rights of RoW will remain with the Forest Department, AEGCL will obtain requisite permission from concerned forest officers from time to time for pruning of trees in project operation stage.

b) Impact on Avia-Fauna

Electrocution:

Impacts: Electrocution of birds is caused when a bird bridges the gap between either a live phase or an earth component (phase-earth electrocution) or two live phases (phase-phase electrocutions) (Harness and Wilson 2001). Birds sitting on power poles and /or conducting cables could cause short circuits between energized wires or short to ground especially for numerous medium sized birds and large birds using the power poles as perching, roosting and even nesting sites. Birds are able to cause electrical faults (short circuits on power lines). Power lines pose a number of threats to a variety of birds especially those migrating, in large flocks and large birds with limited maneuverability. Birds of prey are vulnerable to mortality due to overhead lines.

Mitigation Measures:

- Provide artificial bird safe perches and nesting platforms placed at a safe distance from the energized parts

³¹ Extremely Low Frequency (ELF) Fields (<http://www.inchem.org/documents/ehc/ehc/ehc35.htm>) published by WHO 1984.



- Cross-arms, insulators and other parts of the power lines can be constructed so that there is no space for birds to perch where they can be proximate to energized wires.
- All terminal structures (transformers) should be constructed with sufficient insulation on jumper wires and surge arrestors

Risk of Collision

Impacts: Collisions are a significant threat posed by overhead lines to birds (van Rooyen 2004). Those that would be mostly impacted are Bengal Florican, storks, cranes and various species of ducks. These species are mostly heavy-bodied birds with limited maneuverability, which makes it difficult for them to take the necessary evasive action to avoid colliding with power lines (van Rooyen 2004, Anderson 2001). This can be the most significant impact on avifauna that would result from the transmission line project. This impact was assessed as Medium prior to mitigation due to the abundance of medium size winged species and raptors that are present in the area which are vulnerable to collisions. The transmission line passes through riverine habitat, valleys and hills which are all sensitive areas from an avifauna perspective.

The world's largest inhabited riverine island of Majuli, three tanks built by Ahom kings between Ahom kings between the 17th and 18th centuries in Sivasagar, and the Panidihing Wildlife Sanctuary - all lying in the Central Asian Flyway are among the 40 wetlands identified for special conservation measures of migratory birds. Under the National Central Asian Flyway Action Plan, 20 bird species of birds have been identified that take migratory routes over these areas.

Mitigation Measures:

- Line marking to increase the visibility of the line. There are three general types of line marking devices: aerial marker spheres, spirals, and suspended devices
- Managing surrounding land to influence bird use.
- Consider line placement that takes migratory patterns and high bird-use areas into account.
- All sections of line crossing rivers and the adjacent riparian habitat should be fitted with Bird Flappers on the earth wire.
- If practical, consider line orientation that considers biological and environmental factors such as bird flight paths, prevailing winds, and topographical features factors

Note: The potential impacts of bird collision and electrocution are correspondent to the species and their flight heights. Vultures are at risk on power line structures in terms of both collisions and electrocutions due to their far-ranging nomadic habits and their colonial nature. They are gregarious and often attempt to perch together on one structure. Bird species including ducks and herons are more likely to die of power line collisions than from electrocutions others include storks and corvids due to their morphology and behavior. These birds are most at risk of electrocution due to their relatively wide wingspans and tendency to use poles as nesting platforms and perches from which they survey for prey.

c) Disturbance and Habitat destruction

Impacts: Habitat destruction is expected during the construction phase and maintenance of power lines. This happens with the construction of access roads, the clearing of power line servitudes and construction of transmission towers. Servitudes have to be cleared of excess vegetation at regular intervals in order to allow access to the line for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the conductors and to minimize the risk of fire under the line, which can result in electrical flashovers. These activities have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat.

Mitigation Measures:

- Destruction of vegetation during construction and operation should be kept to a minimum.
- No destruction of riparian habitats and water pans during construction and operation should be allowed
- The activities of the construction and operations staff must be restricted to the servitude and immediate surrounds.



- Under no circumstances must birds be exposed to more disturbance than is inevitably brought about by construction and operations activities
- Care should be taken in sensitive areas such as grassland, wetland and valleys not to create more disturbance than is necessary. Machinery and vehicle access to these areas should be carefully controlled and maintenance and construction activities must be restricted to the servitude where practical.

Other necessary measures to counter impact on birds

- Provide artificial bird safe perches and nesting platforms placed at a safe distance from the energized parts
- Ensuring cross-arms, insulators and other parts of the power lines construction so that there is no space for birds to perch where they can be proximate to energized wires.
All terminal structures (transformers) should be constructed with sufficient insulation on jumper wires and surge arrestors

D. Ambient Quality

a) Atmospheric Emissions/Dusts and Air Quality

Impacts: The activities that are likely to form part of atmospheric emissions are dust from construction activities and exhausts from vehicles serving the construction activities. As the construction of transmission line and substation construction (specifically control room construction) involves limited groundwork, the potential for dust generation is low and short lived. The increase in traffic volumes during the construction of the transmission line and substations is expected to be occasional and negligible. Hence, it is considered that the contribution to pollutant concentrations arising from the construction activities and traffic is small and insufficient to cause any increase in the stipulated air standards or existing concentrations. Notwithstanding the potential of atmospheric emissions from construction and related activities the environmental impact of the project is low.

Mitigation Measures:

- Sprinkling of water on dust generating areas;
- Restricting the speed limits of vehicles during movement on unpaved roads; and
- Covering of vehicles carrying loose soil/construction material.

b) Noise Generation

Impacts: There is potential for disturbance to sensitive receptors in proximity of the substations and transmission towers due to construction related activities. During construction work at substation, foundation work, erection of tower, stringing of conductors there can be disturbance from noise of workers. Also, during stringing there is potential for disturbance from continuous operation of tractors. Construction activities should be concentrated and done sequentially so that no area is prone to extensive duration of noise impacts. For example, though it might take anywhere between 3 to 6 months to complete tower erection and stringing exercise, the actual construction only happens for about 15-30 days. There will be minimum lag period between laying of foundations and erection of the tower. Similarly, in case of substation construction, the construction of control room will result in dust emission more than the other activities associated with it.

The sources of noise during construction activities include:

- Construction traffic; and
- Construction activities such as excavation, concreting, tower erection, backfilling, construction of control room, demolishing of existing quarters, construction of tower foundations, use of pumps (for pumping excess water), use of electrical generators, use of portable cement concrete mix, earth filling in case leveling is required and compressors, etc.;

Mitigation Measures: Most of the work is done manually instead of cranes and other heavy equipment, which will reduce the potential for noise impacts. Construction activity should be undertaken only during daytime. There will be some noise generated from the movement of tractors and trailers transporting the



materials and equipment, but the traffic volumes are expected to be occasional and insignificant. As specified in the baseline section of this report most of the sensitive receptors are found to be away from the zone of impact.

The process of stringing will produce only human voices, which might be audible to residents in very close proximity of the operations. However, again these impacts will be localized and short lived.

c) Soil Quality

Impacts: Digging of foundation pits for the substation and towers and the cutting of vegetation (for foundation purposes) are the main two activities, which are likely to affect the soil structure and quality. There will be some damage to crops and vegetation during stringing operation due dragging and pulling of conductors. Loss of vegetation/crop will occur due to movement of construction material and manpower through cultivated areas. The most significant potential impacts will be due to change to soil structure and soil quality as a result of excavation or compaction. The magnitude and extent of the impacts are likely to vary according to the characteristics of the soil and the types of construction activity. Foundation pits should be backfilled by the excavated soils which will resemble the order of the original soil layers. Loose soils, construction material and demolishing material if placed in adjoining fields will lead to damage of existing crop and contamination of soil. The excavated if kept uncovered and unprotected will be rendered vulnerable to loss from erosion.

Mitigation Measures: As part of mitigation, construction materials to be stored within the footprint of the site to avoid any kind of damage or contamination of soil/crop of adjoining fields. Movement of material and manpower shall be restricted to existing roads/tracks or as agreed upon with the stakeholders to avoid creation of new roads/tracks.

d) Surface and groundwater

Impacts: The substation and transmission line will require water for casting of foundations, which can be sourced locally using ground water extraction and through tankers. There is potential for contamination of nearby surface water bodies due to runoff from fuel/oil storage area, construction material, construction activities, construction equipment / vehicle cleaning area and leakage of fuel from construction equipment's & construction vehicles. Contractor should not be permitted to use the community water resources without consultation/consent of local public.

Mitigation Measures: Construction activities in proximity of water bodies to ensure prevention of runoffs. As per the design specification used by AEGCL in their previous projects, at the river crossing the horizontal clearance (the distance between the towers) are kept being greater than the maximum river width at high flood levels and the vertical clearances are in according to the statutory requirements. Construction activity to be avoided in proximity of water bodies during monsoon season.

5.6. Audit Findings and Proposed Remediation Measures for Existing Substations

Table 40: Identified Environmental and Social Impacts and Proposed Mitigation Measures for Existing Substation

S.No.	Activities	Current Status/ E&S Problems	Proposed Remediation Measures ³²
1.	Storage and Disposal of Transformer oil	As part a routine maintenance, transformer oil is changed every 10-15 years or while replacing existing transformers and other electrical equipment containing PCB. The used transformer oil is categorized as hazardous waste as per Hazardous Waste	<ul style="list-style-type: none"> • AEGCL will seek authorization for disposal of hazardous waste (using Form – 13 For Disposal of Refused Oil) from concern State Pollution Control Boards as and when required. The oil can be auctioned to authorized/registered re-refiners and information to the respective SPCB is submitted. • Prior to final disposal, retired transformers and equipment containing PCB will be stored

³² The budget allocation for these proposed measures is being covered under the BOQ items of contractors' agreement.



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S.No.	Activities	Current Status/ E&S Problems	Proposed Remediation Measures ³²
		(Management and handling) Rules. Used mineral oil generated at substations meets the requirements of Schedule 5 of the Rules. Thus, it is the responsibility of relevant authorities to ensuring appropriate storage, decontamination, and disposal of contaminated units. Currently there is no defined criteria for labelling, storage and disposal of used oil or transformer oil drums	on a concrete pad with curbs sufficient to contain the liquid. AEGCL will avoid storage of transformer oil as far as possible and the used oil will be collected from transformer directly to tanker container and taken away at storage facility. <ul style="list-style-type: none"> • AEGCL will ensure that the soil exposed to PCB leakage from equipment will be assessed, and appropriately removal and / or remediation measures will be implemented. All proposed transformers will have oil trap (concrete) or oil sump pit to avoid any possibility of ground contamination.
2.	Fire Protection Equipment	Absence of adequate fire protection equipment's and smoke detectors is reported by concerned authorities in existing substations.	<ul style="list-style-type: none"> • AEGCL will ensure installation of fire protection system in all existing substations and new proposed facilities, the fire protection system will include smoke detectors, fire resistance sheets (Mats) in all control rooms, fire extinguishers (halon gas of various kinds, carbon dioxide chemical foam and powder), firefighting HVSW system, sand, blankets and fire hoses. • AEGCL will also insure conducting fire drills at operational facilities.
3.	Storage facilities	The present storage facilities in existing substations are not adequate for storage of transformers, moreover the transformer oil drums are generally being stored in switch yards with no raised platforms as recommended by CPRI.	<ul style="list-style-type: none"> • Construction/renovation of storage facilities within substation premise for storage of empty oil drums (until handed over to registered vendor) and storage of other electrical equipment's.
4.	Drainage facility	Drainage facility is absent at most of the existing substations, wherever available it requires strengthening.	<ul style="list-style-type: none"> • AEGCL will insure development of drainage layout plan for existing substations.
5.	Sf₆ Retrieving arrangement	All the existing substations (14) proposed under component B are equipped with Sf ₆ switch gear. However, Sf ₆ retrieving arrangement is available at only 5 substations	<ul style="list-style-type: none"> • AEGCL will ensure installation of storage and recovery facilities at all locations.
6.	Need of Extra Gravel	Extra gravel work is required at Golaghat, Panchgram, Narangi and Gauripur substation	<ul style="list-style-type: none"> • AEGCL will ensure that scope of work will include gravel work for these 4 locations.
7.	Environmental Monitoring Data	The Air quality, Noise Level and Water Quality data is not available for any existing substations	<ul style="list-style-type: none"> • AEGCL will ensure baseline monitoring, construction phase monitoring and operational phase monitoring for Air quality, water quality and noise level is conducted at existing substations.
8.	Personal	Absence of respiratory and	<ul style="list-style-type: none"> • AEGCL will ensure the adequacy of below



S.No.	Activities	Current Status/ E&S Problems	Proposed Remediation Measures ³²
	Protective Equipment's	hearing gears is notified by officials at all the existing substations. Out of 14 facilities, face shield is available at only 3 substations. The adequacy of other PPE (helmets, hand gloves, gum boots, safety belt etc.) also not certain at most of the existing substations.	listed PPE at all the existing substations: Helmets (Class A or Class B hard hats only), Hand Gloves (insulating rubber gloves), Gum Boots, safety belt, eye shield, respiratory gear (mask/respirators) and hearing gears (ear muffs/earpieces) etc.
9.	Training Need Assessment	Periodic occupational health and safety trainings are being carried out at 6 existing substations out of 14 facilities	<ul style="list-style-type: none"> • AEGCL will ensure that periodic trainings for Disaster Management, fire safety, electrical safety and waste management is conducted at all the existing substations.
10.	Grievance Redress Mechanism	GRM is not available	<ul style="list-style-type: none"> • The proposed GRM in section 10 of this report will be applicable for existing substations.

5.7. Environmental and Social Management Plan

At the onset of this assessment, a detailed ESMP considering the worst-case scenario has been developed incorporating public consultation findings, which will serve as a contractual obligation toward contractor and PMC, further this will be shared with all relevant stakeholders for effective implementation of ESMP.

The ESMP for the project identifies feasible and cost-effective measures to be taken to reduce potential significant, adverse, impacts to acceptable levels. Here, proper mitigation measures are proposed for each potential impact, including details on responsible parties for implementation of mitigation measures and supervision.

The Contractor shall be responsible for carrying out the work in full compliance with this ESMP and applicable National, State, AIIB Policies governing E&S impacts, pollution control, waste management, and occupational health and safety. However, in the event of any disparity between the AIIB policies and Indian acts, the IFC general and sector EHS guidelines shall prevail. The ESMP has to be followed by the EPC contractor throughout the project life cycle. The provisions of ESMP are designed to avoid, minimize and mitigate any potential impact caused due to project execution & operations. EPC Contractor will follow such provisions in its day-to-day functions & work executions.

The Contractor shall be required to prepare detailed site-specific Safety, Health and Environment Social Management Plans (SHESMP) for implementing the subprojects. SHESMP should include plan for Environment, Social, health & safety, waste, emergency and debris disposal management plan etc.

The Contractor shall appoint one Environmental and one Safety officer with at least minimum 3 years of working experience in the same field. These officers will continuously be on site to ensure compliance. The Contractor will be responsible for obtaining environmental permits as required to comply ESMP.

Below mentioned ESMP (Refer **Table 41**) is applicable to all the sub-projects.



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Table 41: Environmental & Social Management Plan (ESMP)

S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
PRE-CONSTRUCTION PHASE³³								
A. Physical Environment								
1.	Substation and line alignment location and design	Disturbance to the adjacent lands and the people due to cut and fill operations	Construction of retaining structures, peripheral drain, minimize cut and fill operations, etc. Substation designed to ensure noise will not be a nuisance.	Setbacks to houses and other structures	Setback distances to nearest houses – as per RoW norms 132 kV- 27 m 220 kV- 35 m 400 kV/DC 46 m 400 kV/SC- 52 m	Once during substation siting survey and detailed alignment survey and design	Surveyor (during route survey) Contractor (Detailed design and layout development) PMC (Review of Detailed Design) AEGCL -PMU (Approval of survey report, detailed design and design layout), AEGCL Field Officials & P&E Wing	Part to site selection, layout development and detailed design
2.	Interference with drainage patterns/land slide hazard/Irrigation channels	Temporary flooding, landslide hazards/loss of agricultural production	Appropriate siting of towers to avoid channel interference. Marking of landslide zones along the route. Provision of retaining walls at tower base to mitigate landslide effect due to excavation to be included in the project cost.	Site location and transmission line alignment selection	Consultation with local authorities and design engineers	Once during alignment survey and detailed design	Surveyor (during route survey) Contractor (Detailed design and layout development) PMC (Review of detailed design) AEGCL -PMU (Approval of survey report, detailed design and design layout) & AEGCL Field Officials	Detailed alignment survey and design
B. Ambient Environment³⁴								
3.	Substation location and design	Noise generation Exposure to	Substation designed to ensure noise will not be a nuisance. AEGCL – PMU and PMC to	Ambient noise levels at the substation	The Noise Pollution (Regulation and	Once during project planning and	Contractor (Detailed design and layout development) PMC (Review of detailed	Part of detailed alignment survey and

³³ All clearance/permits will be obtained prior to construction commencement.³⁴ A full set of ambient baselines will be collected prior to contractor mobilization and present in the first monitoring report as a benchmark for construction impacts monitoring.

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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
		noise causing nuisance to neighboring properties	review the detail design to ensure substation noise level are designed as per required limits.	boundary and distance from nearby dwellings	Control) Rules, 2000 and IFC/WB EHS General Guidelines and Guidelines for Electric Power Transmission and Distribution, whichever is stringent	site finalization	design) AEGCL -PMU (Approval of, detailed design and design layout) & AEGCL Field Officials	design.
4.	Location of land for transmission towers	Impact to the existing environment	Tower locations to be fixed at suitable distance from water bodies, natural flow paths, important ecological habitats and residential areas. (Minimum distance of 100 m to be maintained between tower footings and water body/canal etc.)	Soil Erosion and Impact on land use pattern	Visual identification - Environmental, Health, and Safety IFC/WB EHS General Guidelines and Guidelines for Electric Power Transmission and Distribution	Once during project planning stage	Surveyor (during route survey) Contractor (Detailed design and layout development) PMC (Review of detailed design) AEGCL - PMU (Approval of survey report, detailed design and design layout) AEGCL Field Officials	Detailed design
5.	Equipment specifications and design parameters	Release of chemicals and gases in receptors (air, water, land)	PCBs forbidden in substation transformers or other project facilities or equipment	Transformer design	Exclusion of PCB's in transformers (should be part of tender specifications)	Once	AEGCL – PMU, PMC, AEGCL Field Officials & P&E Wing	Tender document/specifications
			The equipment's and process should not use chlorofluorocarbons or halon. Their use (if any) in existing	Design stage of equipment's and process finalization	Part of tender specifications (Exclusion of CFC)	Once during project design and tender specifications	Contractor (during procurement of equipment) AEGCL - PMU & PMC (during site inspections and	Part of tender document and detailed project design



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
			process should be phased out and disposed of in a manner consistent with the required statutory guidelines.		Disposal/phase out of existing equipment's and process (IEC 61619 or ASTM D4059)		approval for installation) & AEGCL Field Officials	
C. Ecological Environment								
6.	Encroachment into precious ecological areas	Loss of precious ecological values/ damage to precious species	Avoid encroachment by careful site and alignment selection and reconnaissance before final siting of facilities.	Presence of area of ecological sensitivity and Floral and faunal habitats to be identified	Enumeration of flora and fauna at site in discussion with local authorities, forest department, Wildlife authority etc.	Once during route survey	Surveyor (during route survey) Contractor (Detailed design and layout development) PMC (Review of detailed design) AEGCL - PMU (Approval of survey report, detailed design and design layout) & AEGCL Field Officials	Detailed survey and design
7.	Cutting of Trees	Loss of trees along the RoW, deforestation and loss to biodiversity	Use of flexible tower placement, conductor heightening to avoid cutting of trees. Avoid selection of route with higher intensity of vegetation or plantation Tree replantation budget allocated as per Forest Department's requirement	Trees loss, relevance of applicable clearances required from concerned authorities (forest department, revenue authorities)	Tree Enumeration, nearest ecological sensitive areas.	Consultation with local authorities (once) Statutory approval (clearance) from relevant authorities (once)	Surveyor/AEGCL - PMU/Revenue Circle/Forest Department/Contractor & AEGCL Field Officials	Detailed Design and Planning stage
D. Social Environment								
8.	Transmission line design	Exposure to electro-magnetic interference	Transmission line design to comply with the limits of electromagnetic interference from overhead power lines as	Electromagnetic field strength for proposed line design	Line design compliance with relevant standards	once	Contractor (Detailed design and layout development) PMC Review of detailed design) AEGCL - PMU	Part of detailed alignment survey and design



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
			Given in IFC EHS guidelines for Electric Power Transmission.				(Approval of detailed design and design layout) & P&E Wing	
9.	Involuntary resettlement or land acquisition	Loss of lands and structures	Compensation for temporary/permanent loss of productive land, Development of stakeholder engagement plan as part of ESIA	Public complaints/Grievance RAP Implementation	Consultation with relevant PAP's and authorities AIIB's ESS2	Consultation with authorities – Once	Revenue Circle/AEGCL – PMU/EPC Contractor/PMC & AEGCL Field Officials	Pre-Construction/Prior to initiating Construction (during construction phase)
10.	Encroachment into farmland	Loss of agricultural productivity	Avoid siting towers on farmland/orchards wherever possible. Compensation to be paid for any temporary or permanent loss of crops	Implementation of crop and tree compensation in discussion with Concerned Revenue circle.	Consultation with local authorities and design engineers	Consultation and design review - Once	Surveyor/Revenue Circle/AEGCL-PMU/Horticulture Department/EPC Contractor PMC & AEGCL Field Officials	Part of detailed alignment survey and design
11.	Interference with drainage patterns/ Irrigation channels/rivers	Flooding hazards/loss of agricultural production	Appropriate siting of towers to avoid channel interference/low laying areas	Tower location and line alignment selection (distance to nearest flood zone)	Consultation with local authorities and design engineers	once	Surveyor (during route survey) Contractor (Detailed design and layout development) PMC (Review of detailed design) AEGCL - PMU (Approval of survey report, detailed design and design layout) PMC & AEGCL Field Officials	Part of detailed alignment survey and design
12.	Cutting of Trees	Livelihood loss	Avoid cutting/trimming. Trees to be allowed to be growing up to a height within the RoW by maintaining	Species-specific tree retention as approved by statutory	As per applicable direction/provisions of forest	Once before stringing activity	AEGCL- PMU/Revenue department (assessment and evaluation) /Contractor (Marking of trees)/ &	Construction phase before commissioning of line.



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S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
			adequate clearance between the top of tree and the conductor as per the regulations. Trees that can survive trimming to comply with statutory distance should be lopped and not felled Compensation to be paid for any temporary or permanent loss of productive fruit trees/non fruit trees and trimming/pruning of fruit bearing trees along RoW	authorities Disposal of cleared vegetation as approved by the statutory authorities Careful Tower location and transmission line alignment selection and applicable Statutory approvals for tree trimming /removal from Horticulture department/Forest Department	department.		AEGCL Field Officials	
CONSTRUCTION PHASE								
A. Physical Environment								
13.	Site clearance	Soil erosion and surface runoff	Construction near seasonal rivers, erosion and flood-prone areas should be restricted to the non-rainy season. Provision and maintenance of drains and retention ponds.	Soil erosion	Visual inspection (Turbidity and sedimentation)	Twice during construction phase	Contractor through contract provisions under supervision of PMC / PMU of AEGCL PMC & AEGCL Field Officials	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
14.	OPGW Installation	Soil erosion and surface runoff	Construction near seasonal rivers, erosion and flood-prone areas should be restricted to the non-rainy season.	Soil erosion	Visual inspection (Turbidity and sedimentation)	Twice during construction phase	Contractor through contract provisions under supervision of PMC and PMU of AEGCL & AEGCL Field Officials	Throughout the construction Phase
15.	Disturbance to public utility services- Water supply, sanitation	Public inconvenience	<p>Advance notice to the public about the time and the duration of the utility disruption.</p> <p>Use of well trained and experienced machinery operators to reduce accidental damage to the public utilities – pipelines/Power Lines/Road crossings etc.</p> <p>Restoring the utilities immediately to overcome public inconvenience.</p>	<p>Disruption to other commercial and public activities/public complaints</p> <p>Contractor obligation to restore the facilities such as blocked drains (if any) through contract provisions</p>	Technical specification – per public complaint	At least Once during construction (as and when required)	AEGCL and Contractor through contract provisions and PMC through public disclosure and consultations & AEGCL Field Officials	Contractor provisions in planning stage and PMC monitoring in Construction period
16.	Uncontrolled erosion/silt runoff	Soil loss, downstream siltation;	Minimize the need for access tracks, Use of existing roads.	Design basis and construction procedures (suspended solids in receiving waters; area re-vegetated in m ² ; amount of bunds constructed [length in meter, area in m ² , or volume in m ³])	Incorporating good design and construction management practices	once for each site	Contractor through contract provisions under supervision of PMC and AEGCL -PMU & AEGCL Field Officials	Throughout the construction Phase



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S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
B. Ambient Environment								
17.	Equipment layout and installation	Noise and vibrations	Selection of construction techniques and machinery to minimise ground disturbance.	Construction techniques and machinery	Minimal ground disturbance	Once – Commencement of construction phase	Contractor through contract provisions under supervision of PMC and AEGCL -PMU & AEGCL Field Officials	Throughout the construction Phase
18.	Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Excess fill from tower foundation excavation to be reused on site where earth filling is required.	Location and amount (m3) of fill disposal Soil disposal locations and volume (m3)	Appropriate recoding disposal and dispersal locations in quarterly reporting of contractor and PMC	At least Once during construction phase (as and when required)	Contractor through contract provisions under supervision of PMC and AEGCL -PMU & AEGCL Field Officials	Throughout the construction Phase
19.	Substation construction	Loss of topsoil	Use the excess soil from excavation of the substation foundation and drainage improvement in filling operations	Borrow area sighting and required earth filling (area of site in m2 and estimated volume in m3)	Record maintenance for excavated earth and utilization of earth for earth filling	At Least once during construction phase (as and when required)	Contractor under supervision of PMC & AEGCL -PMU & AEGCL Field Officials	Throughout the construction Phase
		Water pollution due to wastewater disposal and construction water runoff. Interference in drainage of rain and	Construction of appropriate drain system Removal of silt and trash choking the drainage from the substation land.	Drains choked with rain/ water due to silt and trash	Presence of proper drainage and sanitation and waste disposal facilities	Daily - construction phase	Contractor under supervision of PMC & AEGCL -PMU & AEGCL Field Officials	Construction/ operation period Semi-annually Inspection report to be submitted by Contractor along with



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
		wastewater at site						Photographs.
20.	Construction of roads for accessibility to substations	Air pollution due to loosen dust might blow in the area causing dusty conditions	Damping of dust by sprinkling of water within the work area and stack the loose soil and contain it with covers if required.	Soil stacking locations (access roads & substation site)	CPCB ambient air quality standards and IFC/WB EHS General Guidelines and Guidelines for Electric Power Transmission and Distribution, whichever is stringent	Daily - Visual inspections. Monitoring for PM ₁₀ & PM _{2.5} twice	Contractor (for implementing mitigation measures), PMC (conducting air quality monitoring) under supervision of AEGCL – PMU & AEGCL Field Officials	Throughout the construction Phase
		Nuisance caused by noise to neighboring areas	Minimize construction activities undertaken during the night Construction as per scheduled timings only	Timing of construction (noise emissions, [dB(a)])	Monitoring of time schedule for work CPCB regulations for noise level and IFC/WB EHS General Guidelines and Guidelines for Electric Power Transmission and Distribution, whichever is stringent	Weekly monitoring by contractor specially during usage of heavy machinery. PMC to monitoring noise levels in dB at least once during construction phase	Contractor (maintenance of record) and PMC (verification of record) under supervision of AEGCL – PMU & AEGCL Field Officials	Throughout the construction Phase
21.	Construction of transmission	Loss of soil	Cutting and filling for the tower foundations obtained by creating or improving local	Borrow area siting (area of site in m2 and estimated	As specified under EIA notification	Once – before commencing operation	Statutory clearance (Environmental Clearance) obtained for digging borrow	Throughout the construction Phase



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S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
	towers		drainage system.	volume in m3)	2006 and amendments	relating to borrow earth requirement (sand/ordinary earth)	earth to be obtained by contractor Contractor through contract provisions under supervision of PMC (verification of EC document) and AEGCL - PMU & AEGCL Field Officials	
		Water pollution	Minimize construction activities involving significant ground disturbance during the monsoon season. Provide drains and retention ponds if required.	Water Quality (pH, BOD/COD, suspended solids, other) during major earthworks	Water quality standards (WHO standards for drinking water. BIS drinking water standards IS:10500-2012. Effluent standards as per Environment (Protection) Amendment Rules, 2017	At least once (as and when required)	Contractor (implementing mitigation measures) through contract provisions under supervision of PMC (monitoring of water quality parameters) and AEGCL – PMU (authorization of documents) & AEGCL Field Officials	Throughout the construction Phase
22.	Provision of facilities for construction workers	Contamination of receptors (land, water, air) Health Impact on labour due to lack of basic amenities	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities. (IFC/EBRD- Worker's Accommodations: processes and standards or its equivalent can be followed)	Amenities for Workforce, grievances filed by workers.	Presence of proper sanitation, water supply and waste disposal facilities Statutory clearances obtained under:	Once before commencing construction work	Contractor (to provide amenities to workforce) through contract provisions under supervision of PMC (visual inspection and monitoring for provided facilities to labour/workers) and AEGCL – PMU (validation of documentary	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
					Inter-State Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979 and Contract Labour (Regulation and Abolition) Act, 1970 AIIB ESS1		evidence) & AEGCL Field Officials	
23.	Mechanized construction	Noise, vibration and operator safety, efficient operation Noise, vibration, equipment wears and tear	Construction equipment to be well maintained. Construction techniques and Machinery selection to minimize ground disturbance	Construction techniques and equipment - estimated noise emissions and operating schedules	Technical specifications, safety regulations, Noise control regulations (the more stringent of the standards, national or International to be followed)	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
24.	Construction of roads for accessibility to transmission tower sites	Increase in airborne dust particles Increased land requirement for temporary	Existing roads and tracks to be used for construction and maintenance for access to the site wherever possible. New access ways to be restricted to a minimum of single carriageway width.	Access roads, routes (length and width of access roads)	Use of established roads wherever possible Access restricted to a minimum of single carriageway	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
		accessibility	Sprinkling of water to settle down dust particles.		width			
25.	Storage of chemicals and materials	Contamination of receptors (land, water, air)	Fuel and other hazardous materials securely stored above high flood level.	Location of hazardous material storage; spill reports (type of material spilled, amount (kg or m ³) and action taken to control and clean up spill)	Fuel storage in appropriate locations and receptacles with reference to IFC/WB EHS General Guidelines and Guidelines for Electric Power Transmission and Distribution, whichever is stringent	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
C Ecological Environment								
26.	Site clearance	Vegetation	Marking of vegetation to be completed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Vegetation marking and clearance control (area in m ²)	Clearance strictly limited to target vegetation	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
27.	Trimming/cutting of trees within RoW	Loss of vegetation and deforestation	Trees that can survive cutting should be pruned. Felled trees and other cleared or pruned vegetation to be	Species-specific tree retention as approved by statutory authorities	Presence of target species in RoW following vegetation clearance	On-going activity before Stringing of conductors	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
			disposed of by authorized agents/forest department. Tree replantation budget allocated as per Forest Department's requirement	(average and maximum tree height at maturity, in meters) Disposal of cleared vegetation as approved by the statutory authorities (area cleared in m2)			AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	
28.	Tower Construction and stringing	Disturbance to animal movement and avian species	Consult the wildlife department Increase the tower height wherever close to the elephant corridors to maintain the required ground clearance for crossing of wildlife Maintenance of sag line to 9 m height, barbed wire around towers in area with population of elephants. Deflectors and line markers need to be installed at the identified location of the transmission line – which is falling 10 km in the vicinity of Important Bird Areas/potential Migratory	Hight of tower Number of Diverter	As recommended by wildlife department	Once	AEGCL – PIU and PMC, Contractor (implementation of proposed measures) through contract provisions under supervision of wildlife department & AEGCL Field Officials	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
			Bird route					
29.	Wood/vegetation harvesting, cut and fill operations	Loss of vegetation and deforestation	Construction workers should be prohibited from harvesting wood in the project area during their employment.	Illegal wood/vegetation harvesting (area in sq. m, number of incidents reported)	Complaints by local people or other evidence of illegal harvesting	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
		Effect on fauna (including avifauna)	Preventing work force from disturbing the flora, fauna including hunting of animals and fishing in water bodies. Proper awareness programme regarding conservation of flora, fauna including ground vegetation to all workers. Construction is to be halted if breeding season is observed for any species.	Habitat loss	Complaints by local people or other evidence of illegal hunting	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
D Social Environment								
30.	Construction schedules	Noise nuisance to neighbouring properties	Minimize construction activities should be undertaken during the night and local communities to be informed of the construction schedule.	Timing of construction (noise emissions, dBA)	Construction as per Scheduled timings only/consultation with nearby dwellings	Once	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase



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S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
31.	Acquisition of cultivable lands	Loss of agricultural productivity	Avoiding faming/harvesting season for field crops wherever possible for the project activities. Ensuring existing irrigation facilities to be maintained in working condition Protecting /preserving topsoil and reinstate after construction is completed Repairing /reinstating damaged bunds etc. after construction completion and Providing Compensation for temporary loss in agricultural production	Land area of agriculture loss Usage of existing utilities Status of facilities (earthwork in m3) Implementation of crop compensation (amount paid, dates, etc.)	Loss of crops-work in post-harvest period but before next crop Documentary evidence as certified by revenue officer	Once	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
32.	Temporary use of land	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices. As much as possible existing access ways to be used. Productive land to be reinstated following completion of construction Compensation to be paid for loss of production, if any.	Contract clauses Design basis and layout. Reinstatement of land status (area affected, m2). Implementation of Tree/Crop compensation (amount paid).	Incorporating good construction management, design engineering practices. Consultation with affected parties immediately after completion of construction and after the first harvest	Twice (during tower erection and stringing activity)	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase



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S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
33.	Transportation and storage of materials	Nuisance to the general public	Transport loading and unloading of construction materials should not cause nuisance to the people by way of noise, vibration and dust Avoiding storage of construction materials beside the road, around water bodies, residential or public sensitive locations Construction materials should be stored in covered areas to ensure protection from dust, emissions and such materials should be bundled in environment friendly and nuisance free manner	Compliance to traffic management plan	CPCB Emission standards and Water Quality standards (the more stringent of the national or International standards to be followed)	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
		Road Safety	Prepare the Traffic Management Plan; Instruct drivers of construction vehicles to strictly follow road regulations; Adequate and clearly visible warning signs (such as danger, detour, cross here, works in progress, people at work, etc.) will be posted at designated sites while scaffoldings will be placed over road crossing points	Compliance to traffic management plan	Regular Monitoring and Daily Incident Reporting	Once a month	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase
34.	Surplus Earth	Impact on	Selection of construction	Construction	Construction	Daily – during	Contractor (implementation	Throughout the



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
	Work	community health and safety due to air pollution and increase in noise level	techniques and machinery to minimize ground disturbance, noise generation. Using water sprinkling to suppress the dust	techniques and machinery	timing, type of machineries & pollution under control certificates of machineries in use.	construction phase	of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	construction Phase
35.	Temporary outage of the electricity	Loss of power supply to the local community when distribution lines crossing the new transmission line are switched off	Advance notice to the public about the time and the duration of the utility disruption Restore the utilities immediately to overcome public inconvenience	Disruption of power supply to houses and commercial premises.	Regular monitoring during the period of construction - At each public complaint.	Continuous activity	AEGCL – Field staff and division officials	Throughout the construction Phase
36.	Worker's Health and safety Community health and safety	Injury and sickness of workers and members of the public; Incidents/accidents; GBV/SE	Contract provisions specifying minimum requirements for construction camps. Contractor to prepare and implement a health and safety plan and provide workers with required PPE. Contractor to arrange for health and safety awareness programmes including on AIDS and sexually transmitted diseases (STD). Detailed workers camp management plan.	Contract clauses (number of incidents and total lost-work days caused by injuries and sickness) Valid Workers compensation insurance policies and periodic health check-up details	Monitoring of Health and safety practices. IFC/WB EHS General Guidelines and Guidelines for Electric Power Transmission and Distribution, whichever is stringent	Workers Compensation Insurance to be valid throughout the project. Twice - Health check-up of workers	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
		Electrocution , other accidents, potential conflict between migrant workers and local inhabitants.	Adequate signage and barriers around charged components, conflict to be addressed through workshops to workers regarding local customs, and codes of conduct.	Complaints by public or workers. Record of accidents, at which stretch and the frequency.	Regular Monitoring and Daily Incident Reporting	Continuous activity	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence)	Throughout the construction phase
		COVID-19 Response	Taking cognizance of situation at time of mobilization, the Contractor shall undertake a COVID-19 risk assessment of project area and prepare a COVID-19 Response and Management Plan (C-R&MP) and submit to AEGCL and PMC for approval. The preparation of C-R&MP shall consider guidance of GoI, World Health Organisation, International Labour Organisation etc. The contractor shall submit a monthly monitoring and progress report to AEGCL and PMC.	PPE distributed Plan implementation checklist	WHO/GoI COVID-19 Guidelines	Monthly	Contractor through contract provisions under supervision of PMC and PMU	Throughout the construction phase
		Animal-human conflicts	Restrict construction work during the known period of crossing the route by any wildlife in the area	Identification of elephant corridor or wildlife corridor,	Detailed Route Survey and daily monitoring during	Entire construction phase	Contractor (implementation of measures), Forest officials, PMC and AEGCL - PMU	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
				identification of timing for crossing the path	construction phase (National Forest Policy)			
37.	Impact on Migrant workers	Lack of proper contract, unregulated working hours, unsanitary living conditions, occupational hazards, spread of diseases in camps; Potential conflict between migrant workforce and local inhabitants.	The provisions given in the Inter-state Migrant Workmen (Regulation of Employment and Conditions of Service) Act, 1979, along with the Bonded Labour System (Abolition) Act 1976, and subsequent amendments, to be followed. Potential conflict to be addressed through proper awareness and training session to the workforce, to sensitise the workforce	As per provisions Regulation of Employment and Conditions of Service) Act, 1979, along with the Bonded Labour System (Abolition) Act 1976	Regulatory clearance documents	Continuous activity	Contractor (implementation of proposed measures) through contract provisions under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	Throughout the construction phase
38.	Capacity Building	Improve standards of implementation and monitoring	Training of AEGCL staff & Contractors	Training schedules	Number of training program	Quarterly	PMC to provide training to EPC and AEGCL – PMU, AEGCL – Field staff and Divisional Officers.	Throughout the construction Phase
39.	Site clearance and excavation	Chances of finding archaeological	Chance finds procedure Instruction to workers to not	Discovery of any artefact of such historical or	Chance finds procedure	As per occurrence of event	Contractor (implementation of proposed measures) through contract provisions	Throughout the construction Phase



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
	works	l/cultural artefacts	remove such articles and immediately information to Contractors supervisor and further to Environmental Specialist PMU	cultural significance			under supervision of PMC (Site inspections) and AEGCL – PMU (Validation of documentary evidence) & AEGCL Field Officials	
OPERATION AND MAINTENANCE PHASE								
A. Ambient Environmental								
40.	Soil Erosion at tower base of transmission line	Removal of topsoil	Planting of buffer zone native species suitable for terrain	Turbidity of water (Visual Inspection)	Visual inspection (Turbidity and sedimentation)	Continuous activity	AEGCL-Divisional Offices/PIU & PMC	Throughout the operations
41.	Oil Spillage	Contamination of land and nearby water bodies/aquifer	Presence of Oil pit for collection of oil leakage (if any from transformer) Storage of transformer oil drums on raised and solid surface.	Design of transformer pad and availability of storage area for transformer oil drums	Visual inspections	Continuous activity	AEGCL-Divisional Offices/PIU & PMC	Throughout the operations
42.	Switchgear operation	SF6 leakage during Operations and refilling activity	Record of all substation switchgear, storage cylinders located within secure casings	Usage of SF6 gas	As per prevailing guidelines	During storage and refilling of equipment's containing SF6 (Record is to be maintained for all substation switchgear, storage cylinders located within secure casings)	AEGCL-Divisional Offices/PIU & PMC	Throughout the operations
43.	Vegetation	Soil and	Marking of vegetation to be	Vegetation	Visual	Weekly	AEGCL-Divisional	Throughout the



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
	Clearance in substations	water contamination	removed prior to clearance, and strict control on clearing activities to ensure manual cutting and removal of vegetation	marking and clearance control (area in m ²) Usage of herbicides if any should be reported.	Inspections to check if clearance is strictly limited to marked area	inspections	Offices/AEGCL – PIU & PMC	operations
B. Ecological Environment								
44.	Vegetation Clearance in substation	Toxic impact on nontarget organism	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure manual cutting and removal of vegetation	Vegetation marking and clearance control (area in m ²) Usage of herbicides if any should be reported.	Visual Inspections to check if clearance is strictly limited to marked area	Weekly inspections	AEGCL-Divisional Offices/AEGCL -PIU & PMC	Throughout the operations
45.	Trimming/ cutting of trees within RoW	Fire hazards	Trees allowed growing up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations. Regular pruning is required.	Species-specific tree retention as approved by statutory authorities (average and maximum tree height at maturity, in meters.	Presence of target species in RoW following vegetation clearance	Continuous activity	AEGCL (Divisional Office and PIU), with forest department & PMC	Throughout the operations
46.	Stringing of line and post stringing	Disturbance to avifauna species due to collision with transmission line,	Deflectors and line markers need to be installed at the identified location of the transmission line – which is falling 10 km in the vicinity of Wildlife sanctuary/potential	Bird deaths and collisions	No. of bird deaths, frequency and seasons/times for these occurrences.	Once – Installation of deflectors/bird flappers	AEGCL-Divisional Offices/AEGCL – PIU & PMC	Throughout operations



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
		electrocution to elephant and avifauna.	<p>Migratory Bird route. Maintenance of sag line to 9 m height, barbed wire around towers in area with population of elephants.</p> <p>Monitoring of transmission line especially for bird strikes during the operation and use of deflectors if required.</p> <p>If the monitoring shows that certain areas of the transmission line show increased bird carcasses, additional bird flappers might have to be installed.</p> <p>A routine for record keeping of bird carcass with details around numbers, species, and season is to be maintained by AEGCL and regularly analysed to determine the need for any enhanced mitigation measure.</p>					
C Social Environment								
47.	Operation and Maintenance of substations	Nuisance to Neighbouring properties	If required, provision of noise barriers near substation sites	Noise level	Noise level standards as prescribed by CPCB and IFC/WB EHS General	Once a year	AEGCL-Divisional Offices/AEGCL -PIU & PMC	Throughout the operation



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S. N o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
					Guidelines and Guidelines for Electric Power Transmission and Distribution, whichever is stringent			
48.	Operation and Maintenance of Transmission line	Exposure to electromagnetic interference	Transmission line to be designed to comply with the limits of electromagnetic interference from overhead power lines	Required ground clearance (meters).	Ground clearance, ICNIRP guidelines on EMF	Once	AEGCL-Divisional Offices/AEGCL -PIU & PMC	Throughout the operations
		Electric Shock Hazards	Careful design using appropriate technologies to minimize hazards	Usage of appropriate technologies (number of injury incidents, lost workdays)	Preparedness level for using these technologies in crisis	once a month	AEGCL-Divisional Offices/AEGCL -PIU& PMC	Throughout the operations
		lightning	Lightning conductor and earth wire will be installed on the transmission line. Resistance of turbine tower feet will be designed to limit lightning back voltage. Metallic components on structures located within the right of way will be grounded, where directly under transmission line. If there are structures with more than about 500m ² of metal surface, provision for	Usage of appropriate technologies (number of incidents)	Preparedness level for using these technologies in crisis	once a month	AEGCL-Divisional Offices/AEGCL -PIU & PMC	Throughout the operations



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S. N. o.	Project Activity	Potential Environmental and Social Impact	Mitigation Measures	Parameters to be Monitored	Standards/ Measurement	Frequency	Institutional Responsibility	Implementation Schedule
			reconstruction in alternative materials. If there are structures used to store highly flammable materials, alternative storage arrangements will need to be provided.					
49.	Inadequate provision of staff/workers health and safety	Injury and sickness of staff and workers	Availability of Personal Protective Equipment's. Safety awareness trainings. Availability of emergency action plan and training of staff and worker on implementation of emergency action plan	Availability of PPE's Training records Availability of emergency action plan Documentation of fire drills and emergency action plan implementation drills	Record of Number of staff trained in a year	Twice a year	AEGCL – corporate office/HR Department	Throughout the operations
50.	Training for Electric safety	Raising awareness for electrical safety measures	Training of AEGCL – Project Implementation Unit	Training schedules	Number of training program	Twice a year	AEGCL – corporate office/HR Department	Throughout the operations



For effective monitoring of ESMP implementation, the collection of real time environmental data and assessment of same is of real importance. In order to certain the implementation of ESMP, Environmental and Social Monitoring Plan (ESMoP) is developed which is to be followed by the project management consultancy during pre-construction, construction and operational stage. The detailed ESMoP is provided **Table 42** below:

Table 42: Environmental and Social Monitoring Plan

Environm ental compon ent	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
1.Air Quality	A. Pre- construction stage	PM ₁₀ , PM _{2.5} , along with Meteorological data-temperature Humidity, wind speed, wind direction	Inside the substation Boundary	One time	National Air quality standards of CPCB	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
	B. Construction Stage	PM ₁₀ , PM _{2.5} , along with Meteorological data-temperature Humidity, wind speed, wind direction	Same location as selected during pre-construction period	twice a year	National Air quality standards of CPCB	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	PM ₁₀ , PM _{2.5} , along with Meteorological data-temperature Humidity, wind speed, wind direction	Same location as selected during pre-construction period	One time	National Air quality standards of CPCB	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
2.Water Quality	A. Pre- construction stage	As per IS: 10500 (PH, Colour, TSS, Conductivity, Odour, Nitrate, Fluoride, Sulphates, Chloride, DO, BOD, T. coliform, E. coliform, Dissolved Iron, total pesticides, Floating materials- wood, plastic, rubber etc. Oil and grease, TDS,	Nearest downstream spring/handpump along the Project site	One time	National water quality standards of CPCB	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC

³⁵ Here the frequency means the frequency for the monitoring report. The ground data collection frequency should refer to those in the ESMP.



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Environm ental compone nt	Project stage	Parameters to be monitored	Location	Frequency 35	Standards	Implementation	Supervision
		Turbidity Total hardness, (as CaCO ₃), corrosivity, Taste)					
	B. Construction Stage	As per IS: 10500 (PH, Colour, TSS, Conductivity, Odour, Nitrate, Fluoride, Sulphates, Chloride, DO, BOD, T. coliform, E. coliform, Dissolved Iron, total pesticides, Floating materials- wood, plastic, rubber etc. Oil and grease, TDS, Turbidity Total hardness, (as CaCO ₃), corrosivity, Taste)	Nearest downstream spring/handpump along the Project site	Twice a year	National water quality standards of CPCB	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	As per IS: 10500 (PH, Colour, TSS, Conductivity, Odour, Nitrate, Fluoride, Sulphates, Chloride, DO, BOD, T. coliform, E. coliform, Dissolved Iron, total pesticides, Floating materials- wood, plastic, rubber etc. Oil and grease, TDS, Turbidity Total hardness, (as CaCO ₃), corrosivity, Taste)	Nearest downstream spring/handpump along the Project site	One Time	National water quality standards of CPCB	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
3.Noise/ Vibration	A. Pre-construction stage	Noise level (dB level) On hourly basis for 24 hours	Inside the substation Boundary	One Time	CPCB standards for Noise and vibrations	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials &



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Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
							PMC
	B. Construction Stage	Noise level (dB level) On hourly basis for 24 hours	Same location as selected during pre-construction period	Twice a year	CPCB standards for Noise and vibrations	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	Noise level (dB level) On hourly basis for 24 hours	Same location as selected during pre-construction period	One Time	CPCB standards for Noise and vibrations	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
4. Soil	A. Pre-construction stage	PH, Sulphate (SO ₃), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content	Inside the substation Boundary	One time	Technical specifications	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
	B. Construction stage	PH, Sulphate (SO ₃), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content	Same location as selected during pre-construction period	Twice a year	Technical specifications	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	PH, Sulphate (SO ₃), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content	Same location as selected during pre-construction period	One Time	Technical specifications	PMC by CPCB approved laboratory	AEGCL-PMU/ AEGCL Field officials & PMC
5. EMF	A. Pre-construction stage	Design specification	-	Once during final design approval	National Electrical Safety Code, American National Standard Institute,	Contractor (designing), PMC and PMU (design review)	AEGCL-PMU/ AEGCL Field officials &



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Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
					C2		PMC
	B. Construction stage	Adherence to Design specification during construction work	Transmission line routes	Continuous activity	National Electrical Safety Code, American National Standard Institute, C2	Contractor	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	Maintenance of conductor to ground, phase to phase and circuit to circuit clearances	Transmission line routes	Continuous activity	National Electrical Safety Code, American National Standard Institute, C2	AEGCL – Field Staff	AEGCL-PMU/ AEGCL Field officials & PMC
6. Carcass	A. Pre-construction stage	Visual inspection for substation locations and RoW of Transmission Line during detailed route survey	Substations & Transmission line routes	Continuous activity	Identification of carcass (animals/birds) to be reported to concerned	Surveyor	AEGCL-PMU/ AEGCL Field officials & PMC
	B. Construction stage	Visual Inspection for substation and transmission line route during construction activity	Substations & Transmission line routes	Continuous activity	forest/wildlife authority for identification of species. Record to be maintained for number of carcasses	Contractor	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	Visual Inspection for substation and transmission line route during maintenance activity	Substations & Transmission line routes	Continuous activity		AEGCL – Field Staff	AEGCL-PMU/ AEGCL Field officials & PMC
7. Traffic	A. Pre-construction stage	Number & type of vehicles being used to access path for conducting detailed route survey	Transmission Line Route	Continuous activity	Record maintenance for being used for survey and increased traffic load in localities	Surveyor	AEGCL-PMU/ AEGCL Field officials & PMC
	B.	Number & type of vehicle	Substations &	Continuous	Maintenance of	Contractor	AEGCL-



Environmental and Social Management Planning Framework

Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
	Construction stage	being used for material transportation by EPC contractor.	Transmission line routes	activity	Logbook for in-out time of vehicle on site (substation and transmission line routes)		PMU/AEGCL Field officials & PMC
	C. Operation Stage	Number & Type of vehicles being used for maintenance activity	Substations & Transmission line routes	Continuous activity	Maintenance of Logbook for in-out time of vehicle on site (substation and transmission line routes)	AEGCL – O&M staff	AEGCL-PMU/AEGCL Field officials & PMC
8. Tree cutting	A. Pre-construction stage	Enumeration of trees during detailed survey of transmission route and after finalization of layout plan of selected substation area	Substations & Transmission line routes	Once during detailed survey and layout design development	Documentary evidence to be maintained by surveyor for counting of trees	Surveyor	AEGCL-PMU/AEGCL Field officials & PMC
	B. Construction stage	Development of inventory of tress before starting stringing for transmission lines and before initiating the substation construction	Substations & Transmission line routes	Once during construction phase	Marking of tress by revenue authority in presence of contractor and AEGCL officials Obtaining applicable clearance from forest department in case tree cutting is involved in declared forest area	Contractor/Revenue Department/AEGCL	AEGCL-PMU/AEGCL Field officials & PMC
	C. Operation Stage	Pruning/cutting of tress for maintenance activity	Transmission line routes	Continuous activity	Maintenance of minimum clearance between conductors and trees. Obtaining applicable clearance	Contractor/Revenue Department/AEGCL	AEGCL-PMU/AEGCL Field officials & PMC



Environmental and Social Management Planning Framework

Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
					from forest department in case tree cutting/pruning is involved in declared forest area		
9. Stakeholder Engagement	A. Pre-construction stage	Mapping of stakeholders	Substation and Transmission Line routes	Continuous activity	Consultation record with mapped stakeholders (minutes of consultation and attendance sheet)	DPR Consultant/ Concerned revenue circle	AEGCL-PMU/ AEGCL Field officials & PMC
	B. Construction stage	Listing of identified stakeholders (administrative and project affected people)	Substation and Transmission Line routes	Continuous activity	Consultation record with identified stakeholders (minutes of consultation and attendance sheet)	Contractor/PMC/AEGCL/ concerned revenue circle	AEGCL-PMU/ AEGCL Field officials & PMC
	C. Operation Stage	Identified stakeholders at project pre construction and construction stage	Substation and Transmission Line routes	Continuous activity	Consultation record with identified stakeholders (minutes of consultation and attendance sheet)	AEGCL – Field Officers	AEGCL-PMU/ AEGCL Field officials & PMC
10. Grievance Mechanism	A. Pre-construction stage	Identification of officials, NGO, stakeholders to be part Grievance redressal committee	All Project Locations	Continuous activity	Development of Grievance redress mechanism as per provisions of Notification of formulation of GRM and GRC	AEGCL - PMU	AEGCL-PMU/ AEGCL Field officials & PMC
	B. Construction	Working files of GRC and GRM records	All Project Locations	Continuous activity	Notification of formulation of GRM	Contractor, PMC, AEGCL – PMU, Revenue	AEGCL-PMU/



Environmental and Social Management Planning Framework

Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
	stage				and GRC and display of GRM procedure in project locations. Working records for GRM	department and concerned electrical circle, AEGCL – Field staff	AEGCL Field officials & PMC/GRC
	C. Operation Stage	Working files of GRC and GRM records	All Project Locations	Continuous	Notification of formulation of GRM and GRC and display of GRM procedure in project locations. Working records for GRM	Concerned field staff, concerned electrical circle, concerned revenue department	AEGCL-PMU/ AEGCL Field officials & PMC
11. Compensation	A. Pre-construction stage	Identification of project affected people	All project locations	During detailed route survey and identification of land parcel	Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013 and IFC's	Revenue circle & AEGCL/ /EPC Contractor	AEGCL – PMU & Revenue Department/ PMC & AEGCL Field Officials
	B. Construction stage	Mapping and listing of projects affected people (crop damage (area m ²), zirat damage (marking of trees & development of inventory), land acquisition (area m ²) – if applicable	All project locations	Before commencement of work in area of impact	Performance Standard 5	Contractor, PMC, Revenue circle & AEGCL/ /EPC Contractor	AEGCL – PMU & Revenue Department /PMC & AEGCL Field Officials
	C. Operation Stage	Marking of tress (enumeration) to where pruning/cutting is required to maintain clearance between trees and conductor.	Transmission lines routes	Continuous activity		AEGCL – concerned electrical circle and AEGCL – field staff (O&M)/ /EPC Contractor	AEGCL – PMU & Revenue Department/ PMC &



Environmental and Social Management Planning Framework

Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
		Damage to crop (area m ² and listing of crop) during maintenance of line					AEGCL Field Officials
12. Livelihood	A. Pre-construction stage	Identification of any impact on livelihood due to acquisition of land, crop damage and zirat damage.	All project locations	Once during detailed route survey and identification of land parcel for substation	Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013 and IFC's Performance Standard 5	Revenue Department & AEGCL concerned divisional officer, PMC, EPC Contractor	AEGCL – PMU/ PMC & AEGCL Field Officials
	B. Construction stage	Identification of any impact on livelihood due to loss of land (area m ²) – land utilization pattern, crop damage (area m ² and type of crop) and zirat damage (inventory development)	All project locations	Once – before commencing construction work		Revenue Department & AEGCL concerned divisional officer, PMC, EPC Contractor	AEGCL – PMU/ PMC & AEGCL Field Officials
	C. Operation Stage	Identification of any impact on livelihood due to acquisition of land, crop damage and zirat damage (inventory development)	All project locations	Continuous activity		Revenue Department & AEGCL concerned divisional officer, EPC Contractor	AEGCL – PMU/ PMC & AEGCL Field Officials
13. Restoration	A. Pre-construction stage	Identification of any damage to public utilities and public/private property to be envisaged during construction phase	All project locations	Once during detailed survey and identification of land parcel for substation location	Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013 and IFC's Performance Standard 5	Revenue Department & AEGCL concerned divisional officer, PMC, EPC Contractor	AEGCL – PMU/ PMC & AEGCL Field Officials
	B.	Marking and listing of	All project locations	Continuous		Revenue Department &	AEGCL –



Environmental component	Project stage	Parameters to be monitored	Location	Frequency ³⁵	Standards	Implementation	Supervision
	Construction stage	damage to public utilities/shifting of public utilities and public/private property		activity		AEGCL concerned divisional officer, PMC	PMU/ PMC & AEGCL Field Officials
	C. Operation Stage	Marking and listing of damage to public utilities/shifting of public utilities and public/private property	All project locations	Continuous activity		Revenue Department & AEGCL concerned divisional officer	AEGCL – PMU/ PMC & AEGCL Field Officials

Abbreviations:

PMU – Project Management Unit

PMC – Project Management Consultancy

P&E Wing - Planning and Engineering Wing

SO₂- -Sulphur Dioxide; NO₂- - Nitrogen Dioxide; CO- Carbon Monoxide; EC – Electric Conductivity;Pb – Lead; PM_{2.5} - Particulate Matter <2.5; PM₁₀ - Particulate Matter <10; TSPM- Total suspended Particulate Matter;

EC - Electrical Conductivity; DO - Dissolved Oxygen; TSS - Total Suspended Solids;

BOD - Biological Oxygen Demand; NAAQS - National Ambient Air Quality Standards;

NWQS - National water Quality Standards; AEGCL - Assam Electricity Grid Corporation Limited;

ORP – Oxidation Reduction Potential, PMC – Project Management Consultancy

PMU – Project Management Unit (AEGCL), PIU – Project Implementation Unit (AEGCL) IFC – International Finance Corporation (World Bank Group), HR – Human Resource

PS – Performance Standards



5.8. Budget for implementation of ESMP

The compliance with the ESMP has been prepared based upon optimum and reasonable costs that are derived upon minimization of mitigation measures on a “least-cost” basis. Without such expenditures, the project might generate significant environmental impacts, causing the biophysical environment in the area to deteriorate and indirectly depressing the economies of local communities. Based upon the environmental & social issues identified, assessment of the project impact on the environment, ESMP cost is estimated to implement the key environmental measures and environmental & social monitoring plan as listed in **Table 43** below.

Table 43: Environmental and Social Monitoring Plan

S. No.	Description	Quantity	Unit	Rate (in INR)	Amount (in INR)
A.	Environmental Monitoring (Pre-construction Stage)				
1	Air Quality	27	No.	7,214	194778
2	Water Quality	27	No.	15,000	405000
3	Noise Levels	27	No.	4,809	129843
4	Soil	27	No.	12,500	337500
	Sub-Total Cost				1067121
B.	Environmental Monitoring (Construction Stage)				
1	Air Quality (Twice/year for 2 year)	108	No.	7,214	779112
2	Water Quality (Twice/year for 2 year)	108	No.	15,000	1620000
3	Noise Levels (Twice/year for 2 year)	108	No.	4,809	519372
4	Soil (Twice/year for 2 year)	108	No.	12,500	1350000
	Sub-Total Cost				4268484
C.	Environmental Monitoring (Operation Stage)				
1	Air Quality	27	No.	7,214	194778
2	Water Quality	27	No.	15,000	405000
3	Noise Levels	27	No.	4,809	129843
4	Soil	27	No.	12,500	337500
	Sub-Total Cost				1067121
	Total Cost				6402726
D.	Training Workshops/Consultations/ Health Awareness Camp				
1	Training on Implementation of ESMP for PMU, contractors and Divisional Nodal Officers	432	No.	50,000	43200000
2	Public Consultation: Pre-Construction- Once Construction- 2 times / year for 2 year Operation- Once	432	No.	10,000	43200000
3	Health & Safety Awareness Camp: Pre-Construction- Once Construction- 2 times / year for 2 year Operation- Once	432	No.	20,000	21600000
4	Training on Implementation of GRM (Quarterly for 4 years)	16	No.	300,000	4800000
5	Training on Occupation Health	16	No.	300,000	4800000



S. No.	Description	Quantity	Unit	Rate	Amount
				(in INR)	(in INR)
	and safety (Quarterly for 4 years)				
6	Training on fire safety and disaster management (Quarterly for 4 years)	16	No.	300,000	4800000
	Total Cost				122400000
	Grand Total (A+B+C+D)				128802726³⁶

Note: Considering the quantum of civil work in transmission line sector, the quantitative monitoring for Air Quality, Noise Level and Water quality is limited to substation location. The proposed trainings, public consultations and health and safety camps are to be organized collectively for individual substation and transmission lines associated with those substations, covering all the proposed 11 location plus 17 existing locations where augmentation of transformer capacity and bay extensions are proposed. The detailed project components are specified in project description section of this report.

The proposed ESMP Budget doesn't include the cost Estimate for wire insulation and provision of Bird Deflectors. If installation of bird flappers is identified at the time of detailed ESIA study or any time during the project execution, the lump sum cost for deflectors to be installed at a spacing of 10 m, over a stretch of 1 km stretch can be considered as INR 164,680.

The proposed ESMP budget doesn't include the budget for civil work (development and implementation of drainage layout plan, development of storage facility, construction of oil pits, repair of slabs etc.) and procurement and installation of equipment's (lightening and illuminating devices, personal protective equipment's, fire protection equipment's and devices, SF6 retrieving arrangement etc.).

5.9. Institutional Arrangement for Monitoring and Reporting

5.9.1. Monitoring of ESMP compliance

The proposed mitigation measures comprise of conducting environmental monitoring for Air Quality, Noise Level, Soil Quality and Water Quality during Pre-construction, construction and operational phases of the project. The Environment and Social staff of AEGCL shall ensure the monitoring of the environmental and social aspects. During the construction phase, the contractor should ensure that activities like handling of earth works, disposal of debris, storage of materials, labor camps, putting proper traffic signals is done properly to have minimum impact on the environment and affected communities. The PMC for the project will monitor these parameters with the supervision of PMU's E&S special staff. The PMU's E&S staff and Divisional official at divisional level will supervise the contractor. Other environmental good practices include sanitary waste management, noise abatement, maintaining hygienic conditions, maintenance of fire and safety equipment.

The Environmental and Social staff of PMU will ensure that site engineers and contractors adhere and comply with all measures and procedures identified in the ESMP. Activities to be monitored should include, but are not limited to:

- All planning, coordination and management activities related to the implementation of E&S safeguard issues;
- The identification of corrective and preventive actions;
- Records of health and safety matters and training activities;
- Consultations with project affected people (as and when needed, particularly during the implementation);

³⁶ The ESMP cost is 0.00041% of the total project cost, exclusive of the Land acquisition, compensation and resettlement cost, which will be based on actuals as per the assessment of conducted by Revenue Authority at later stage of project.



- Feedback, trouble shooting and project related grievances;
- Ensuring that livelihoods, where negatively impacted, are restored to pre-Project levels;
- Preparation of progress and monitoring reports as required by the funding agency, and
- Verifying the projects overall compliance with safeguard measures and its progress towards achieving the intended loan outcomes.

5.9.2. Monitoring of ESMoP Compliance

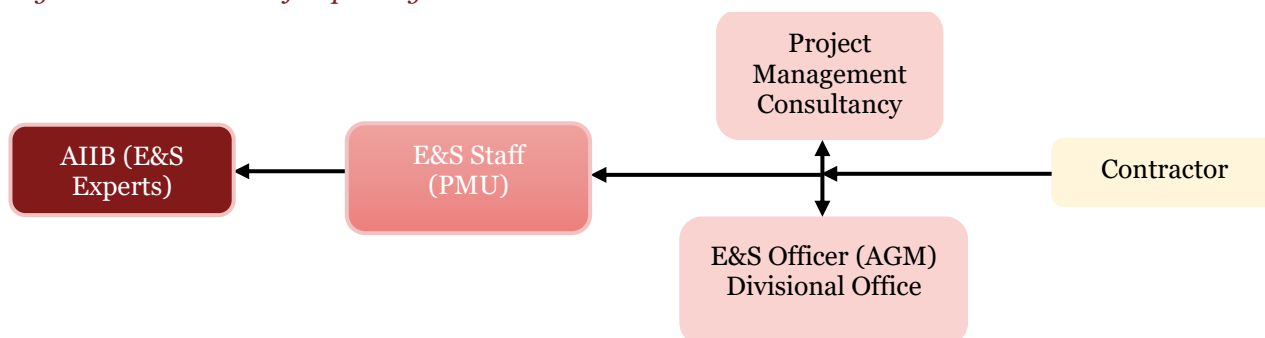
Environmental Parameters to Be Monitored:

To ensure that project would not generate negative impacts to the environment and affected communities, monitoring of environmental and social parameters has to be performed by PMU- AEGCL and PMC as per contract provisions. The monitoring activities of the project include site supervision, verification of permits, monitoring of water quality, soil, noise and air, traffic disruptions, livelihood restorations, Occupational, Health and Safety, etc. Monitoring of the quality of water, soil, air and noise during the construction stage is the responsibility of the PMC. The ESMoP compliance will be monitored by E&S staff of PMU.

5.9.3. Reporting Line

Mitigation measures related to construction as specified in the ESMP to be incorporated into civil works contracts, and their implementation will be primarily the responsibility of the contractors. In addition, contractors are required to submit monthly progress reports on the implementation of ESMP measures to PMC/PMU. The PMU – AEGCL will report to the AIIB E&S experts on progress achieved against the ESMP activities and milestones on a half-yearly basis. Progress reports will include a description of implementable activities and their status; identify the responsible parties involved in their implementation; and provide project management schedules and timeframes for doing so, along with their associated costs. The illustration of reporting line is provided in **Figure 8** below:

Figure 8: Illustration of Reporting Line



The environmental monitoring report will be submitted by the PMC- E&S staff to the PMU, which will include the result of environmental monitoring into its environmental report. The Environment and Social Staff of PMU after interaction with PMC E&S staff will ensure the adequacy of submitted monitoring reports and PMU will further submit these reports to AIIB twice in a year. This report will include the results of environmental monitoring to demonstrate that sound environmental management practices are applied, and the set environments targets are achieved.

In case the implementation of ESMP measures is not satisfactory, AEGCL may engage external qualified experts to verify monitoring reports and assess the significant impacts and risks. These external monitoring experts shall recommend actions for AEGCL to enhance environmental compliance. Funding agency will continue to monitor project compliance with safeguard plans and requirements on an on-going basis throughout the duration of the contract.

6. Environmental and Social Management Planning Framework

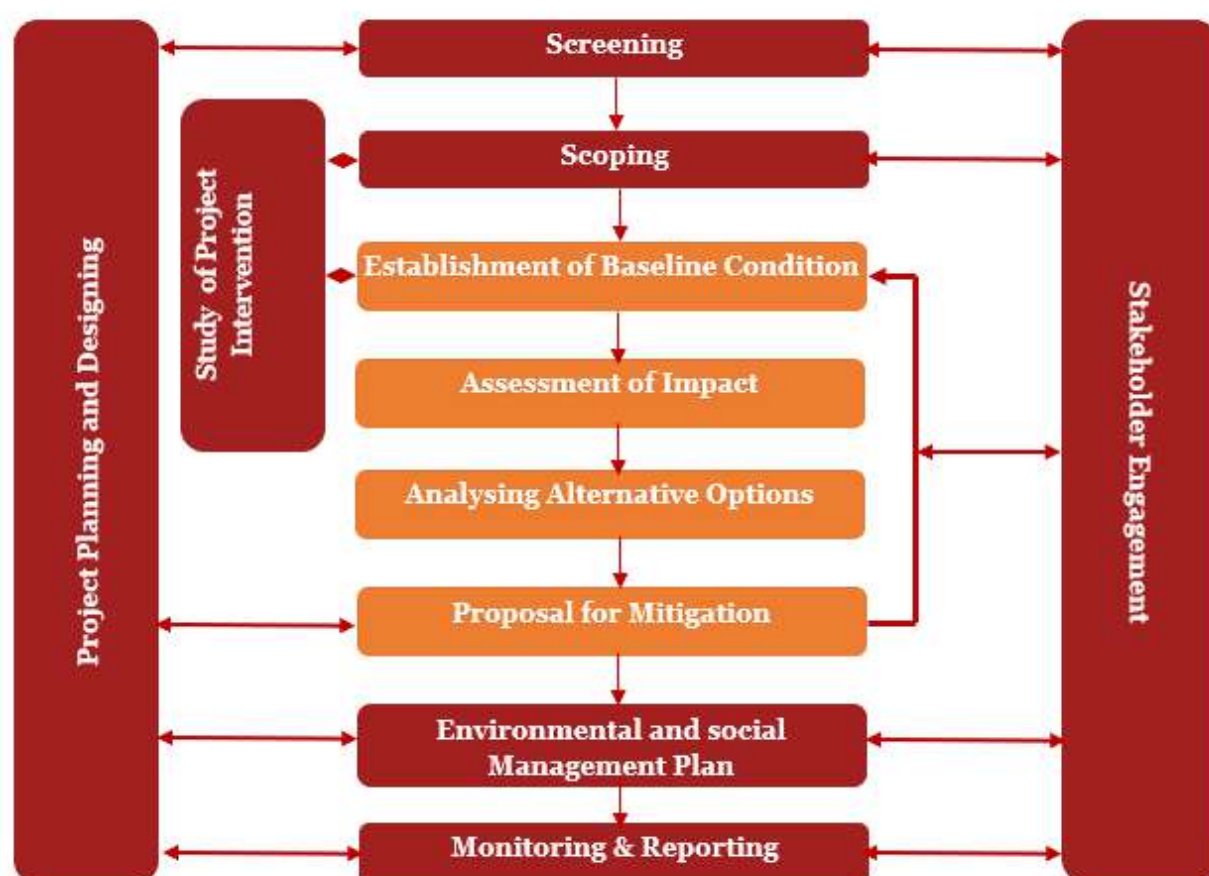
6.1. Introduction

The Environmental and Social Management Planning Framework is prepared since some of the subprojects' footprints are not decided. Hence, this Framework provides a broad outline for conducting E&S Assessment at Sub-Project Level based on the sampling E&S assessment and preparing a generic ESMP during ESMPF Development stage. The ESMPF prescribes following stages for conducting E&S Assessment:

- | | |
|---|---|
| a) Understanding of applicable Policies and Procedures for conducting Environment & Social Assessment | f) Analysis of Alternatives |
| b) Study of Proposed Sub-Project Details | g) E&S Impact Assessment |
| c) Screening and Project Categorization | h) Stakeholder Consultation and Disclosure |
| d) Scoping for Assessment Activities | i) Preparation of ESIA/ESMP |
| e) Establishment of Baseline Conditions | j) Development of Institutional Arrangement Framework |

The flow chart of activities for conducting environmental and social assessment is provided in **Figure 9** below:

Figure 9: Flow of activities for conducting Environmental and Social Assessment



6.2. Applicable Policies and Procedures for conducting Environment & Social Assessment

6.2.1. National Context

EIA notification 2006 and its subsequent amendments lists out types of projects that requires EIA and Environmental Clearance from MoEF&CC or SEIAA prior to commencement of any developmental work or project expansion. The notification gives stage-wise guidance for processing of Environmental Clearance.

The construction of Substation and Transmission line project doesn't come under purview EIA Notification 2006 and its subsequent amendments. However, project associated activity like creation of borrow area (if any) for the project will require prior Environmental Clearance. Hence, prior Environmental Clearance at sub-project level to be ensured in case creation of borrow area is involved.

6.2.2. AIIB Context

Environmental and Social Standard 1 (ESS1): Environmental and Social Assessment and Management of AIIB's Environmental and Social Framework aims to ensure the environmental and social soundness and sustainability of Projects and to support the integration of environmental and social considerations into the Project decision-making process and implementation. ESS 1 is applicable if the Project is likely to have adverse environmental risks and impacts or social risks and impacts (or both). The scope of the environmental and social assessment and management measures are proportional to the risks and impacts of the Project. ESS 1 provides for both quality environmental and social assessment and management of risks and impacts through effective mitigation and monitoring measures during the course of Project implementation. The ESS 1 defines the detailed requirements of the environmental and social assessment to be carried out for any project to be financed by AIIB.

Involuntary Resettlement (ESS 2): ESS 2 is applicable if the Project's screening process reveals that the Project would involve Involuntary Resettlement (including Involuntary Resettlement of the recent past or foreseeable future that is directly linked to the Project). Involuntary Resettlement covers physical displacement (relocation, loss of residential land or loss of shelter) and economic displacement (loss of land or access to land and natural resources; loss of assets or access to assets, income sources or means of livelihood) as a result of: (a) involuntary acquisition of land; or (b) involuntary restrictions on land use or on access to legally designated parks and protected areas. It covers such displacement whether such losses and involuntary restrictions are full or partial, permanent or temporary. The ESS 2 defined detailed requirements of resettlement planning of the projects involving involuntary resettlement.

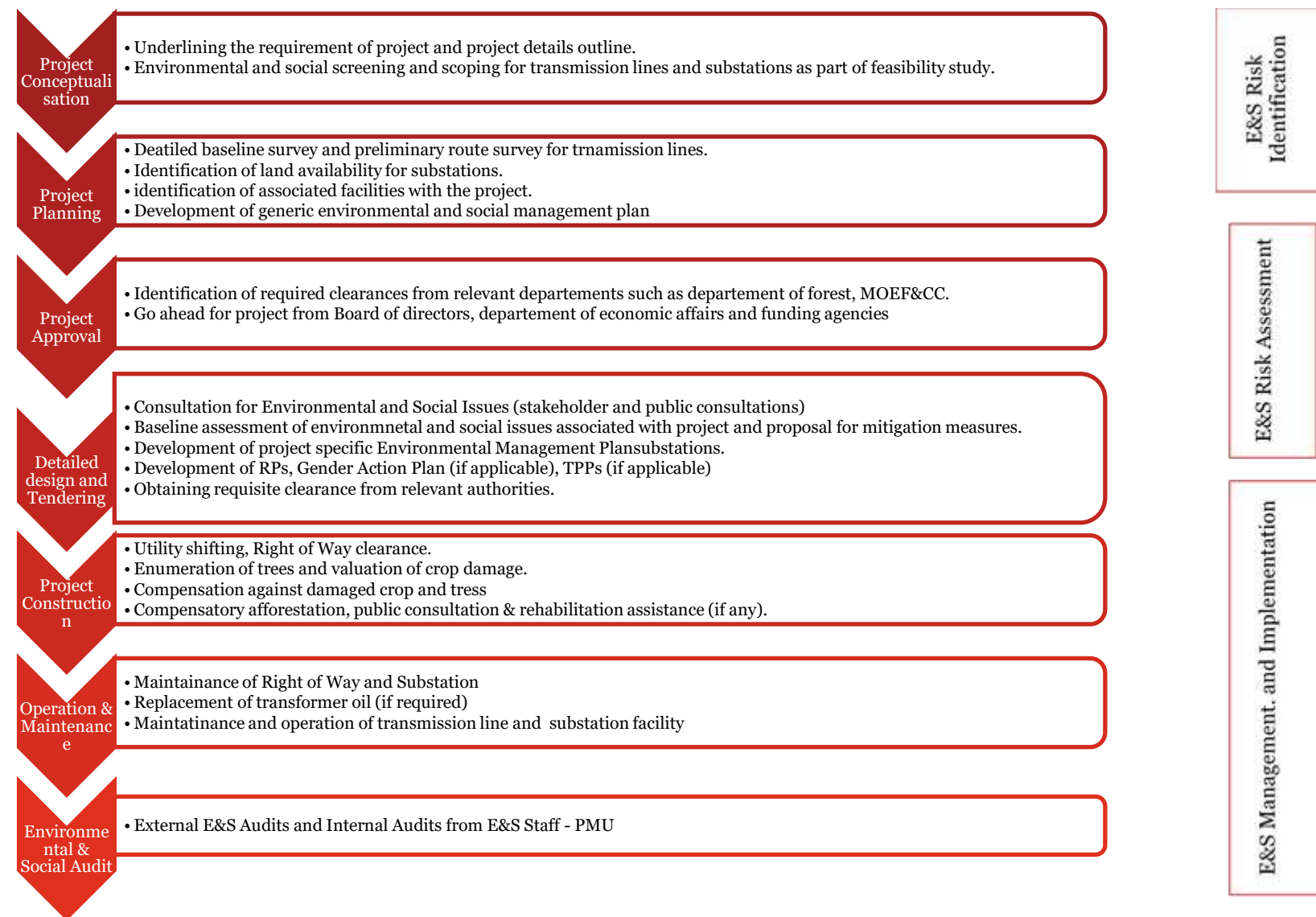
Indigenous Peoples (ESS 3): The ESS 3 is applicable if Indigenous Peoples are present in, or have a collective attachment to, the proposed area of the Project, and are likely to be affected by the Project. The term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

- (a) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others;
- (b) collective attachment to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories;
- (c) customary cultural, economic, social or political institutions that are separate from those of the dominant society and culture; and
- (d) a distinct language, often different from the official language of the country or region.

At this stage on finalization of Sub-Project components, the applicability of other relevant laws, regulations and policies as discussed under Chapter 'Legal and Policy Framework' should be reviewed towards ensuring compliance of the same at various stages of project (Refer **Figure 10**).



Figure 10: Environmental and Social Management Procedures Across Project Cycle



6.3. Study of Proposed Sub-Project Details

The design report and other relevant documents (like Detailed Route Survey Report, Tower Schedule, Layout of Substations etc.) to be studied thoroughly. This will help to understand the various components of proposed project, requirement of land acquisition, requirement of raw material and utilities, potentially applicable environmental legislations/policies, negative impacts on STs, etc. The details of the project would give an understanding of the following details:

- Geographic coordinates and locational information
- Zone of Impact (ZoI) and Important E&S Features within the ZoI
- Details on type of technology, material sources, work methodology/sequencing, key equipment/machinery and manpower proposed to be used and other such technical details
- Various activity and operational parameters/issues
- Construction methodology and strategies proposed for the execution of works
- Impact on existing utilities and infrastructures
- Probable impact on natural and social resources
- Waste generation potentiality etc.

The subprojects selection criterial is listed in Appendix 4 for guiding E&S due diligence, in order to rule out the subprojects with significant E&S impacts.

6.4. Screening and Project Categorization

The screening and Categorization of Project are important to determine the nature and level of the environmental and social review, type of information disclosure and stakeholder engagement require for the Project. The categorization takes into consideration the nature, location, sensitivity and scale of the Project and is proportional to the significance of its potential environmental and social risks and impacts. An overview of generic Environmental and Social concerns associated with Transmission Sector projects are furnished in **Table 44** below:

Table 44: Impacts Associated with Transmission Line Sector

Impacts Associated with Power Transmission Project	
Environmental Impacts	Social Impacts
<ol style="list-style-type: none"> 1. Impact on movement of avifauna and arboreal species may be caused from transmission lines. 2. Clearance of tree and vegetation cover 3. Acquisition of Forest: Forest under a new transmission line is removed from active forestry use. 4. Possible threat to animal/plant species: Construction and maintenance of transmission lines might disturb individual plants and animals or might affect their habitat 5. Soil Erosion: Impacts can occur wherever soils will be disturbed, at pole locations, or where heavy equipment is used. 6. Generation waste like Used Oil, E-waste; oil spills, sanitation. 7. Possible Impact on water bodies /wetlands from construction activities, oil spill 8. Impact on Ambient air and Noise Quality during construction stage 9. Improper Sewage and waste from construction 	<ol style="list-style-type: none"> 1. Loss of land and assets for the project 2. Restriction of land use: A transmission line project may have an indirect impact on the location and direction of expansion of land use. 3. Impact on Agriculture: Transmission lines can affect field operations, irrigation, aerial spraying, windbreaks, and future land uses. 4. Cultural concerns: A cultural concern can occur when an identifiable group or community has practices or values that may conflict with the presence of a new transmission line. 5. Property Ownership Issues: Property owner issues are often raised by individuals or communities along proposed transmission, especially due to reduction in land prices 6. Electromagnetic Interference: EMF can also result in Potential Impacts to Implantable Medical Devices. 7. Enhanced chances of communicable diseases, and GBV/SE due to influx of migrant labour



Impacts Associated with Power Transmission Project	
Environmental Impacts	Social Impacts
labour camps 10. Leakage of SF ₆ , an extremely potent greenhouse gas 11. Occupational health and safety during implementation, operation and maintenance phase 12. Change in landscape: A new line corridor has a splintering effect on the landscape. 13. Impact on Aesthetics	force. 8. Temporary loss of access to common properties during construction, operation & maintenance phase.

The E&S screening to be carried out at sub-project level as defined in the following sections-

6.4.1. Environmental Screening

This step would involve review of the available environmental information about the sub-project and its surrounding Zone of Impact (ZoI). The extent of ZoI may vary from sub-project to sub-project depending on its siting, magnitude, components of Sub-Projects and local geographical condition. Extent of ZoI should be established with proper justification at the time of scoping process and also must be determined with the advice of environmental specialists engaged for Environmental and Social Impact Assessment. Environmental Screening would help to identify key environmental concerns during site visits and also provide a preliminary idea regarding the nature, extent, and phasing of environmental issues that would need to be handled during the subsequent stages of project cycle. It will also help to identify opportunities for avoidance and/or minimization at early stage of the project cycle so that the change in design process is possible. The following describes the steps to be followed during the screening:

- Confirm the presence of environmentally and ecologically sensitive areas from secondary sources and site observations
- Verify the extent of applicability of legislation of GoI and GoA and Policies of AIIB in sub-project activities
- Identify potential negative or positive, direct or indirect impacts and provide clarity on issue, which needs to be investigated more comprehensively during process of ESIA at later stage
- Incorporate feedbacks of public consultation and answer to published notice
- Categorize the project in order to determine whether it requires ESIA
- This should help with sequencing of sub-projects and factoring in timelines like those associated with regulatory clearance processes (if any).

The results of the screening will help:

- To determine applicability of regulatory and policy and requirement of clearances/permissions
- Identification of key environmental concerns
- Scoping for ESIA

A checklist for undertaking Environmental Screening for sub-projects is provided in **Appendix 5**

6.4.2. Social Screening

The purpose of conducting Social Screening at Sub-Project Level is to get an overview of the nature, scale and magnitude of the social issues in order to determine the need for conducting social impact assessment and



preparing RPs/Abbreviated Resettlement Plan (ARPs)³⁷, IPPs (if applicable). After identifying issues, the applicability of the Bank's ESS2 and ESS3 should be established along with GoI and GoA regulatory requirements. Based on this, the level and focus areas for the Social study should be determined.

The Social Screening should be carried out in close consultation with various stakeholders like project beneficiaries, Potential PAPs, Women Group, Indigenous community, Economically Backward Communities, other local key informants, Vulnerable Groups³⁸, institutional stakeholders like various Govt. Departments, Non-Government Organizations (NGOs) etc. as applicable.

Social screening provides first stage information about the subproject on: (i) Potential PAP population; (ii) extent of land required and potential impact on other assets; (iii) impacts on poor and vulnerable groups (iv) potential needs for permanent/temporary livelihood restoration; and (v) any other possible social impacts.

A checklist for undertaking Social Screening for sub-projects is provided in **Appendix 5**

The outcome of the Social Screening process will also help to prioritize the sub project and where required, start the social mitigation process in a timely manner. This will also assist in sequencing /phasing of Sub-Projects in overall project implementation.

6.4.3. Project Categorization

AIIB determines the Project's category by the category of the Project's component presenting the highest environmental or social risk, including direct, indirect, cumulative and induced impacts, as relevant, in the Project area of influence. The Bank assigns each proposed Project to one out of the 4 designated Categories i.e. Category A, Category B, Category C and Category F1 (Refer **Table 45**)

Table 45: Project Categorization as per AIIB

S. No	Category	Requirement of Assessment
1	Category A	Project will be categorized as 'A' if it is likely to have significant adverse environmental and social impacts that are irreversible, cumulative, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works and may be temporary or permanent in nature. These types of projects require a detailed ESIA
2	Category B	Project is categorized B when it has a limited number of potentially adverse environmental and social impacts; the impacts are not unprecedented; few if any of them are irreversible or cumulative; they are limited to the Project area; and can be successfully managed using good practice in an operational setting. Requirement of E&S Assessment or another similar instrument as appropriate to be determined by a prior initial review of the environmental and social implications of the Project. The scope of the assessment may vary from Project to Project, but it is narrower than that of the Category A ESIA.
3	Category C	A Project is categorized C when it is likely to have minimal or no adverse environmental and social impacts. Such projects do not require an environmental and social assessment but do require to conduct a review of the environmental and social implications of the Project.
4	Category FI	A Project is categorized FI if the financing structure involves the provision of funds to or through a financial intermediary (FI) for the Project, whereby the

³⁷ Where impacts on the entire displaced population are minor, or fewer than 200 people are displaced, with the prior approval of the Bank, ARP can be prepared. Apart from that, RP to be prepared.

³⁸ vulnerable groups or individuals refer to people who, by virtue of factors beyond their control, may be more likely to be adversely affected by the Project's environmental or social impacts and may be more limited than others in their ability to claim or take advantage of Project benefits.



S. No	Category	Requirement of Assessment
		Bank delegates to the FI the decision-making on the use of the Bank funds, including the selection, appraisal, approval and monitoring of Bank-financed subprojects.

The Project has been tentatively assigned to Category B under the AIIB's ESP, as power transmission projects' general insignificant impacts and AEGCL will avoid siting the sub-projects in sensitive areas to minimize E&S impacts to the extent possible. However, the Category may be updated to properly reflect latest Sub-Projects impacts.

6.5. Scoping for Assessment Activities

Based on the screening exercise, the scoping for E&S study will be done. The main objective of the scoping study is:

- To get familiarized with the sub-project details
- To define the study area comprising the project sites and its ZoI
- Outline the E&S interactions pertaining to the project, on which the ESIA study shall be focusing on
- Define the scope of work and the approach and methodology towards conducting the ESIA/ESMP, RP or ARP

Scoping should be done to ascertain the determination of environmental and social issues associated with the Sub-Project, extent of ZoI, PAP, adequate mitigation approach etc. and the aspects particularly on which ESIA study should emphasis on. For this purpose, the project documents and design related information should be reviewed; site survey should be undertaken to understand the E&S sensitivities prevailing in the project area and its ZoI. The secondary information on the project area and on similar project should also be studied. Based on the study, likely E&S issues associated with the Project activities during preconstruction, construction and operation should be determined.

6.6. Analysis of Alternative

The analysis of alternatives should be carried out at project planning phase. Analysis of alternatives is necessary to minimize negative impacts and maximize positive ones. Analysis of alternative may include site selection for substation, provision for alternative design, materials, technologies, etc.

In general, for any sub-project, the analysis of alternative should focus on the following components as per applicability and their relevancy:

- Alternative location of substation
- Alternative assessment of transmission line alignment;
- Alternative design and technology;
- Assessment of With Sub-project and No sub-project scenario
- Alternative source of resource (water/ material)
- Alternative options for location for labor camps
- Alternative practice for management and disposal of waste
- Alternative route/time for transporting material

The without-Project scenario would provide the status if the proposed interventions are not undertaken. This will be done by analyzing the previous status using data collected during environmental-social baseline and field investigations; and

In with-Project scenario, status with implementation of the proposed interventions will be projected.



Among the above-mentioned components, the most significant in power transmission project is alternative assessment of Transmission Line alignment and substation siting. For Transmission Lines, multiple alternate route options as proposed by design/engineering team should be thoroughly examined by ESIA study team towards documenting E&S sensitive features located along the corridor of each of the alignment options. Based on the assessment and keeping in place required design and financial feasibility considerations, most suitable option where E&S conflict is less, should be recommended for final consideration.

The alternative analysis conducted by AEGCL to shortlist the most feasible transmission line route needs to include the parameter of social assessment, along with environmental. The process of understanding and calculating the compensation for temporary damages may be carried with the alternative analysis.

The process is given below:

- A Social (and Environmental) Assessment is conducted in respect of each of the chosen lines of alignment. The process involved extensive consultations with land owners/farmers and different stakeholders.
- During the process public views and necessary inputs about surroundings/ villages/crops etc. are also necessary and noted for screening/scoping. After comparison and analysis of the environmental and social parameters gathered for all alternatives, and considering other significant economic benefit associated with the project/subproject, the most optimum route having the minimum environment & social impact is selected for further investigation.
- Site office will consult with state forest departments if the line is passing through forest areas. Revenue authorities will be consulted for their views on revenue/other lands. Experts' assistance will be taken, as appropriate, on valuing crops, trees and other assets.
- Social Assessment concludes with: (i) selection of an optimum line; and (ii) a Social Management Plan viz., assessment of temporary damages and compensation. All these are disclosed widely among the stakeholders as well as on the internet and evince a feedback. Due approval will be sought from District/ Village Councils. In case the scheme/project is implemented in predominantly tribal area a separate and comprehensive analysis in respect of likely impact both positive and negative shall be carried out and will be incorporated in the entitlement matrix or under a whole Indigenous development plan.
- In cases of areas under the District Council/ Village Council in tribal areas, where official land records don't exist, formal land/property boundaries of private property owned by the tribal households can be determined through the process of community consultation and discussion with village head and village council members. Based on such information, land can be classified, and land record can be updated, and compensation assessment can be made.
- In the states where the district council is under operation, although the land is notified from the district collector's/ deputy commissioner's office, the verification of ownership is done by the district/village council in consultation with the village people and assessment of compensation also done by the revenue officials based in the district council. After determination of ownership and compensation amount the same is sent to the district collector/ deputy commissioner.
- A notice under Indian Telegraph Act/Electricity Act, 2003 is served to the landowners informing that the proposed transmission line is being routed through the property of the individual concerned. The notice shall contain the particulars of the land, ownership details and the details of the trees/crops inevitably likely to be damaged during the course of the construction of the proposed transmission line and acknowledgement received from land owner.
- The revenue officer shall further issue a notice of intimation to the concerned landowner and inspect the site to verify the documents related to the proof of ownership and a detailed Mouja list is prepared for the identified trees and crops inevitably damaged during the course of the construction. For assessing the true value of timber yielding trees help of forest officials is taken and for fruit bearing trees help of Horticulture department is taken.
- The Mouja list shall contain the land owner details type of tree/crop, its present age, variety, yielding pattern etc. and the same is prepared at site in the presence of the land owner. These Mouja lists are further compiled and a random verification is conducted by the concerned District Collector or his authorized representative in order to ascertain the assessment carried out by the revenue office is genuine and correct. After this process the District collector issues a tree cutting permit to AEGCL to enable removal / damage to the standing tree/crop identified in the line corridor.



- Once the tree/crop is removed / damaged, AEGCL shall issue a tree cutting/crop damaged notice to the land owner with a copy to the Revenue Officer to process the compensation payment. The detailed Valuation statement is verified at various levels and approval of payment of compensation is accorded by the concerned District Collectors.
- On approval of compensation, the revenue officer shall further intimate the amount payable to the different landowners and AEGCL arranges the payment by way of Demand Draft to the affected parties.

6.7. Establishment of Baseline Condition

6.7.1. Establishment of Existing Environmental Condition

For environmental assessment, it is very important to adequately define the existing environmental conditions (Environmental Baseline) against which environmental impacts of a sub-project would be subsequently evaluated. The characteristics of “environmental baseline” to be developed would depend on:

- Nature of the sub-project location,
- Nature/ extent of a sub-project and its likely impact,
- Level of environmental assessment required (e.g., ESIA) with focus on the development of inventory for tree cutting and conducting socio economic survey for PAP's for individual subprojects.

For systematic definition and recording, the baseline environment is usually classified into Physical, Ambient, Ecological, and social environment. Important features/ parameters under each category should be identified and measured during baseline survey. **Table 46** below summarizes information on the type of baseline information that will be required (but not limited to) as per their applicability in Sub-Projects.

Table 46: Description of Environmental Baseline Information required for the Sub-Project

Environmental Components/Concerns	Baseline Information	Source (Primary / Secondary)
Physical Environment		
Geography	Geographical information of Sub-Project Area Location, Physiography, Geology, Slope & Elevation, Drainage Pattern, seismology, topography, landslide prone zones, Flood plain & River Morphology. Contour map, details of micro drainage, flood passages and information on high levels flood periodicity	Secondary
Weather and Climatology	Long term climatological profile for the Sub-Project area Temperature (Max/Min), Precipitation, Wind Direction, Wind Speed, Cloud Cover, Humidity, record of natural calamity	Secondary
Natural Hazard	Threat from Natural Hazard <ul style="list-style-type: none"> • Records on natural calamity like earthquake, flood, landslide, drought, famine, epidemic, wildfire etc. in the project area supported with local consultation • Land slide prone /geologically unstable slope areas with respect GPS Coordinate 	Secondary
Land Use	Land Use pattern for ZoI Cadastral Map/Land Ownership document/Record for Zone of Impact & Topo Sheet; GIS Map showing ZoI	Secondary
Ambient Environment		
Ambient Air	Baseline condition of Ambient Air Quality <ul style="list-style-type: none"> • Level of PM₁₀, PM_{2.5}, CO, SO₂, NO_x 	Primary (Prior to beginning of construction)



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Environmental Components/Concerns	Baseline Information	Source (Primary / Secondary)
	<ul style="list-style-type: none"> Inventory of sensitive receptors like school, college, hospital etc. in the vicinity of the project area Inventory of major air polluting sources 	
Ambient Noise	Baseline condition of Ambient Noise Level through primary Monitoring <ul style="list-style-type: none"> Day Time & Night time Noise Level Inventory of sensitive receptors like school, college, hospital etc. in the vicinity of the project area Inventory of major noise generating sources 	Primary (Prior to beginning of construction)
Water	Information on ground water and surface water resources <ul style="list-style-type: none"> Inventory Surface Water resources including tentative capacity, use and its distance from project site Information on hydrogeology and availability of Ground water Quality of Ground and Surface Water of the project area through primary monitoring 	Secondary-Hydrogeology and ground water availability Primary-Quality monitoring of Ground & Surface water where may be affected and inventory of Surface water resources (Prior to beginning of construction)
Soil	Nature of soil and fertility of the Project Area <ul style="list-style-type: none"> Nature and type of soil Soil profile Fertility, crop produced, crop cycle Quality of Soil Physicochemical parameters	Nature of soil and fertility - Secondary Soil Quality-Primary (Prior to beginning of construction)
Debris Disposal Site	Identification of Debris Disposal Site Tentative site for disposal of dismantled/construction debris may be identified	Secondary (to be validated through stakeholder consultation)
Quarry Sites and Borrow Areas	Identification of Licensed Quarry Sites and Borrow Areas The details of Borrow Areas and Quarry sites to be used in the sub project should be listed out with lead distance and mode of transportation	Secondary
Ecological Environment		
Felling of Trees and clearance of Vegetation Cover	Trees falling within project footfall area <ul style="list-style-type: none"> Listing of Species, Girth size of affected Trees & Poles with respect to Tower No & GPS Coordinates Information on Endemic, Endangered, Medicinal, Protected species Information on offset areas for tree plantation in case of compensatory afforestation activity 	Primary through inventory survey
Forest Area	Acquisition of forest land for the project <ul style="list-style-type: none"> Legal status of forest land proposed for acquisition Block/Survey/Compartment No. of the area concerned Extent of Forest area to be acquired Delineation of affected forest area on map (Cadastral Map and toposheet) Threat to associated biodiversity (Flora & Fauna) Information of Endemic, Endangered, Medicinal, Protected species (Flora & Fauna) 	Primary and Secondary



Environmental Components/Concerns	Baseline Information	Source (Primary / Secondary)
Protected Area/Ecologically Sensitive Areas/Ramsar Sites/Important Bird Areas	<p>Ecological condition of ZoI</p> <ul style="list-style-type: none"> Information on presence of Protected Area (National Parks, Wildlife Sanctuary, Biosphere Reserves etc.) / site of ecological importance like nesting, breeding ground, Important Bird and Biodiversity Areas (IBA), Ramsar Sites, Wildlife Corridor/Migration Route, Forest Areas, any site of national/international importance etc. within ZoI. Information should include GIS Map showing distance of such site from project site, its ecological condition and biodiversity † record of local extinction of any species or declining species (population decreasing day by day) <p>†In case such site is located within ZoI, a detailed ecological assessment may be undertaken. The study should cover biological diversity, species richness of the area; seasonal, Diurnal and nocturnal movement of wildlife towards project site; probable threat from proposed project and suggested mitigation in consultation with concerned stakeholders</p>	Primary and Secondary
Biodiversity	<p>Floral & Faunal community of project area</p> <ul style="list-style-type: none"> Floral and faunal (Covering mammals, aves, amphibians, reptiles, fishes etc.) community Biodiversity of aquatic system in case its within ZoI occurrence of Endangered/Vulnerable/rare/critically endangered species as per IUCN red list Record of migratory species (specifically birds)-i.e. residential, intercontinental migration record of local extinction of any species or declining species (population decreasing day by day) occurrence of Threatened Species (IUCN) and corresponding Schedule as per Wildlife Conservation Act, 1972 in ZoI 	Secondary information through stakeholder consultation, literature study followed by primary survey

6.7.2. Establishment of Social Baseline

For Social Assessment, it is very important to adequately define the “social baseline” against which projected social impacts of a sub-project would be subsequently evaluated. The characteristics of “social baseline” would depend on:

- Land requirement (both temporary and permanent)
- Social-economic conditions
- Issues specifically faced by women or vulnerable groups
- Social needs, benefits and barriers
- Extent and type of potential losses
- Number of Project Affected Families

The table below summarizes the type of baseline indicators that will be required to estimate number of PAPs and extent of losses. The social assessment should be carried out at regional and sub-project level. For regional level assessment, baseline information can be acquired from secondary data. Whereas, the Sub-Project level information should be acquired through socio economic and census survey. The indicative list of social



components for which baseline information should be collected (but not limited to) is furnished in **Table 47** below.

Table 47: Description of Social Baseline Information required for the Project

Component/Parameters	Baseline Information
Demography & Socio-Economic Condition (disaggregated by gender, where available)	<ul style="list-style-type: none"> • Population • Sex Ratio • Literacy • Work Participation • Population Density • Economic Profile • Access to social infrastructure
Forestry: Forest users affected due to acquisition of forest land (disaggregated by gender, where available)	<ul style="list-style-type: none"> • Forest type • Forest land getting acquired • Uses of forest products • No. of users likely to get affected • No. of users under different social categories (caste, gender, vulnerable, disability, economic status) • Dependent of indigenous /vulnerable community
Agricultural Assets: (disaggregated by gender, where available)	<ul style="list-style-type: none"> • Demographic and socio- economic profile • Land holding pattern • Land holding according to social categories • Cropping pattern and agricultural practices • Farm labors employed • Livelihood pattern • Source of water for irrigation • Extent of loss (Land, crop damage and other agricultural assets) • Enumeration of PAFs/PAPs • Affected Plot No/ Survey No and details of its ownership • Estimation of other properties like cattle's, Vehicles, Crops, Trees etc. • Demographic pattern of affected PAFs/ PAPs • Quality of life (To access parameters such as access to basic amenities such as water, transport, education, health etc.) • Health, Sanitation condition • Prevalence of Social Development Programs (Govt./NGO) • Property prices
Other Private assets	<ul style="list-style-type: none"> • Land holding pattern • Type of major structures (Shop, house etc.) • Types of minor structures (hand pump, boundary, cattle sheds etc.) • Socio-economic profile of affected families • Livelihood pattern • Loss of livelihood or assets of non-title holders and title holders • Types of trees and count • Types and value of fruit bearing and other trees • Property prices
Common Property Resources and Utility	<ul style="list-style-type: none"> • Types of utility services that need to be shifted and no. of users • Types of public/ common assets that have to be shifted • Disruption of access to common resources including road, utility services etc. • Disturbance/ demolition of water supply infrastructure, groundwater



Component/Parameters	Baseline Information
	resource leading to drinking water and irrigation problems <ul style="list-style-type: none"> • Damage to Resting sheds, bus stops, water source etc.
Social Infrastructure	<ul style="list-style-type: none"> • Existing health facilities; Predominant diseases • Academic institutes
Cultural Resource	<ul style="list-style-type: none"> • Sites of historical / archaeological/anthropological Importance: Age of the site, its significance, location, distance of such site from Sub-Project Site • Sites of Religious/ cultural
Indigenous and Vulnerable community	<ul style="list-style-type: none"> • Social profiles • Type of indigenous group present and their cultural practices • Community consultation practices • Any kind of social discrimination • Access to social benefit and infrastructure • Livelihood and economic condition • Involvement in decision making • Willingness to participate in the project • Can the project adversely impact indigenous or vulnerable community
Gender	<ul style="list-style-type: none"> • Collection of Gender disaggregated baseline data • Involvement of women in decision making • Access to social benefit and infrastructure • Willingness of women to participate in the project • Education and work participation • Prevailing wages for men & women • Source of income • Instances of gender violence • Issues like child marriage, • Issues related to child birth and women health • Women headed PAHs • Disaggregated information on loss of livelihood, property and assets

6.8. E&S Impact Assessment

Key potential benefits as well as adverse impacts on physical, biological and socio-economic environment associated with the preconstruction, construction and operation and maintenance phases of the project in the ZoI should be identified. Difference in the status between the future-with-Project and future-without-Project condition would be considered as the impact of project on the environmental and social components and should be analyzed covering (a) the primary sub-project site (b) associated facilities requirement (c) raw materials source used in the project (d) possible cumulative impact and (e) induced impact for the ESIA study.

The envisaged impacts should be categorized as impacts during the preconstruction, construction and operation phase of the project. There are common E&S risks which are associated with pre-construction, construction and operation stages of transmission line projects are listed below:

- Impact due to change in land use
- Impact on livelihoods
- Impact due to change in drainage pattern
- Impact on ecology & biodiversity
- Impact on ambient air quality and noise levels
- Impact on water quality
- Impact on private and community properties and assets



- Impact on permanent or temporary use of public spaces and facilities
- Health and safety issues during construction operation phases
- Occupation and safety hazards during construction and operation phase
- Temporary access control
- Deteriorated ambient air and noise quality due to improper Material transport and handling during construction work
- Utility and Water demand for the project
- Emission from vehicle/equipment usage during construction
- Utility shifting/
- access loss to utilities/assets
- solid and hazardous waste generation
- Improper management and disposal of solid waste, e-waste and hazardous waste
- Waste handling and management, including construction waste, hazardous and non-hazardous waste

Qualitative and Quantitative impact assessment tools (such as GIS mapping, analytical matrices, available and relevant analytical tools etc.) has to be used to understand the extent of impact due to the proposed sub-project. Effort should be given to quantify the impacts to the extent possible. For example, Quantitative assessment of impact is essential to be carried out for loss of land-properties- other assets, loss of trees, acquisition of forest land - waterbodies, impact on common property resources, impact on utilities, generation of debris/waste, requirement of natural resources in the project etc. On the other hand, qualitative impact assessment may be carried out for impact due to labour influx, safety and security of workers and communities etc.

6.8.1. Mitigation measures for identified Impacts and guidance on preparation of ESMP

An ESMP is the key document focused on implementation of mitigation measures, once the potential impacts are identified. It starts operationalizing the avoidance / minimization aspects from Design/ Pre-construction phase and ensures that the project impacts are reduced to an acceptable level during implementation of the sub-project. Thus, ESMP becomes the document to ensure that all the effort has been made to ensure mitigation of E&S concerns associated with the sub project. The ESMP should be sub-project specific, clearly and concisely describing adverse impacts, selected management measures to bring it to an acceptable level and timelines for implementing these measures. It should also clarify roles and responsibilities of various entities – AEGCL, PMC, Contractors, other stakeholders etc. The key components of an ESMP are:

- Mitigation measures to be adopted for every possible potential adverse impacts during Design, Pre-construction, Construction/Implementation and Operation phases as identified through ESIA
- Enhancement plans for positive impacts
- Monitoring Plan with indicators, mechanisms, frequency, locations,
- Institutional arrangements for each activity and mitigation measures
- Implementation schedules for each activity
- Budgetary allocations for implementation of mitigation measures
- Reporting procedures, including for redressing grievances related to environmental issues

The cost for implementation of the management measures, the institutional arrangements for monitoring shall be included in the estimated project cost. The site-specific mitigation measures should be designed by contractor.

Budget for ESMP

Sub-projects under each contract package will have its own budget to cover the ESMP costs relating to mitigation measures, enhancements, and monitoring costs. In addition, training and capacity building costs need to be added for specific issues that ESIA may bring out. For instance, there may be a need to have short courses on specific topics, experience exchanges on any particular issue, etc.



6.9. Provisions for Stakeholder Consultation and Disclosure

Stakeholder consultations constitute one of the most important components of ESIA exercise and should be carried out with institutional stakeholders as well as with the community. Such an exercise helps to collect information on baseline scenario, to understand applicability of law/legislation, opinions of the public and to disseminate information on the Project. The stakeholder consultations should be undertaken to get an in-depth understanding of the sub-project and the related Environmental and Social issues. Stakeholder consultation should be preceded by a stakeholder analysis to identify relevant stakeholders to the proposed sub-project intervention. **Table 48** presents the indicative list of stakeholders for the project.

Table 48: Type of Stakeholders

S. No	Type of Stakeholders	Entity
1	Institutional Stakeholders	<ul style="list-style-type: none"> • Forest Department & Department of Wildlife, GoA • Revenue Department • Ground water authority • Department of Tourism • Pollution Control Board • State Wetland Authority • Department of Fisheries • Department of Meteorology • Civil Societies (NGOs, youth clubs, etc.)
2	Community	<ul style="list-style-type: none"> • Potentially affected people who are likely to lose land or other assets or livelihood • STs • Women Groups (SHGs) • Workers

As a systemic approach is required to achieve the highest efficiency of engagement, initial identification is followed by a more detailed analysis of stakeholders. The main principles of this deeper stakeholder identification and analysis are presented below³⁹:

- Identify those whose “interests” determine them as stakeholders such as local media, NGOs etc.
- Be strategic and prioritize. Affected communities and stakeholders with significant interest into the Project should be given most intensive and focused engagement, while standard disclosure and consultation mechanisms can suffice for a wider public.
- Refer to past stakeholder information and consultation.
- Develop socio-economic fact sheets with a focus on vulnerable groups (population numbers and mapped locations; demographic characteristics of the local population; location and accessibility of social infrastructure etc.)
- Verify stakeholder representatives, both formal and informal, to ensure that these individuals are indeed true advocates of the views of their constituents
- Engage with stakeholders in their own communities to enhance dialogue, provide comfort and improve perception of the Project

³⁹ For more details, see the Stakeholder Engagement Handbook, IFC 2007.

Source: https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/publications/publications_handbook_stakeholderengagement_wci_1319577185063. Date of reference: 9 October 2019.



- Remember that government is a key stakeholder. Keeping track of government-led consultation with stakeholders on issues related to your project is highly recommended
- Work with representative and accountable NGOs
- Recognize employees of the Project as a good channel of communication.

To ensure meaningful consultation with vulnerable groups and individuals the stakeholder engagement activities will be designed but not limited to:

- Reach out to affected parties that may be differentially affected by the project because of their disadvantaged or vulnerable status.
- The information shall be provided to those parties personally with appropriate aide in cases of illiteracy, sight or hearing impaired,
- For these groups information disclosure and consultation shall aim to build their capacity for better inclusion in other engagement processes in the future.
- Single parents to be given a choice for consultation and information disclosure activities to correspond to their care giving responsibilities to young children,
- Transport to be provided to and from venues in cases of less mobility due to health conditions,
- Focus Group discussions should be moderated in an inclusive way,
- House visits and individual consultation in special cases,
- If needed in special cases liaison and include social workers to assist in the stakeholder engagement.

The primary objective of stakeholder analysis is to map the stakeholders, their organizational structures, operational networks, representation requirements and impact on type of activity in the project to strategically prioritize consultation with them and develop an understanding of operational and organizational gaps. The stakeholder interactions should be pluralistic, inclusive and may be conducted through the following:

- Focused group discussions
- Key informant interviews
- Personal Interviews

The outcome of the consultations and suitable process documentation should be maintained and shall be furnished in the ESIA report. The stakeholder consultation is a continuous process and should be conducted at various phases of project in line with Project progress and evolving expectations and needs of PAP.

Initial public consultation should be done while conducting reconnaissance survey screening phase, to be followed by acquiring information on baseline data for ESIA study. After the preparation of ESIA report, the findings should be made available for public review through public notice. Copy should be available at AEGCL website; AEGCL's PMU and Divisional Offices; Local Panchayat and block levels, etc. for at least 30 days to seek public's recommendations and concerns towards further consideration.

Effectiveness and appropriateness of stakeholder consultation activities will be measured, as appropriate, to provide an indication of the effectiveness of the meetings and the process of stakeholder engagement. These will be tailored to be relevant to the audience but will address the manner in which the meeting and overall process is viewed to be free of manipulation, interference, coercion, and intimidation, and conducted on the basis of timely, relevant, understandable and accessible information in a culturally appropriate format.

6.10. Preparation of ESIA Reports

ESIA is the most commonly used tool to ensure that environmental and social aspects are considered during decision making by influencing design to avoid /minimize, and where unavoidable mitigating the adverse impacts and/or enhancing positive impacts. It also provides a platform for getting views from stakeholders



including the directly affected community and institutions to improve the design so that the asset quality is improved. The contents of an ESIA Report should include-

- a) Executive Summery
- b) Introduction
- c) Description of Project and Sub-Project
- d) Review of Legal and Policy Framework
- e) Description of Environmental and Social Baseline Condition
- f) Analysis of Alternatives
- g) Stakeholder Consultation and Disclosure
- h) Impact Assessment and Mitigative Measures
- i) Environmental & Social Management Plan and Monitoring Mechanism (Covers mitigation measures, monitoring and institutional responsibilities)

6.11. Institutional Arrangement for Environmental and Social Management Implementation, Monitoring & Reporting

Monitoring is a major part of the ESMPF to ensure its goals and objectives are adequately met. The environmental and social safeguards implementation will be monitored internally. The Environmental and Social (E&S) staff of Project Management Unit (PMU), Divisional (E&S) Staff of AEGCL with the help of Project Management Consultant (PMC) will monitor the project site in the initial, construction, post-construction and operational phases of project to ensure that all environmental and social issues related to each subprojects are well addressed and complied with the requirements mentioned in ESMPF. Divisional Offices (AGMs) with the help of PMC will prepare quarterly progress reports and submit them to PMU. PMU with the help of PMC will prepare semi-annual monitoring reports (template attached as Appendix 7) for submission to AIIB. The reports will cover ESMPF implementation, focusing on compliance and any needed corrective actions. Public consultation will be conducted as necessary during pre-construction, construction, operation phases. The Environmental & Social Management Plan and Monitoring Mechanism of ESIA for Sub-Project should clearly define Environmental and Social Management Monitoring & Reporting Framework of Sub-Project. Detailed institutional arrangement is discussed in chapter 8.



7. Resettlement Planning Framework

7.1. Introduction

The following framework has been designed in accordance with the applicable ESP ESS2, National and State laws as well as with international standards for social impact management. The framework is built on the principle of avoidance, minimization and mitigation wherein preference is given to avoiding negative social impacts wherever possible. The rationale for the Resettlement Planning Framework (RPF) is originated from the fact that specific subproject sites and activities are yet to be identified to understand the exact nature and scale of their impacts. Thus, this RPF has been developed to guide detailed resettlement planning to address land acquisition and resettlement impacts. This framework establishes the involuntary resettlement and compensation principles to be applied to meet the needs of the people who may be affected by the project activities resulting due to permanent or temporary land acquisition, loss of shelter, assets or livelihoods, and/or loss of access to economic resources.

Objectives of RPF:

The RPF's main objective is to define overarching principles, procedures, actions, organizational structures and capacity requirements during resettlement (physical or economic), if such should be required, and its impact attributable to Project implementation. It provides the framework for individual A/RPs under the Project which would identify the full range of people affected by the project and justify their displacement after consideration of alternatives that would avoid or minimize displacement. The specific objectives of the RPF are:

- detail GoI's legal solutions in all events of involuntary resettlement, relocation and loss of assets, including legal and administrative procedures and compensation paid for loss of assets; compare them to AIIB's ESS2 and international good practices; and provide the way to bridge the gaps;
- identify key institutions, besides AEGCL, involved in the Project implementation, including especially legally authorized state institutions implementing the procedures and safeguards of involuntary resettlement process; including AEGCL measures and monitoring in order to provide compliance with ESS2, international good practices, RPF and individual A/RPs;
- identify stakeholders and ways of their engagement in course of Project implementation.
- present PAPs eligibility criteria and compensation entitlement matrix according to type of loss assets;
- define the process of identification and evaluation of affected assets and the value of compensation to replace the loss of assets;
- describe mitigation measures under this RPF and individual A/RPs, including procedures in order to minimize impacts on PAPs during Project implementation, including specific mitigation measures provided for vulnerable groups and women;
- define grievance and complaint rights, process, bodies and procedures available to PAPs during the whole course of Project implementation, including feedback reporting;
- describe and provide directions to preparation of individual A/RP and approval procedure, future A/RP outlines and their implementation process;
- specify requirement of public disclosure, disclosure of documents, public and local community involvement especially including public consultation in the PAP community during process of involuntary resettlement and Project implementation that may result in loss of assets;
- establish a gender-sensitive framework for resettlement in order to determine differential impacts since economic and social disruption do not result in equal hardship for women and men;



- specify internal monitoring activities during all phases of Project implementation, especially regarding resettlement issues, safeguarding legal and under this RPF defined process, including evaluation of the resettlement process;
- define the need and extent of monitoring and evaluation of the resettlement process, including external monitoring and evaluation;
- provide forms and questionnaires key to safeguarding and implementing the resettlement process under this RPF and individual RPs.

This RPF applies to the PAPs, whose lands will be permanently or temporarily affected by compulsory actions due to any land acquisition and/or restriction of access required for the Project's development. It also applies to people who lease private or state-owned lands or those who have no registered or legal rights over the land they use, and who will be adversely affected as a result of the Project. However, the RPF does not apply to state land that is transferred from one state entity to another, or used temporarily by the PIU during construction works, unless third parties are adversely affected by the transfer or use.

Based on the laws of Government of India, Government of Assam and AIIB's Environmental and Social Framework (ESF), the core principles of this RPF that is to be followed for each sub-project is:

- a) Land acquisition, and other involuntary resettlement impacts will be avoided or minimized exploring all viable alternative sub-project designs.
- b) Where land acquisition is unavoidable, time-bound resettlement plans (RPs) will be prepared and PAPs will be assisted in improving or at least regaining their pre-project standard of living.
- c) Consultation with APs on compensation, disclosure of resettlement information to APs, and participation of APs in planning and implementing sub-projects will be ensured.
- d) Vulnerable⁴⁰ groups will be provided special assistance in all such instances
- e) Payment of compensation will be done to PAPs including non-titled persons (e.g., informal dwellers/squatters, and encroachers) for acquired assets at replacement rates.
- f) The payment of compensation and resettlement assistance will be done prior to the contractor taking physical acquisition of the land and prior to the commencement of any construction activities.
- g) There will be provision of income restoration and rehabilitation in cases displacement – physical or economic.
- h) Appropriate grievance redress mechanisms will be established prior to project works which will be open to APs, as well as workers for each sub-project.

The sub-projects under the 'Environmental and Social Management Planning Framework for Enhancement of Intra State Transmission System of Assam' project, will broadly have three types of potential impacts that will require mitigation measures. The types of impacts are

- Loss of assets, including land and structures
- Loss of income or livelihood
- Collective impacts on groups, such as loss of common property resources and loss of access or limited access to such resources.

Every effort will be made during the preparation of detailed design to minimize acquisition of land and other assets and to reduce any involuntary resettlement impacts. Unforeseen impacts will also be compensated in accordance with the principles of this resettlement planning framework.

Additionally, the issues related to the Right of Way (RoW) for the transmission lines will be dealt with proper care especially for the temporary loss. The loss of crop and agriculture during the construction of the transmission lines will be paid as instant cash compensation for the damaged period. Although, the Right of Way is reserved for future activities, i.e., repair etc. by the executing agency (AEGCL), but in practice, people will be allowed to use the land below the lines after the construction. AEGCL will provide cash compensation to the APs for the temporary loss of crop, if occurred, during the time of maintenance and repair.

⁴⁰ Vulnerable PAPs include STs residing in scheduled areas/ physically handicapped HoH/ disabled families, Women headed families, etc.



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As a fundamental rule, under this RPF, during implementation of the Project, the regulatory framework (GoI/A or AIIB ESP) that is most beneficial to the PAPs will prevail. Under this RPF, during the Project implementation process AIIB's resettlement policies will also prevail in a principle of "replacement value" as it is more beneficial for the PAPs



7.2. Land and Asset Acquisition

Mandatory Social requirements for AEGCL at State level include provisions of section 67 & 68 (5 & 6) of the Electricity Act, 2003 for the calculation of compensation for any temporary damages. Involuntary land acquisitions, if any done, for securing private lands for construction of sub-stations, fall under the realm of The Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act, 2013 (RFCTLARRA). The provisions of Indian Treasure Trove Act, 1878 as amended in 1949 covers chance finds. The Right to Information Act, 2005 (RTI) ensures citizens to access information under the control of public authorities.

Subject	National Regulations	AIIB ESS 2	Gaps and measures to bridge gaps
Additional assistance to PAPs	The Act has the provision of transportation cost of Rs. 50000/- for each displaced family and one-time resettlement allowance of Rs. 50000/- for each affected family to provide support during relocation.	It is necessary to provide assistance during relocation; particular attention is to be paid to the needs of poor and vulnerable individuals and groups.	AEGCL will ensure providing financial assistance to PAP's as per GoI regulations, which generally covers the provisions of AIIB's ESS2.
Livelihood restoration and assistance	The Act provides for various types of support to affected and displaced families. It employment to one member of the displaced family if jobs are created under the project by providing suitable training or onetime payment of Rs. 5 lakhs to restore their livelihood and living standard. Besides, a subsistence grant @ Rs. 3000/- per month for 12 months to each displaced family. In addition to this amount, the Scheduled Castes and the STs families displaced from the Scheduled Area shall be paid one time financial assistance of Rs. 50000/-.	ESS 2 provides that the RP or policy include measures to ensure that the displaced persons are (i) offered support after displacement for a transitional period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standard of living; and, (ii) provided with development assistance in addition to compensation measures, such as land preparation, credit facilities, training or job opportunities.	AEGCL will ensure the livelihood restoration and assistance as per GoI regulation. which generally covers the provisions of AIIB's ESS2.
Resettlement instruments, census and social impact assessment	Conducting Social Impact Assessment (U/s 4 of the Act) is mandatory before the land acquisition for the project is initiated under the RFCTLARR Act, 2013. Preparation of the Resettlement and Rehabilitation Scheme (U/s 16 of the Act) is compulsory. Census, the socio-economic survey, and consultations are carried out for the preparation of Resettlement	Preparation of individual RPs, census survey and social impact assessment.	As per GoI norms development of RP or socio-economic survey is not required for transmission line projects as no land acquisition is required for area under tower footing. The preliminary assessment does not envisage and Land acquisition for substation land. Thus, does not require development of RAP.



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	Plan for all externally funded projects. Depending upon the magnitude of impacts, a RAP shall be prepared for each sub-project separately.		AEGCL will insure the development of subproject specific RAP.
Meaningful consultations	Conducting meaningful consultations with affected persons and others and disclosure of the report mandatory exercise as per the Act. Section 5, Section 6, Section 18, and Section 19 are related to consultation and disclosure. The public hearing for SIA is conducted in the affected area after giving adequate publicity and pre-fixed date, time and venue.	Meaningful consultations with affected persons and communities, local authorities, and, as appropriate, nongovernmental organizations needs to be carried out.	AEGCL will ensure that public consultation and disclosure is carried out during entire project duration. Consultation is to be carried out with affected persons and other and disclosure is to be made as per GoI regulations and AIIB's policy.
Cut-off date for eligibility and census	The cut-off date is the date for determining the entitlements (compensation and assistance) to all those who are affected by the project irrespective of the ownership of titles. According to the Act, the cut-off date for assistance to those depending on affected private lands is three years preceding the acquisition and for the titleholders, it is the date of notification under the said Act. Thus in case of land acquisition, the date of issue of public notice of intended acquisition under Section 4(1) under the Act will be treated as the cut-off date for title holders.	Normally, the cut-off date is the date the census begins. The cut-off date could also be the date the project area was delineated, prior to the census, provided that there has been an effective public dissemination of information at the area delineated, and systematic and continuous dissemination subsequent to the delineation to prevent further encroachment.	The Act does not cover encroachers, squatters, and others collectively known as non-titleholders. For non-titleholders, the cut-off date will be the start date of the census survey/enumeration of affected persons for each sub-project.
Timing of compensation of payments	The Act ensures that the possession of land is taken after full payment of compensation (within 3 months) as well as resettlement entitlements (within 6 months) to entitled persons from the date of award U/s 30 of the Act.	The compensation should be provided before construction work start and before taking possession of the assets	AEGCL will ensure that compensation is provided before construction work start and before taking possession of the assets
Resettlement of formal owners of immovable property except agricultural land	The Act provides compensation and resettlement and rehabilitation assistance to entitled persons. The market value of the immovable property is determined as per the current BSR of the State/District and then solatium is added @ 100%. The value of the immovable property without depreciation along with	Option 1: Cash compensation: Cash compensation at replacement cost. Option 2: Resettlement: Replacement property of equal or higher value and similar productivity + Moving and transitional allowance + Administrative fees	AEGCL will ensure the Resettlement of formal owners of immovable property as per GoI regulation, which generally covers the provisions of AIIB's ESS2



	<p>solatium is the replacement cost.</p> <p>The entitled person is eligible for following resettlement and rehabilitation assistance: (i) provision of a housing unit in case of displacement; (ii) subsistence grant @ Rs. 3000/- per month for 12 months to each displaced family; (iv) transportation cost of Rs. 50000/- for each displaced family; (v) one-time resettlement allowance of Rs. 50000/- for each affected family; (vi) provision of stamp duty and registration fees if a house is allotted to the affected families.</p> <p>The Scheduled Castes and the STs families displaced from the Scheduled Area shall be paid one-time financial assistance of Rs. 50000/- over and above the resettlement and rehabilitation assistance mentioned above.</p>		
Acquisition of agricultural land	<p>The Act provides compensation and resettlement and rehabilitation assistance to entitled persons. The market value of land is determined as per section 26 of the Act which is the replacement cost. The payment of compensation is four times the market value of the land determined in rural areas and 2 times the market value of land determined in urban areas.</p> <p>Besides, compensation entitled persons are eligible for resettlement and rehabilitation assistance which includes the following: (i) onetime payment of Rs. 5 lakh to restore their livelihood and living standard; (ii) subsistence grant @ Rs. 3000/- per month for 12 months to each displaced family; (iii) provision of stamp duty and registration fees if the land is allotted to the affected families.</p>	<p>Resettlement: Replacement property of equal or higher value and similar productivity + Moving and transitional allowance + Administrative fees</p>	<p>AEGCL will ensure that the Acquisition of agricultural land (if involved) will be as per GoI regulation, which generally covers the provisions of AIIB's ESS2</p>

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Resettlement of informal owners of buildings	<p>The Act does not cover informal owners of buildings known as non-titleholders.</p>	<p>PAP is entitled to cash compensation at replacement cost for construction of similar quality construction with additional moving and transitional allowances AND The value of time invested in construction</p>	<p>AIIB does not differentiate between the titleholders and non- titleholders (encroachers, squatters, tenants, etc) except for compensation for land. Assam Electricity Grid Corporation Ltd. (AEGCL), Govt of Assam, recognizes existence of such informal owners and occupants of the building (encroachers, squatters, tenants, etc) for the Enhancement of Intra State Transmission System of Assam Project and agrees to provide resettlement and rehabilitation assistance including cost of buildings (as per current BSR of the District/State – the value of time invested in constructed is subsumed in the BSR), shifting allowance, displacement allowance, subsistence grant, etc at par with titleholders in accordance with the Second Schedule of the RFCTLARR Act, 2013. Non-titleholders (encroachers, squatters, tenants) will not be eligible for compensation of land encroached upon or occupied without authority or squatted upon for whatever purpose(s).</p>
Resettlement of informal users of agricultural land	<p>The Act also provides rehabilitation and resettlement entitlements to families whose livelihood is primarily dependent on land acquired. The rehabilitation and resettlement entitlements include the following: (i) onetime payment of Rs. 5 lakh to restore their livelihood and living standard; (ii) subsistence grant @ Rs. 3000/- per month for 12 months to each displaced family; (iii) one time resettlement allowance of Rs. 50000/- for each affected family.</p> <p>The value of perennial crops shall be determined by the concerned department as the standard process</p>	<p>PAP is entitled to cash compensation for any improvements made on the land e.g. irrigation, drainage, perennial crops, objects etc. at replacement cost, and support after displacement for a transition period to restore livelihood.</p>	<p>The replacement cost of improvements (irrigation channel, drainage, etc) made on the land shall be estimated without depreciation as per the method followed by the concerned department (Irrigation or Water Resources Department) based on the current year rate.</p>



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	followed.		
Resettlement of the lessee of agricultural land	<p>The Act also provides rehabilitation and resettlement entitlements to families whose livelihood is primarily dependent on land acquired. The rehabilitation and resettlement entitlements include the following: (i) onetime payment of Rs. 5 lakh to restore their livelihood and living standard; (ii) subsistence grant @ Rs. 3000/- per month for 12 months to each displaced family; (iii) one time resettlement allowance of Rs. 50000/- for each affected family.</p> <p>The value of perennial crops shall be determined by the concerned department as the standard process followed.</p>	PAP is entitled to cash compensation for any improvements made on the land i.e. Irrigation, drainage, perennial crops, objects etc. at replacement cost, assistance in provision of lease to corresponding public owned property for an equivalent period of time (if applicable), and support after displacement for a transition period to restore livelihood.	The lease amount for the remaining period of the lease agreement shall be deducted from the compensation amount of land to be paid to the landowner and the same will be paid to the lessee.
Annual crops or (owner lessee)	The Act provides for assessing the value of the standing crops damaged during the process of land acquisition. The value of crops shall be determined by taking the services of experienced persons in the field of agriculture as may be considered necessary.	PAP is entitled to compensation for lost crops at full replacement cost, including all not harvested crops.	Both AIIB and GoI norms insist on entitled to compensation for lost crops at full replacement cost, including all not harvested crops.
(Tea) Plantations	The compensation of the damage is governed by the Electricity Act, 2003 and the Indian Telegraph Act, 1885. The compensation towards the damage are provided without the acquisition of land which are assessed/reviewed by the Revenue Authorities.	PAP is entitled to compensation at replacement cost for the tea plantation including the net value of the production lost during the period it takes to restore the productivity of the plantation, and any investments (seedlings, treatment of land etc.) and labour needed for growing plantation.	As per GoI norms compensation is paid as per assessment done by revenue department, which is the net value of production loss Including shade trees and tree bushes. AIIB guidelines suggest additional support with regards to seedlings, treatment of land and labour needs.
(Tea) Plantations not yet yielding (owner, lessee, informal owner)	The compensation of the damage is governed by the Electricity Act, 2003 and the Indian Telegraph Act, 1885. The compensation towards the damage are provided without the acquisition of land which are assessed/reviewed by the Revenue Authorities.	PAP is entitled to compensation at replacement cost for the plantation including the net value of the production lost during the period it takes to restore the plantation, and any investments (seedlings, treatment of land etc.) and labour needed for growing the plantation	As per GoI norms compensation is paid as per assessment done by revenue department. AIIB guidelines suggest additional support with regards to seedlings, treatment of land and labour needs.
Business property	The Act has provision for determining the market	Option 1. Cash compensation at replacement cost, loss of income and	The route alignment for transmission lines are selected to avoid any damage to permanent



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	value of the building and other immovable property or assets attached to the land or building which are to be acquired. The services of a competent engineer or any other specialist in the relevant field shall be used for the same. The market value of the business property shall be estimated based on current year BSR without depreciation.	moving allowance Option 2. Alternative property with adequate tenure arrangements, full relocation cost, including the inventory, and the replacement cost for any investment, transitional allowance, appropriate level of support for skill upgrading training if necessary, to restore livelihood.	structure or temporary structure. AEGCL will ensure the compensation against damage to any business property in case of damage as per law of land, which is in coherence with AIIB policy.
Loss of benefits and income for workers and employees	The Act does not cover workers and employees who will experience loss of income.	Targeted assistance and opportunities to restore, and where possible improve, income-earning capacity, production levels and standards of living.	AEGCL recognizes the existence of workers and employees whose livelihood will be disrupted due to the implementation of the proposed project. Workers and employees engaged with the business enterprise, industrial units, and others shall be identified and considered for rehabilitation and resettlement assistance including livelihood training at project cost.
Loss of civic infrastructure and community services.	The Act has the provision of Infrastructural Amenities. Infrastructural facilities and basic minimum amenities shall be provided at the cost of the Requisitioning Authority at the resettlement site/colony.	Assistance should be provided that will offset any loss of a civic infrastructure and community services. Identification of institutions tasked with setting up and maintaining specific public amenities and consult local communities on how to replace them. These provisions shall be specified in the RP.	The proposed project is not likely to have any large scale involuntary resettlement leading to development of a new resettlement site/colony. However, common property resources are likely to be affected due to the implementation of the project. AEGCL will replace or reconstruct or provide an alternate common property resources affected in consultation with the local community at project cost.
Grievance mechanism and dispute resolution	The Act mandates the establishment of land acquisition, rehabilitation and resettlement authority for the purpose of providing speedy disposal of disputes relating to land acquisition, compensation, and rehabilitation and resettlement.	Accessible and appropriate grievance mechanism must be enabled for PAPs and local communities at the whole period of project implementation.	A multi-tier GRM (at sub-project and Project level) shall be constituted prior to the start of the project works to resolve as many grievances as possible using an understandable and transparent process that is gender-responsive, culturally appropriate, and readily accessible at no costs and without retribution.
Monitoring of resettlement implementation	The formulation, execution and monitoring of the Rehabilitation and Resettlement Schemes shall vest in the Administrator who will work as per directions and control of the Commissioner for Rehabilitation and	PIU is responsible for appropriate monitoring of the activities, which were defined in this RPF and RPs.	Project level internal monitoring of RAP implementation will be carried out by PMU/PIU/ESC of AEGCL and PMC. Evaluation of RAP implementation will be conducted by an external agency to be engaged by AEGCL.



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	Resettlement. Further, the Act provides for establishing National Monitoring Committee & State Monitoring Committee for reviewing and monitoring the implementation of rehabilitation and resettlement schemes or plans under this Act.		
Vulnerable groups	Act governing land acquisition (Second Schedule) provides additional assistance to SC and ST families displaced from Scheduled Areas only which is Rs. 50000/-. This one time financial assistance is in addition to the rehabilitation and resettlement as per the second schedule.	According to the ESS2, special attention must be given to vulnerable groups. They are entitled to additional compensation, legal assistance during resettlement and help during physical relocation. As well, these PAPs are given a priority of employment.	AEGCL recognizes vulnerable groups. The ESMP Framework for the proposed project has been covered under the “Objectives of the resettlement planning framework”. It includes STs residing in scheduled areas, physically handicapped HoH, disabled families, Women headed families, etc. Special assistance of Rs. 25,000/- shall be paid to vulnerable households.



7.3. Process of Land Acquisition as per GoI/GoA Regulations

Applicability: *Transmission projects which involve the construction of substations and involve acquisition of land*

Land is required for construction of substations and erecting transmission and distribution towers. Land secured for construction of substations is no longer accessible to the existing owner and hence in such cases ownership is transferred from the existing owner to the respective utility. *However, ownership of land used for erecting towers remains with the existing land owner and the utility only receives rights to use the land.* Therefore, when we talk of loss of land, it refers to land secured for substation construction.

If a sub-project requires acquisition of land or asset, necessary measure should be taken to ensure that the affected persons are:

- Informed about their options and rights pertaining to resettlement;
- Consulted on, offered choices among, and provided with technically and economically feasible resettlement alternatives;
- Provided prompt and effective compensation at full replacement cost for losses of assets attributable directly to the project.

If the impacts include physical relocation, the RP or RPF includes measures to ensure that the displaced persons are:

- Provided assistance (such as moving allowances) during relocation; and
- Provided with residential housing, or housing sites, or, as required, agricultural sites for which a combination of productive potential, locational advantages, and other factors is at least equivalent to the advantages of the old site.

Where necessary to achieve the objectives of the policy, the RP or RPF also include measures to ensure that displaced persons are:

- Offered support after displacement, for a transition period, based on a reasonable estimate of the time likely to be needed to restore their livelihood and standards of living;
- Provided with development assistance in addition to compensation measures such as land preparation, credit facilities, training, or job opportunities.

Depending on extent of land requirement for sub-project, the nature of acquiring land for substation subprojects could be through the following three processes: Transfer of voluntary donation, purchase of land on negotiated price, involuntary acquisition of land. The pre-requisites to sub-project finalization and acquisition of land which should be followed by the concerned authorities are:

- Land record has been correctly updated in revenue record as well as cadastral maps by the concerned authorities
- The land and asset acquisition have been done in accordance to the regulation GoI, GoA and AIIB policies.
- Ensuring that the land and asset acquisition has been done in legal, documented and transparent manner. The documents pertaining to transfer of land, consents from owners should be properly documented and published in public domain.
- All grievances especially related to the land acquisition must be registered, recorded and informed to AIIB along with the redress process followed for them.

7.3.1. Voluntary donation

In case of voluntary donation of land, the following shall be ensured:

- The land user(s) will not be subjected to undue pressure for parting of land;



- Ensure that the land owner has the capacity to voluntarily donate land. In other words, land donation will be not accepted from land owners whose land holding is less than the minimum economical land holding size (2.5 acres).
- Voluntary donation shall not be more than 10% of the total land holding.
- The donation will not cause any economical or physical displacement of the current land users.
- All out efforts shall be made to avoid any physical relocation/displacement due to loss of land;
- The land in question must be free of squatters, encroachers, or other claims or encumbrances.
- The AEGCL shall facilitate in extending 'gratitude' to the land donor(s) in lieu of the 'contribution' if so agreed. The same shall be documented in the shape of MoU between donor and utility and subsequently title of land transferred in the name of AEGCL
- All land donations (as well as purchases) will be subject to a review/ approval from a committee comprising representatives of different sections including those from the IA and Government of Assam.

7.3.2. Purchase of land on willing buyer and willing seller basis on negotiated price

When land is purchased from a willing seller, the utility shall ensure:

- Consultation with the affected person has to be carried out and documented.
- All negotiations have to be carried out in a transparent manner.
- That land owners are aware of the basis on which compensation is calculated.
- In case of procurement of land through private purchase, AEGCL shall ensure that compensation/rate for land is not less than the rate provided in the new land acquisition act, 2013 and the Assam Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2015.
- The finalization of land price/negotiation shall be through a committee.
- In order to comply with this provision AEGCL may organize an awareness camp where provisions of new act in respect of basis/modalities of compensation calculation shall be explained to land owners with specific State provision if any.

7.3.3. Involuntary acquisition of land

In order to avoid the loss of private / community lands or agriculture and forest lands, the transmission and distribution utilities will endeavor, wherever possible, to secure Government land for their projects and avoid private or community lands, even if this requires realignment of the proposed route. Only in rare cases when Government land is not available, other methods of securing land (as listed above) will be pursued. Involuntary acquisition of land will be the last resort and be undertaken when other methods are not feasible. In the case of involuntary acquisition, the provisions of RFCTLARR Act, 2013 and The Assam RFCTLARR Rules, 2015 will be applicable.

The RFCTLARRA, 2013 authorizes the state Government, i.e. the Government of Assam, its authorized Government agency to complete the whole process of acquisition of private land including Social Impact Assessment (SIA), Action Plan for R&R (i.e. Rehabilitation and Resettlement) & its implementation. AEGCL's responsibility is limited to identification and selection of suitable land based on technical requirement and ensuring budget allocation.

As per RFCTLARR Act, the appropriate government shall ensure that a Social Impact Assessment study is carried out in consultation with the concerned Panchayat, Municipality or Municipal Corporation in the affected area and hold public hearings in the process. Further, the Appropriate Government will ensure minimum displacement of people, minimum disturbance to the infrastructure, ecology and minimum adverse impact on the individuals affected. For this, the Appropriate Government shall ensure that:

- There is a legitimate and bona fide public purpose which necessitates the acquisition.
- The potential benefits and the public purpose shall outweigh the social costs and adverse social impact as determined by the Social Impact Assessment.
- Only the minimum area of land required for projects is to be acquired.

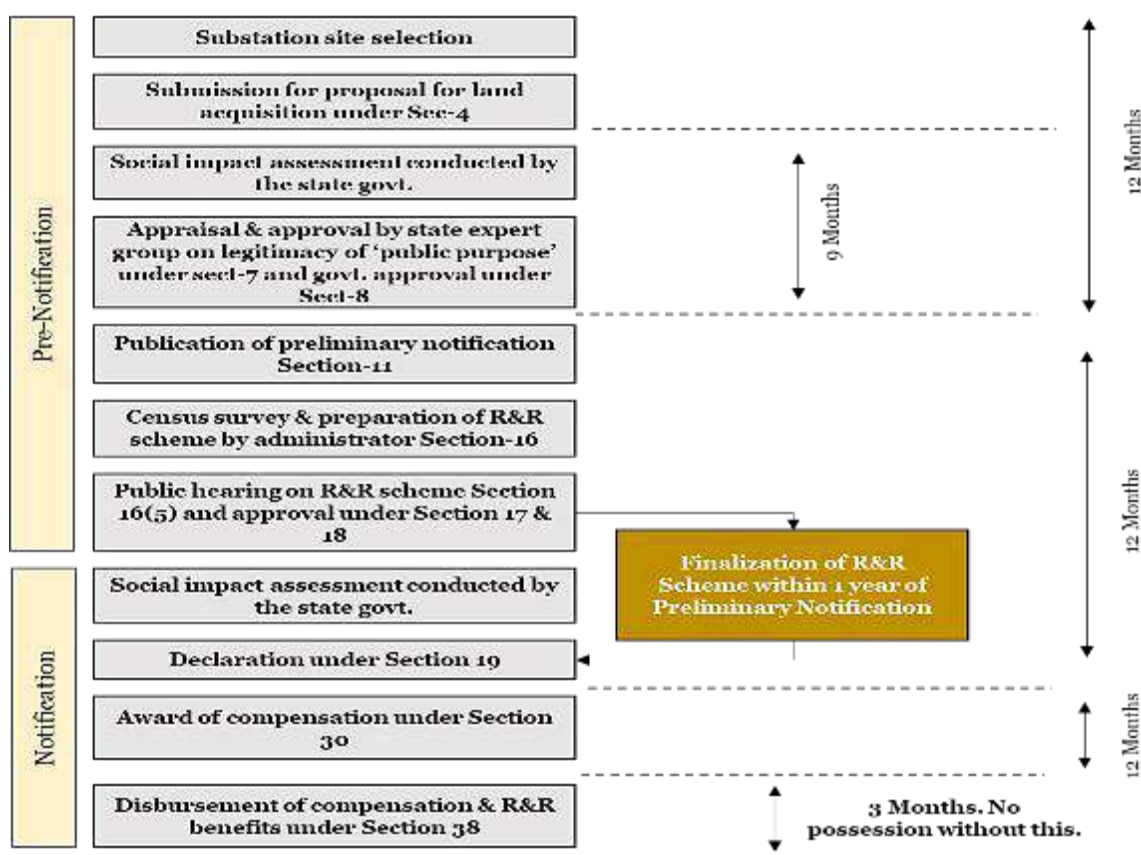


- There is no unutilized land which has been previously acquired in the area. Any land acquired earlier and remaining unutilized is used for the purpose.
- Also, as far as possible no acquisition of land shall be made in Scheduled Areas. Where this is done, it shall be only as a demonstrable last resort and with the prior consent of the concerned Gram Sabha or the Panchayats.

The process under the 2013 land acquisition act is provided below:

- On confirmation of the scheme and finalization of land after exploring alternative site, AEGCL would submit a proposal for acquisition of private selected land detailing the extent of land and its exact location. After due process of approval, the government shall notify the affected area where selected land is situated for conducting detailed social assessment.
- A detailed Social Impact Assessment (SIA) studies shall be undertaken by an Independent Agency/Institution on a project specific TOR. The SIA agency shall first consult the concerned Panchayat, Municipality, District/Village Council at village level or ward level in the affected area to carry out SIA study. SIA shall assess the purpose of acquisition and estimate the affected families, gender, social group carry out analysis regarding impact on community properties, assets and infrastructure particularly roads, public transport, drainage, sanitation, sources of drinking water, sources of water for cattle, community ponds grazing land, plantations, public utilities electricity supply and health care facilities. The SIA agency shall also prepare a Social Impact Management Plan (SIMP) listing ameliorative measures required for addressing the likely impact vis-à-vis intended benefit of the project. The SIA report and SIMP shall be subject to public hearing in the affected area after giving adequate publicity for the venue, time etc. to ascertain the views of affected families/communities which shall be included in the SIA.
- The final SIA report shall be published including its translation in local language and shall also be made available to Panchayats, District/Village Councils & Deputy Collector/District Magistrate office for wider circulation. Explicit consent will be required in the case of lands in respect of tribal areas from ADC and the Village Councils. The process flowchart of SIA is presented in the **Figure 11** below:

Figure 11: The process of land acquisition as per RFCTLARR Act 2013



Compensation and rehabilitation settlement:



- Based on the SIMP, the Collector shall discuss the Package in a meeting with the Rehabilitation and Resettlement committee at project level and submit the Package to Commissioner Rehabilitation and Resettlement along with his/ her remarks.
- The Commissioner Rehabilitation and Resettlement shall, after due vetting, accords approval to the scheme and make it available in public domain.
- After approval of R & R plan by Commissioner R&R, the Collector shall issue two awards - one for land compensation based on procedures described in act & State's rules; and second for R&R as per approved social impact management plan.
- The Collector shall take possession of land after ensuring that full payment of compensation as well as rehabilitation and resettlement entitlements are paid or tendered to the entitled persons within a period of three months for the compensation and a period of six months for the monetary part of rehabilitation and resettlement entitlements as approved and commencing from the date of the award.
- The Collector shall be responsible for ensuring that the rehabilitation and resettlement process is completed in all its aspects before displacing the affected families.
- The Collector shall, as far as possible, not displace any family which has already been displaced by the appropriate Government for the purpose of acquisition under the provisions of this Act, and if so displaced, shall pay an additional compensation equivalent to that of the compensation determined under this Act for the second or successive displacements.

7.4. Temporary restrictions to land use due to RoW

Applicability: *Transmission & Distribution Projects which involve laying of power lines and erection of towers*

Unlike in the case of substations, for construction of transmission towers / distribution poles and laying of power lines, ownership of the land remains with the existing owner and is not transferred to the requesting body. ***The Electricity Act 2003 provides the utilities with powers under the Telegraph Act 1885 which in turn states that land for the lines and poles (towers) will not be acquired.*** The utility will have the right of user only in the property under, over, along, across in or upon which the lines and poles / towers are placed.

However, the Act allows the utilities to from time to time, place and maintain transmission / distribution lines under, over, along, or across, and towers / poles in or upon any immovable property. Further, the utility may at any time for the purpose of examining, repairing, altering or removing any transmission / distribution line or tower, enter on the property under, over, along, across, in or upon which the line or tower / pole has been placed.

In addition, the MoEF provides guidelines for maintaining a Right of Way (RoW) corridor which shall be kept clear of any obstruction. The RoW width depends upon the voltage of the line, for example, a 220Kv transmission line will have to maintain a clear RoW of 35 meters width whereas, a 132kV line will have to maintain 27 meters.

In a similar manner, trees in the RoW have to be cut or pruned to the extent required for preventing electrical hazards by maintaining the prescribed minimum clearances (from the lines). Therefore, while the ownership of land used for towers and lines remains with the existing owners, the construction of towers and laying of lines could lead to damage of crops or trees on the land. Further, the construction of the tower may restrict the use of land under the tower footing. Similarly, use of the land in the RoW corridor may also be restricted.

Most of the impacts are temporary in nature in terms of loss of standing crops/trees and other damages for which compensation will be paid to the affected persons/ community for all damages including cost of land for tower base and RoW corridor to its owner without acquiring it as per the Ministry of Power (MoP) guidelines, and Assam has already adopted MoP guidelines for land compensation vide notification dated 10.03.2017. Regarding this, compensation is made for the following:

- land cost of tower footings;
- standing crops;
- trees, if any;
- other assets like well and



- any other damages/ effects.

The alternative analysis conducted by AEGCL to shortlist the most feasible transmission line route needs to include the parameter of social assessment, along with environmental. The process of understanding and calculating the compensation for temporary damages may be carried with the alternative analysis.

The process is given below:

- A Social (and Environmental) Assessment is conducted in respect of each of the chosen lines of alignment. The process involved extensive consultations with land owners/farmers and different stakeholders.
- During the process public views and necessary inputs about surroundings/ villages/crops etc. are also necessary and noted for screening/scoping. After comparison and analysis of the environmental and social parameters gathered for all alternatives, and considering other significant economic benefit associated with the project/subproject, the most optimum route having the minimum environment & social impact is selected for further investigation.
- Site office will consult with state forest department if the line is passing through forest areas. Revenue authorities will be consulted for their views on revenue/other lands. Experts' assistance will be taken, as appropriate, on valuing crops, trees and other assets.
- Social Assessment concludes with: (i) selection of an optimum line; and (ii) a Social Management Plan viz., assessment of temporary damages and compensation. All these are disclosed widely among the stakeholders as well as on the internet and evince a feedback. Due approval will be sought from District/ Village Councils. In case the scheme/project is implemented in predominantly tribal area a separate and comprehensive analysis in respect of likely impact both positive and negative shall be carried out and will be incorporated in the entitlement matrix or under a whole indigenous development plan.
- In cases of areas under the District Council/ Village Council in tribal areas, where official land records don't exist, formal land/property boundaries of private property owned by the tribal households can be determined through the process of community consultation and discussion with village head and village council members. Based on such information, land can be classified, and land record can be updated and compensation assessment can be made.
- In the states where the district council is under operation, although the land is notified from the district collector's/ deputy commissioner's office, the verification of ownership is done by the district/village council in consultation with the village people and assessment of compensation also done by the revenue officials based in the district council. After determination of ownership and compensation amount the same is sent to the district collector/ deputy commissioner.
- A notice under Indian Telegraph Act/Electricity Act, 2003 is served to the landowners informing that the proposed transmission line is being routed through the property of the individual concerned. The notice shall contain the particulars of the land, ownership details and the details of the trees/crops inevitability likely to be damaged during the course of the construction of the proposed transmission line and acknowledgement received from land owner.
- The revenue officer shall further issue a notice of intimation to the concerned landowner and inspect the site to verify the documents related to the proof of ownership and a detailed Mouza (village/erstwhile administrative land district) list is prepared for the identified trees and crops inevitability damaged during the course of the construction. For assessing the true value of timber yielding trees help of forest officials is taken and for fruit bearing trees help of Horticulture department is taken.
- The Mouza list shall contain the land owner details type of tree/crop, its present age, variety, yielding pattern etc. and the same is prepared at site in the presence of the land owner. These Mouza lists are further compiled and a random verification is conducted by the concerned District Collector or his authorized representative in order to ascertain the assessment carried out by the revenue office is genuine and correct. After this process the District collector issues a tree cutting permit to AEGCL to enable removal / damage to the standing tree/crop identified in the line corridor.
- Once the tree/crop is removed / damaged, AEGCL shall issue a tree cutting/crop damaged notice to the land owner with a copy to the Revenue Officer to process the compensation payment. The detailed Valuation statement is verified at various levels and approval of payment of compensation is accorded by the concerned District Collectors.



- On approval of compensation, the revenue officer shall further intimate the amount payable to the different landowners and AEGCL arranges the payment by way of Demand Draft to the affected parties.

7.5. Identification of persons, land plots and/or other property to be affected by temporary/permanent restriction of access for Project needs

The extent of impacts caused by the Project will be estimated during the detailed design stage. As information about design documents is currently unknown, the need for land acquisition and resettlement may occur in the future. If that turns out to be the case, PIU will prepare an RP in line with all applicable requirements and principles set herein.

The social impact assessment should use the following actions to assess affected persons and anticipated impacts:

- Desktop research to identify such features as population settlements, infrastructure, soil composition, natural vegetation areas, water resources, and land use patterns;
- a census that enumerates the affected people and registers them according to location;
- an inventory of lost and affected assets at the household, enterprise, and community level;
- socioeconomic surveys and studies of all affected people;
- analysis of surveys and studies to establish compensation parameters, to design appropriate income restoration and sustainable development initiatives, and to identify baseline monitoring indicators; and
- consultation with affected populations regarding mitigation of effects and development opportunities.

In case unregistered land users are affected, the PIU or relevant responsible authorities will assist the affected land users to register or update the registration of their lands in order to compensate them under this RPF.

The non-land assets/structures on the affected plots of land users without titles will be evaluated and compensated by exactly the same criteria as those with titles.

7.6. Eligibility, evaluation and entitlement

7.6.1. Persons eligible for compensation

According to this RPF, the following persons are entitled for compensation, if present in the Project area prior to cut-off date:

- PAPs who are formal owners or lessees, or legal users under the provisions of the GoI/A law, or unregistered owners⁴¹ and informal users⁴² of privately or publicly owned affected agricultural or construction land, or part of the land;
- PAPs who are owners and informal users of crops that are affected by the Project;
- PAPs who are owners and informal users of perennial plants and trees such as fruit bearing trees and plantations that are affected by the Project;
- PAPs who are owners and informal users, of affected plantations that have not given yield yet that are affected by the Project;

⁴¹ Owners with recognizable legal right or claim

⁴² Persons who have established usage of public or private land and have invested in immovable objects, crops, woods, trees, fruit bearing trees, plantations, etc.



- PAPs who are owners and informal users, of any plant nursery which has not yield yet that are affected by the Project;
- PAPs who are owners of the affected non-agricultural business on the whole plot or a part of it that are affected by the Project;
- Workers, agricultural processors and farmers on affected property, whose incomes and livelihoods are temporarily affected due to Project's impact.
- Communities or households whose access to their buildings and usual economic, social or cultural resources are affected by the Project;
- PAPs who are formal owners, or lessees, or legal users under the provision of GoI/A law, or unregistered owners and informal users, and who are affected by the Project because of the temporarily occupation of their land;
- Vulnerable groups, persons below the poverty line in accordance with national laws, members of STs, women led households, single parents, elderly, disabled persons or those with long-term health problems which are affected by the Project;
- PAPs who are formal or informal owners (building constructed without building permit on one's own land plot, or someone else's or state-owned plot) or lessees of the building (residential, commercial, industrial, institutional, auxiliary, etc.), or persons with occupancy rights on flats in expropriated residential building or apartment, or a part of the building that is affected by the Project, or informal users of public buildings; and
- PAP's whose losses cannot be determined or foreseen at this stage of the Project.

7.6.2. Cut-off date

The cut-off date is a moratorium date. Persons encroaching into the Project area after the Cut-off date are not eligible for compensation or for any other resettlement assistance. Also, any investments in fixed assets (such as structures, crops, fruit, trees, woodlots, etc.) as result of activities commencing after the Cut-off date will not be eligible for compensation. This cut-off date policy will not include persons who became owners after the cut-off date by court decision of a property existing prior to cut-off date. The date counters opportunistic claims from those moving into the Project area solely in anticipation of benefits.

In order to establish a cut-off date for determine the eligibility of PAPs for resettlement compensation and assistance, a census of persons and inventory of assets shall be produced, as soon as the sub-project is identified, to enumerate all likely impacts and, if possible, supported by video and photo material. The report on the surveys shall be signed off by the PAPs and representative of PIU. The date of beginning of census will be considered as cut-off date. Before the census, PIU will disseminate information about the cut-off date in appropriate local media, informing all owners and users of the initiation of the expropriation process. The cut-off date will also be publicly disclosed on notice boards in local communities and at consultation meetings, with an accompanying explanation. The public announcement will also be posted, as necessary, on frequently visited locations throughout the affected areas.

7.6.3. Evaluation of affected assets

Some general rules shall apply when evaluating assets for compensation:

Compensations for buildings and land. Compensation for agricultural land, an expropriated building or land can be another appropriate replacement property, which corresponds in value, quality, accessibility, etc. If there is a difference of values at replacement cost between expropriated and offered property, the PIU and property owner can agree on additional cash payment to bridge the gap. Cash compensation at replacement cost (including all associated costs of transaction, for example, registration costs in land/cadastral registries, transfer and administrative fees, if any), will be provided



for land and buildings. The compensation will also be provided for all possible damages caused by any construction activities.

Compensation for crops and trees. During the expropriation, it is preferable to comply with the rule that access to site is performed only after all remaining annual crops are collected, whenever possible. For annual crops harvested before access to site the compensation will not be paid. Annual crops that cannot be harvested prior to access to site the compensation shall be provided at replacement costs. The PAP shall have the choice to harvest the crops even after the access to site by PIU, if possible. Compensation for perennial plants and trees will be ensured at a replacement cost. Determining full replacement cost requires consideration not only of yield, but also of costs of setting up the plantation from the start (seedlings, ground preparation etc.), as well as income lost during the period necessary to achieve yield again.

Compensation for other losses. If the project activities result in loss or resettlement of livelihood sources (for example beehives), such persons will be compensated for a loss of production of one season plus reasonable costs in relation to relocating production resources.

7.7. Entitlement Matrix

7.7.1. Comprehensive entitlement matrix

A detailed description of each compensation measure and assistance is provided in the entitlement matrix in **Table 49**. APs will be entitled to a combination of compensation measures and resettlement assistance, depending on the nature of ownership rights of lost assets and scope of the impact, including social and economic vulnerability of the APs.

Table 49: Comprehensive Entitlement Matrix

COMPREHENSIVE ENTITLEMENT MATRIX				
S. No.	Type of Loss	Application	Definition of entitled persons	Entitlement
1.	Loss of private land	Agricultural land, vacant plot, of homestead land	Legal titleholders/ APs with customary land right/APs with Permit from local authority	<ul style="list-style-type: none"> Compensation at replacement value or land for land where feasible. Determination of compensation will be as follows: <ul style="list-style-type: none"> <u>1. Market value of the land</u> -as specified in the Indian Stamp Act, 1899 Or -the average of the sale price for similar type of land situated in the village or vicinity, Or -consented amount of compensation as agreed in case of acquisition of lands for private companies or for public private partnership project. <i>whichever is higher</i> Market value x Multiplier as applicable: <ul style="list-style-type: none"> In case of rural areas (other than Scheduled Areas) within 10 km radial distance from urban areas, a multiplication factor of 1.5 will be applied In case of rural areas beyond 10 kms of urban areas, a multiplication factor of 2 will be applied In case of urban areas, a multiplication factor of 1.00 will be applied <u>2. Value of the assets attached to land:</u> Building/Trees/Wells/Crop etc. as valued by relevant govt. authority; <i>Land compensation = 1+2</i> <u>3. Solatium: 100% of total land compensation</u>



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				<p>Total Compensation= 1+2+3</p> <ul style="list-style-type: none"> One-time Resettlement allowance of Rs. 50,000 per affected family One-time assistance option from: (i) Job for at least one member of the displaced family¹⁰ in project which has created impact or in similar such other project; or (ii) One-time payment of INR 5,00,000 per displaced family. All displaced families will receive (i) monthly Subsistence allowance of Rs. 3,000 for one year from the date of award, and (ii) SC/ST households will receive additional onetime payment of INR 50,000/- 60 days advance notice to harvest standing seasonal crops prior to damage. If notice cannot be given, compensation for share of crops will be provided. Additional compensation for vulnerable households. Exemption from fees and taxes related to compensation (registration, stamp fees, etc.)
			Tenants and leaseholders (whether having written tenancy/lease documents or not)/share croppers	<ul style="list-style-type: none"> Compensation for rental deposit or unexpired lease. Share of the crop loss between owners and sharecroppers/tenants/lease holders as per the agreement (50% of crop) All displaced families will receive (i) monthly subsistence allowance of Rs. 3,000 for one year from the date of award, and (ii) SC/ST households will receive additional onetime payment of Rs. 50,000. 60 days advance notice to harvest standing seasonal crops prior to damage. If notice cannot be given, compensation for share of crops will be provided. Additional compensation for vulnerable households. Exemption from fees and taxes related to compensation
2.	Loss of Government land	Vacant plot, Agricultural land and homestead land	Leaseholders	<ul style="list-style-type: none"> Reimbursement of unexpired lease. All displaced families will receive (i) monthly Subsistence allowance of Rs. 3,000 for one year from the date of award, and (ii) SC/ST households will receive additional onetime payment of Rs. 50,000. 60 days advance notice to harvest standing seasonal crops prior to damage. If notice cannot be given, compensation for share of crops will be provided. Additional compensation for vulnerable households. Exemption from fees and taxes related to compensation
			Squatters	<ul style="list-style-type: none"> 60 days advance notice to shift from occupied land. 60 days advance notice to harvest standing seasonal crops prior to damage. If notice cannot be given, compensation for share of crops will be provided. All displaced families will receive (i) monthly Subsistence allowance of Rs. 3,000 for one year from the date of award, and (ii) SC/ST households will receive additional onetime payment of Rs. 50,000. Additional compensation for vulnerable households.
			Encroachers	<ul style="list-style-type: none"> 60 days advance notice to shift from encroached land. Notice to harvest standing seasonal crops. If notice cannot be given, compensation for share of crops will



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				be provided. <ul style="list-style-type: none"> • Additional compensation for vulnerable households.
3.	Loss of residential structure	Residential structure	Legal Titleholders	<ul style="list-style-type: none"> • Replacement value of the structure and other assets (or part of the structure and other assets, if remainder is viable). Compensation will be at replacement value excluding depreciation (part of land compensation in S. No. 1 of the entitlement matrix) • If house lost in rural areas, constructed house as per Indira Awas Yojana specifications. If in urban area, house of minimum 50 sq. m. plinth area. This benefit should be extended irrespective of title if the affected family is residing in affected area for continuously at least for three years prior to issue of notification. In either case the equivalent cost of the house may also be provided in lieu of the house as per the preference of the PAP. • One-time Resettlement allowance of Rs. 50,000 per affected household • Subsistence/grant allowance for displaced families of Rs 3000 per month for 12 months • All physically displaced families will receive both: (i) One time Shifting assistance of Rs. 50,000 towards transport costs etc.; and (ii) monthly Subsistence allowance of Rs. 3,000 for one year from the date of award, and (iii) SC/ST households will receive additional onetime payment of Rs. 50,000. • Each affected family having cattle shed shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000 for construction of cattle shed • Right to salvage materials from structure and other assets with no deductions from replacement value. • Additional compensation for vulnerable households. • Exemption from fees and taxes related to compensation
			Tenants and Leaseholders	<ul style="list-style-type: none"> • Replacement value of the structure and other assets (or part of the structure and other assets, if remainder is viable). Compensation will be at replacement value excluding depreciation Compensation for rental deposit or unexpired lease. • Right to salvage materials (of the portion constructed by tenants or leaseholders) from structure and other assets • One-time Resettlement allowance of Rs. 50,000 per affected family • All displaced families will receive both: (i) One time Shifting assistance of Rs. 50,000 towards transport costs etc.; and (ii) monthly Subsistence allowance of Rs. 3,000 for one year from the date of award, (iii) SC/ST households will receive additional onetime payment of Rs. 50,000 • Each affected family having cattle shed shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000 for construction of



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				cattle shed <ul style="list-style-type: none"> • Right to salvage materials from structure and other assets with no deductions from replacement value. • Additional compensation for vulnerable households. • Exemption from fees and taxes related to compensation.
			Squatters	<ul style="list-style-type: none"> • Replacement value of the structure and other assets (or part of the structure and other assets, if remainder is viable). Compensation will be at replacement value excluding depreciation • Right to salvage materials from structure and other assets • One-time Resettlement allowance of Rs. 50,000 per affected family • All displaced families will receive both: (i) One time Shifting assistance of Rs. 50,000 towards transport costs etc.; and (ii) monthly Subsistence allowance of Rs. 3,000 for one year from the date of award. SC/ST households will receive additional onetime payment of Rs. 50,000 • Each affected family having cattle shed shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000 for construction of cattle shed • Right to salvage materials from structure and other assets • Additional compensation for vulnerable households.
			Encroachers	<ul style="list-style-type: none"> • 60 days advance notice to shift from encroached structure. • Right to salvage materials from structure and other assets • Additional compensation for vulnerable households.
4.	Loss of commercial structure	Commercial structure	Legal titleholders	<ul style="list-style-type: none"> • Reconstruction cost (without depreciation) for lost frontage/structure; affected person shall be allowed to take salvaged material from the demolished structure at no costs. • Each affected family having petty shop shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000 for construction of petty shop • Right to salvage materials from structure and other assets with no deductions from replacement value. • Additional compensation for vulnerable households. • Exemption from fees and taxes related to compensation
			Tenants and leaseholders	<ul style="list-style-type: none"> • Replacement cost of part/whole of structure constructed by the tenant/leaseholder, and this will be deducted from the compensation amount of the total structure. Compensation will be at replacement value excluding depreciation. • Compensation for rental deposit or unexpired lease. • One-time Resettlement allowance of Rs. 50,000 per affected family



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				<ul style="list-style-type: none"> Each affected family having petty shop shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000 for construction of petty shop Right to salvage materials from structure and other assets with no deductions from replacement value. Additional compensation for vulnerable households. Exemption from fees and taxes related to compensation
			Squatters	<ul style="list-style-type: none"> Replacement cost of structure constructed by the squatter. Compensation will be at replacement value excluding depreciation One-time Resettlement allowance of Rs. 50,000 per affected family Each affected family having petty shop shall get one-time financial assistance of such amount as the appropriate Government may, by notification, specify subject to a minimum of Rs. 25,000 for construction of petty shop Right to salvage materials from structure and other assets. Additional compensation for vulnerable households.
			Encroachers	<ul style="list-style-type: none"> 60 days advance notice to shift from encroached structure. Right to salvage materials from structure and other assets Additional compensation for vulnerable households.
5.	Loss of livelihood	Livelihood	Legal titleholder/tenant/leaseholder/non-titled/employee of commercial structure, farmer/agricultural worker/artisan/small trader/self employed	<ul style="list-style-type: none"> One-time financial assistance of minimum Rs. 25,000 or as decided by the appropriate government, whichever is higher. Income restoration and training to eligible APs Additional compensation for vulnerable households. Consideration for project employment.
6.	Loss of trees and crops	Standing trees and crops	Legal titleholder/tenant/leaseholder/sharecropper/non-titled AP	<ul style="list-style-type: none"> 60 days advance notice to harvest standing seasonal crops prior to damage, fruits, and timber. Compensation to actual cultivator at market rate for crops and 8 years income for fruit bearing trees*. Compensation for trees based on timber value at market price. All timber* will be allowed to retain by the owner.
7.	Impacts on vulnerable APs	All impacts	Vulnerable ⁴³ APs	<ul style="list-style-type: none"> One-time lump sum assistance of Rs. 25,000 to vulnerable households. This will be paid above and over the other assistance. Vulnerable APs will receive preferential income restoration training program under the Project. Consideration for project employment.

⁴³ Vulnerable PAPs include STs residing in scheduled areas/ physically handicapped HoH/ disabled families, Women headed families, etc.



8.	Temporary loss of land	Land temporarily required for sub-project construction (below tower base and in the RoW)	Legal titleholders	For land area below tower base#: <ul style="list-style-type: none"> 85% land cost at market value as ascertained by revenue authorities or based on negotiated settlement without actual acquisition/title transfer. For land coming in corridor of width of Right of Way#: <ul style="list-style-type: none"> Maximum of 15% of land cost as decided by Deputy Commissioner based on the circle rate/ guideline value/ Stamp Act rates Restoration of land to previous or better quality
			Non-titleholder APs	<ul style="list-style-type: none"> 60 days' notice to harvest standing crops If notice cannot be given the, compensation to actual cultivator at market rate for crops and 8 years income for fruit bearing trees*. Restoration of land to previous or better quality Compensation for actual damages (as assessed by concerned authority)
9.	Loss of common resources	Common resources	Communities	<ul style="list-style-type: none"> Replacement or restoration of the affected community facilities – including public water stand posts, public utility posts, temples, shrines, etc. All community facility and utility replacement are compensated and also re-built following the principles of this RPF.
10.	Other damages (if applicable)	-	All APs	<ul style="list-style-type: none"> Unanticipated involuntary impacts will be documented and mitigated based on the principles of the Resettlement Framework. Actual cost as assessed by the concerned authority.

7.8. Preparation of individual RP

7.8.1. Individual RAP development, approval and implementation

Based on this RPF, if expropriation and resettlement is needed, A/RPs will be prepared. The objective of any A/RPs shall be to specify what procedures to follow and what actions to take to properly acquire land and compensate affected people by allowing and providing for adequate participation, consultation and full functioning of the grievance mechanism. Any site-specific A/RP shall be based on up-to-date and reliable information about (a) the proposed resettlement and its impacts on the displaced persons and other adversely affected groups, and (b) the legal issues involved in resettlement.

Irrespective of the complexity of project circumstances any site-specific A/RP shall include at minimum the following:

- Description of the project and identification of the project area,
- Identification of project activities that give rise to resettlement,
- Analysis of alternatives to avoid or minimize resettlement and conduct meaningful consultations with affected people about acceptable alternatives,
- Established mechanisms to minimize resettlement, to the extent possible, during project implementation,
- Comprehensive socioeconomic studies including:
 - census survey covering current occupants of the affected area to establish a basis for the design of the resettlement program and to exclude subsequent inflows of people from eligibility for compensation and resettlement assistance,



- standard characteristics of displaced households, including a description of production systems, labor, and household organization; and
- baseline information on livelihoods (including, as relevant, production levels and income derived from both formal and informal economic activities) and standards of living (including health status) of the displaced population.
- the magnitude of the expected loss--total or partial--of assets, and the extent of displacement, physical or economic, information on vulnerable groups or persons, legal framework.
- Analysis of legal framework, covering gaps, if any, between local laws covering eminent domain and resettlement and ESS2, and the mechanisms to bridge such gaps,
- Established institutional framework, institutional responsibility for implementation, eligibility, valuation of and compensation for losses and the methodology to be used in valuing losses,
- Established grievance procedures, implementation arrangements, monitoring and evaluation and cost and budget.

7.7.1.2 Objectives of the A/RP the objectives of the A/RP are as follows:

- To minimize possible adverse impacts of resettlement on population and property,
- To mitigate adverse social and economic impacts of expropriation and temporary or permanent losses by providing compensation for losses of property on the basis of replacement costs and ensure implementation of the activities of resettlement with appropriate data disclosure, consultations and participation of PAPs;
- To re-establish or improve, where possible, sources of income and living standards of resettled persons on the level before Project impact,
- To establish organizational systems and procedures for monitoring the realization of RP and to take corrective measures.

It is necessary to carry out a socio-economic census in order to identify the following:

- Current beneficiaries of the area in the scope of the Project, in order to establish baseline for creating the resettlement program and to avoid opportunistic claims,
- Standard characteristics of affected households, including description of production system, work and organization of household, with the basic information about livelihood (including, if relevant, level of production and income obtained from formal and informal economic activities) and standard of living (including health condition),
- Range of expected loss of property (total or partial) and range of resettlement, whether physical or economic,
- Information on vulnerable groups, particularly those below the poverty line, old and infirm persons, women and children, ethnic groups and other resettled persons not protected by Law of Expropriation, and for whom special measures must be taken,
- Measures for regular update of information on resettled persons and their livelihood and living standards, so that at the right moment, i.e. when the resettlement begins, the latest information is available. If updated information differs significantly from the original, measures will be defined how to record these changes and to update the resettlement program, in the way which is in accordance with the originally approved program.

A/RP will be submitted to AIIB for review and clearance. No activities on construction works can commence until and unless compensation has been paid, or appropriate budget set aside on an escrow account or account alike, or replacement property administered to PAPs, or court procedure initiated to determine the compensation in case no amicable settlement is reached.



Implementation of A/RP is an obligation of PMU, AEGCL shall monitor overall implementation, collaborate with its Electrical Circles in whose jurisdiction the works are taking place, collaborate with contractors and disclose information to PAPs and communities.

7.7.1.2 Public consultation in RP Preparation and Implementation.

Activities on the preparation of site-specific A/RP will be disclosed in the way to encourage meaningful participation of PAPs. That assumes the phase of preliminary preparations, disclosure of preparations for population census, disclosure of census results while respecting privacy of personal information, disclosure of social assessment, as well as disclosure of A/RP drafts. The purpose of public disclosure and discussions is to ensure meaningful participation of PAPs in the process of preparation, implementation and monitoring of resettlement instruments.

AEGCL will adopt a pro-active approach, which involves public disclosure of all appropriate information about the preparation of the A/RP, meaningful consultation with PAPs and local communities and an effective procedure or mechanism by which people can make comments or raise grievances. As part of A/RP preparation, AEGCL will include following steps to ensure proper communication about key issues and full A/RP disclosure:

- define PAP engagement strategy in A/RP preparation, as part of overall planning of the Project;
- map specific issues (e.g. the definition of entitlements, surveys, census, specific engagement with vulnerable groups etc.) and PAP groups (e.g. owners of property, women, persons and businesses affected by economic displacement, tea plantation owners/employees etc.) to be communicated to define criteria for identifying and prioritizing and select an engagement mechanism;
- define clear internal and management roles, responsibilities and authority as well as designate specific personnel to be responsible for the implementation and monitoring of A/RP disclosure activity;
- provide with effective procedure by which PAPs can express grievances and comments about A/RP at all phases of its preparation, identify opportunities from feedback and determine actions, revisit goals and plan next steps for follow-up and future engagement;
- conduct the engagement itself, disclose information in a way appropriate for groups, type of loss and local circumstances, hold public consultation ensuring equitable PAP contribution and mitigating tension while remaining focused on the issues;
- after final A/RP has been adopted, in addition of appropriate full RP disclosure, prepare and make available to all affected persons and groups a summary document of the A/RP;



8. Institutional Arrangement and Capacity Building

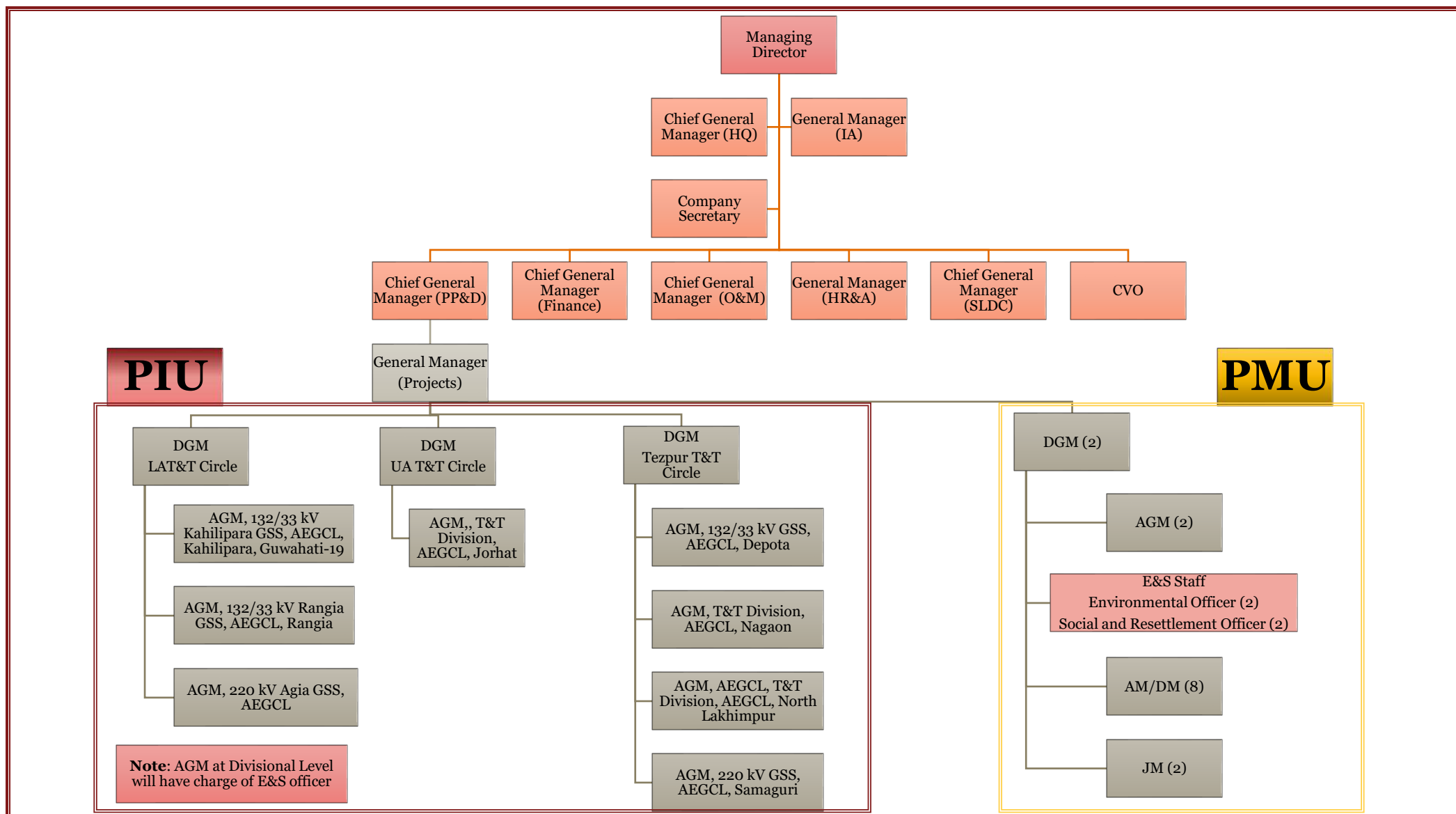
8.1. Institutional Arrangement, Staff, Budget, Environmental and Social related Procedures

AEGCL is both the Executing Agency (EA) and Implementation Agency (IA) for the project. The Project Management Unit (PMU) at corporate level is headed by General Manager (Project) under supervision of Managing Director; AEGCL, who will be assisted by corresponding personnel from various functions – Administration and Finance, Projects Planning and Design, Procurement and contracts and Environment & Social Staff of PMU. Project Implementation Units (PIUs) at divisional level of the project construction unit will be headed by Assistant General Manager.

The organization structure of AEGCL is as follows (**Figure 12**):



Figure 12: Organization Structure: AEGCL



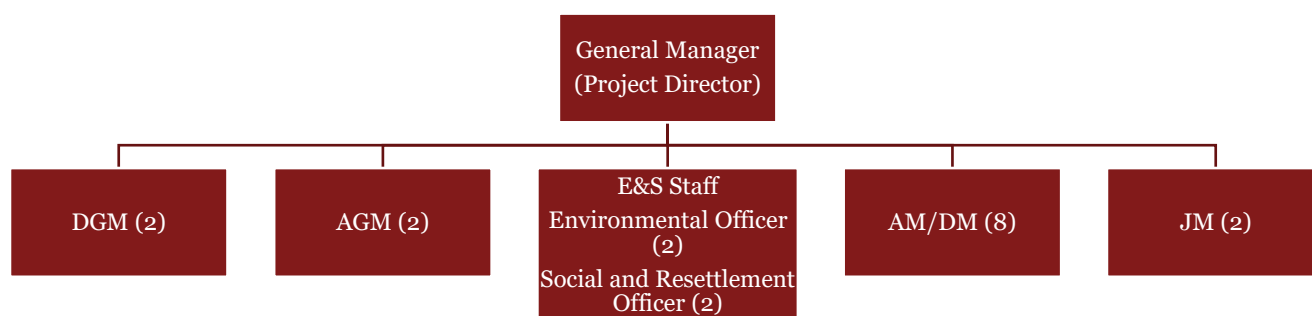
8.2. Implementation Arrangement for Environment & Social Management

Apex position: Project Director (GM level) accountable for overall supervision, coordination and responsibility of the Project planning, implementation, and monitoring. The PMC reports to PMU.

The **Environmental and Social (E&S) staff** is dedicated for projects funded by the Asian Infrastructure Investment Bank (AIIB) to streamline decision-making and provide more autonomy for project execution and delivery. The E&S staff of AIIB project is part of PMU which is headed by Project Director (General Manager Project). At divisional level, the charge of E&S Officer is given to the concern's AGM. The AGM's will also act as project Manager for individual subprojects. The AGM's will work under the supervision of DGM at circle level.

The Project Director will have overall responsibility for implementation and procurement of projects. Two Environmental officer and Two Social and Resettlement Officer will be part of the **Project Management Unit (PMU)**. He/she will have an overall responsibility for overseeing the development of subprojects' specific ESIA/ESMPs, A/RPs and IPPs⁴⁴ (if applicable) as well as implementation of ESMPs and coordinating with Experts from PMC and contractors with the help of all the **Divisional Offices** (Guwahati, Rangia, Agia, Jorhat, Depota, Nagaon, Lakhimpur & Samaguri). The E&S staff of PMU will also be responsible for progress monitoring of E&S compliance during project execution and submission of semi-annual/ annual reports on E&S compliance to AIIB. The structure of PMU is described below (**Figure 13**):

Figure 13: Structure of PMU



In the Divisional offices, the Assistant General Manager will act as E&S officer. The E&S officer will look into the E&S compliance, liaising with local authorities in connection with different permits and licenses, redressing the public complaints on E&S issues, etc. The tentative structure proposed at circle and divisional level is as below:

Sl. No.	Proposed Subproject	Project Authority at Circle Level	Project Manager and E&S Officer at Divisional Level
1	400/220kV, 2x500 MVA GIS at Rangia	Deputy General Manager, (DGM) LAT&T Circle	Asst. General Manager, 132/33 kV Rangia GSS, AEGCL, Rangia
2	400/220kV, 2x500 MVA GIS at Sonapur		Asst. General Manager, 132/33 kV Kahilipara GSS, AEGCL, Kahilipara, Guwahati-19
3	132/33 kV, 2x50 MVA Chaygaon GIS SS		Asst. General Manager, 220 kV Agia GSS, AEGCL

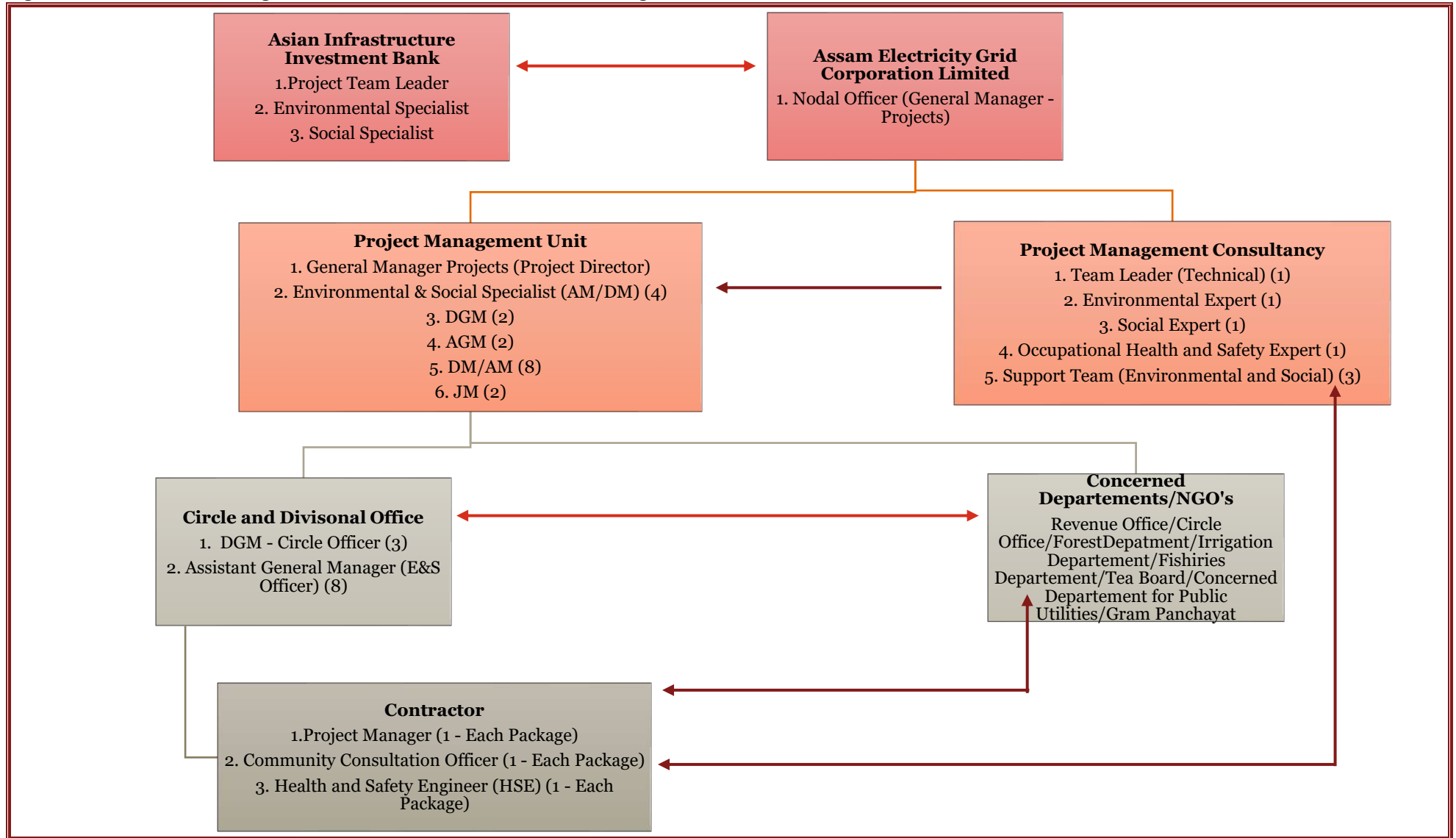
⁴⁴ In the preparation of IPPs (where applicable), AEGCL will have overall responsibility of coordination and financing responsibilities. AEGCL through its PMU & Divisional Officers will prepare, implement, and monitor the IPP. Since IP issues are sensitive, the PMU will ensure that a social specialist or consultant or a designated official responsible for IPP will be deputed with knowledge and experience of working among IP groups. The specialist shall be available for assisting in the planning and implementation of IPPs for the Project. The PMU will ensure that the specialist hired or designated to assist the PMU and divisional offices in planning and implementation of IPPs for subprojects is familiar with AIIB policy and requirements for IPPs.

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Sl. No.	Proposed Subproject	Project Authority at Circle Level	Project Manager and E&S Officer at Divisional Level
4	132/33 kV, 2x50 MVA, Kumarikata AIS		Asst. General Manager, 132/33 kV Rangia GSS, AEGCL, Rangia
5	2x160 MVA, 220/132kV; 2x50 MVA, 132/33kV Khumtai GIS	Deputy General Manager, UA T&T Circle	Asst. General Manager, T&T Division, AEGCL, Mariani
6	132/33kV, 2x50 MVA, Burhigaon GIS	Deputy General Manager, Tezpur T&T Circle	Asst. General Manager, 132/33 kV GSS, AEGCL, Depota
7	132/33kV, 2x50MVA, Nagaon-2 GIS		Asst. General Manager, T&T Division, AEGCL, Nagaon
8	220/132 kV, 2x160 MVA Shankardeb Nagar GIS		Asst. General Manager, 220 kV GSS, AEGCL, Samaguri
9	220/33 kV, 2x100 MVA Jakhalabandha GIS		Asst. General Manager, T&T Division, AEGCL, Nagaon
10	220/33 kV, 2x100 MVA Bihpuria (Narayanpur) GIS		Asst. General Manager, AEGCL, T&T Division, AEGCL, North Lakhimpur



Figure 14: Institutional Arrangement for Environmental and Social Management



8.3. Organizational Responsibilities

The Environment and Social staff at the corporate level will be responsible for monitoring the policy and implementation related environmental and social impacts of all projects of AEGCL. The Environmental and Social staff if PMU will assist both PMU and Divisional E&S officers in managing environmental and social aspects of the projects in compliance with the ESMPF. This E&S staff is responsible for ensuring the implementation of ESMP for all the sub-projects funded by the AIIB. As per AIIB's Policies, PMU is required to conduct and report regular monitoring of environmental and social compliance of projects funded by AIIB to ensure compliance with the ESP.

The implementation of the ESMP during the construction phase is the responsibility of the Contractors. The PMU is responsible for ensuring all measures mandated by the ESMP are included in the design and bid documents. The E&S officer at divisional level under supervision of E&S staff of PMU are responsible for monitoring and enforcement of the ESMP during construction.

The duties of the E&S staff at corporate level are to:

- Monitor the implementation of mitigation measures during construction and operation phases of the project.
- Advise and coordinate field unit's activity towards effective environmental and social management.
- Liaise with the Ministry of Power, CEA, MoEF&CC, GoA and state agencies such as APCB, Assam Forest Department, District Revenue department and seek their help to solve the environmental and social related issues of the project implementation.
- Advise to project planning/design cells on environmental and social issues while route selection of the alignment at the planning/design stage to avoid negative environmental and social impacts. Similarly advise for inclusion of environment and social safeguard provisions in contract documents.
- Advise PIU on training and awareness raising for environmental and social issues to the project/contract staff.

The duties of the E&S Officer at Divisional (site) level are to:

- Ensure implementation of the environmental and social policy guidelines and environmental and social good practices at the sites.
- Advise and coordinate the contractor(s) activity towards effective management of environmental and social issues.
- Liaise with the local officers of forest department, APCB and seek help of their officers in resolving environment monitoring related issues, wherever applicable.
- Carry out environmental and social survey to avoid negative impacts.
- Make the contractor staff aware of environmental and social issues so that ESMP could be managed effectively.
- Prepare site visit report for environment and social compliance.

The duties of the Environmental Expert (1), Social Expert (1) and HSE Expert (1) of PMC are to:

- Oversee the implementation of ESMPs by the Contractors
- Provide technical guidance to the Contractors for implementation of the ESMPs
- Prepare checklists/formats/reports, etc. for implementing each of the activities as per the ESMPs
- Preparation of periodical monitoring reports and E&S compliance with environmental and social clauses of Contract Agreement
- Conduct detailed E&S Assessment for subprojects to prepare ESIA/ESMPs (if required)
- Conduct monitoring of Environmental and social parameters during operation phases.

The duties of the Environmental Health and Safety Engineer (1) and Community Consultation Officers (1) of Contractor are to:

- Ensure compliance of the instructions given by the PMC



- Maintain close interaction with PMC and the field representative and seek instructions and guidance from PMC's E&S Experts and HSE Expert on any issue related to implementation of environment, social and safety measures.
- Record keeping and reporting to the PMC through project manager (contractor) on actions taken.
- Providing in-house training to the workers on environment and safety.
- Securing pertaining clearances /permissions/NoCs from respective concerned authorities with respect to labour laws, applicable insurances for workers, health checkup of workers, height pass generation for workers working on height etc.

The institutional arrangement for E&S management and subsequent of roles and responsibility of various entities are provided in **Figure 14** and **Table 50** describes Environmental and Social Monitoring Plan describes the institutional responsibilities for Environmental and Social Activities. Whereas the Institutional Roles and Responsibilities for Environmental Resettlement activities are provided in **Table 51**.

AIIB's E&S specialists will supervise the E&S compliance through reviewing E&S monitoring reports and conducting supervision missions, coordinated via Project Team Leader and Project Director.

Table 50: Roles and Responsibilities for Environmental and Social Management

Position	Roles and Responsibilities
Environmental and Social Staff (PMU)	<ul style="list-style-type: none"> • Preparation and finalization of project specific ESIA's/ ESMPs for with inputs from PMC and approval from AIIB (where required). • Confirm integration of ESMPs provision related to works in the contract documents • Provide guidance on E&S issues to Divisional Offices as requested • Providing overall coordination to field officers for forest clearance/wildlife clearance those which are prerequisite for initiation of construction work • Coordinate with regulatory agencies like State Pollution Control Board (SPCB), Forest Departments, and at request of PMC and/or Contractor/Divisional Office. • Prepare regular reports on progress on ESMPs implementation across the project with inputs from the PMC's E&S specialist • Document experiences of developing and implementing E&S mitigation measures a convert it into training material for internal and external capacity building • Facilitate interaction between E&S teams of PMC and Contractor to allow cross-fertilization of ideas, successes and learnings • Budgetary allocation/sanction for ESMP implementation • Implementation of RPF/RPs/IPP's and Disclosures
Environmental and Social Officer at Divisional Level (Concern AGM's)	<ul style="list-style-type: none"> • Coordinate with PMC's E&S expert to monitor and report on progress on ESMPs implementation as part of works contracts • Participate in and facilitate consultations with stakeholders. • Coordinate with regulatory agencies like SPCB, Forest Departments, and at request of PMC and/or Contractor/Divisional Office. • Obtaining forest clearance/wildlife clearance whichever is prerequisite for construction work. • Participate in project meetings and report on the issues related to environmental management to provide for any mid-course corrections that may be required based on situation on the ground. • Assist PAPs including IP's to resolve their grievances • Coordinate on the training and capacity building initiatives • Periodic consultation with affected persons
Environmental Expert, Social Expert & HSE Expert, PMC	<ul style="list-style-type: none"> • Lead the development of the sub-projects specific ESIA's, ESMPs, RPs, IPPs (if applicable), Public consultation Plans/community engagement plans for the entire project. • Development of monthly, quarterly and semi-annual progress reports with respect to environmental and social safeguard compliance to local, national regulations and AIIB's ESP. • Conducting primary baseline monitoring for Water quality, Air quality and Noise



Level data for pre-construction, construction and post construction phase as per the parameters and frequencies specified under Generic ESMP.

- Inclusion of climate change and mitigation measures in project designing stage.
- Maintain the record/ documentary evidence for all statutory clearances as applicable to the project.
- Review contract documents to ensure that ESMPs provisions related to works are included in the contract documents.
- Oversee and report to the PMU on implementation of ESMPs provisions included in the works contract for the sub-projects.
- Act as a resource person in trainings based on experience on implementing this project and previous relevant work.
- Providing capacity development training to PMU (quarterly) and contractor personals (monthly).
- Ground Truthing of documents submitted by contractor.

Contractors' Community
Consultation Officer & Health
and Safety Engineer (HSE)

- To collect a full set of baselines at each site as a benchmark, prior to the mobilization.
- Lead the implementation of ESMPs measures included in the Contract.
- Preparation of Scheme including details of land and other resources required
- Development of inventory for tree cutting/pruning along RoW, liaising with various government departments for utility shifting and obtaining regulatory clearance in consultation with AEGCL officials.
- Public consultations in presence of PMU, PMC, district authorities, divisional officers and E&S staff of PMU to be undertaken in case of resistance
- Maintaining statutory clearance documents (labor license, migratory labor license, Primary monitoring documents, EC for borrow earth, pollution under control certificate for vehicles, workers compensation insurance etc.)
- Health and Safety Training of workers (Use of PPEs, fire safety and electrical safety training trainings, construction safety trainings, training for working on height, HIV/AIDS trainings etc.)
- Organizing health checkup camps for workers, authorizing height pass for workers, maintaining register for issuing PPEs.
- Daily report on incidents and near miss, monthly report on ESMPs implementation for each subproject, Report on progress and shortcomings of the measures implemented to E&S Expert of PMC



Table 51: Institutional Roles and Responsibilities for Environmental Resettlement activities

Milestones	Process	Output / Indicators		Responsibility		
				Internal		External
			Preparation /Execution	Review	Approval	Inputs
I. Project Conceptualisation						
Environmental & Social Screening and Scoping for Transmission/ Distribution Lines	Screen and scope Transmission/ Distribution Lines from an environmental & social perspective	E & S screening and scoping documents as part of Concept Paper	(E&S Officer (Divisional Level)	Engg. Dept. PMU	AEGCL Management Appraisal	Pre-appraisal by Planning Dept., GoA
Environmental & Social approval	Submit Concept paper (with E&S details) for Management Approval	AEGCL Mgmt. Appraisal	E&S staff (PMU)	E&S Staff (PMU) Engg. Dept. Corp. Plg.	AEGCL Management Appraisal	In-principle approval by GoA
II. Project Planning						
Environmental & Social Screening and Scoping for substations	Screen and scope substations sites from an environmental & social perspective Consultation with Revenue Authorities	E & S Screening and Scoping reports for substation sites Scope for land acquisition	E&S staff (PMU) Circle Officer	E&S Staff (PMU) Engg. Dept. Corp. Plg.	AEGCL Management Approval	Ext. agency like revenue, forest dept etc. for Social Screening & Scoping
Environmental Assessment and Management Planning	To prepare EAMP Transmission line Substations Public Consultation (line)	Environmental/ Assessment Management Plan	E&S Staff (PMU) Circle office	E&S Staff (PMU)	AEGCL Management Approval	State Forest Dept
Social Assessment for Temporary Damages for TL	To prepare RP Assessment of temporary damages Compensation plan Public consultation	Resettlement Plan	E&S staff (PMU) Circle office	E&S staff (PMU)	AEGCL Management Approval	Revenue Dept



Milestones	Process	Output / Indicators		Responsibility		
				Internal		External
			Preparation /Execution	Review	Approval	Inputs
III. Project Approvals						
Forest Clearance	Submit forest proposal to State Govt Forest Proposal to MoEF&CC for 1st stage approval Compliance to MoEF&CC for Final Forest Clearance	Final Forest Clearance by MOEF	E&S staff (PMU) Circle office	E&S staff (PMU) Finance Dept.	AEGCL Management Approval	Reginal MoEF&CC/MoEF&CC
State Govt.	Submit DPR (with E & S details) to State Govt.	Project approval by State Govt.	Circle Office Corp. Plg.	E&S staff (PMU) Corp. Plg.	AEGCL Management Approval	Budget/fund allocation by GoA
FA Acceptance	Submit ESIA and RP to Funding Agencies for appraisal	ESIA and RP concurrence by FA	E&S staff (PMU) Corp. Plg.	E&S staff (PMU) Corp. Plg. Dept.	Internal Management Approval	Detailed appraisal and concurrence by GoA/GoI/Ministry of Power
IV. Detailed Design & Award						
1. ESIA/RP Implementation	Engage authorised agencies for E & S management plan work	Authorised agencies engaged to execute management works	E&S staff (PMU) Circle office Engg. Dept.	Corp. Plg. E&S staff (PMU) Circle office Engg. Dept.	Management Approval	Monitoring /Supervision by AIIB
2.ESMP part of bidding documents	Project specific EMP to be included in bidding document	EMP part of contract document	Circle office	E&S Staff	Management Approval	Monitoring /Supervision by AIIB
V. Project Implementation						
Execution of Environmental Management Plan	Execute environmental	Environmental management	Circle office	E&S Staff	Management	-



Milestones	Process	Output / Indicators	Responsibility			
			Internal			External
			Preparation /Execution	Review	Approval	Inputs
		measures				
Management Works	management works (ESIA	executed	Authorised agency	Circle office	Approval	-
Execution of RP	Execute RP for TL for Substations (GoA)	CPTD (TL – by AEGCL) SIA/GoA (for substations)	Circle office SIA/GoA	E&S Staff Circle office Corp. Plg. SIA	Management Approval SIA/GoA	-
VI. Operation & Maintenance						
Environmental & Social Monitoring	Monitor ESMP (TL) measures	Periodic monitoring reports Periodic monitoring reports (SIA)	E&S Staff Circle Office	E&S Staff Circle office	Management Approval	Periodic monitoring report to be reviewed by AIIB
	MonitorRP Measures by GoA		Circle office SIA/GoA	O&M Circle office	SIA/GoA	Periodic monitoring reports to be reviewed by AIIB
VII. Project Review						
Periodic Environmental & Social Review	Review and report on E & S performance of project during construction, O &M	Annual environmental and social review report	Circle office ESM/ Circle office	Corp. Plg. Engg. Dept Fin. dept	Management Approval	FA appraisal GoA



Budget: Each sub-project will have its own budget to cover the ESMP costs relating to mitigation measures, enhancements, wherever included in the plan, and monitoring costs. In addition, training and capacity building costs need to be added for specific issues that ESIA and ESMPs may bring out. For instance, there may be a need to have short courses on specific topics, experience exchanges on common issues etc.

8.4. Capacity Building

AEGCL has experience in implementing multiple projects funded by the Asian Development Bank, Non-Lapsable Central Pool of Resources (NLCPR) Scheme and the World Bank. The review of AEGCL's past experience in implementation of E&S management highlights its approach towards dealing with environmental and social concerns which included both strengths as well as shortcomings when dealing with regulatory frameworks. For instance, power transmission projects are exempted for environment clearances in the country, hence the weak application of environmental regulations and CEA regulations was an outcome of the low staff awareness about the related regulatory guidelines. In addition, as a general practice AEGCL relies on hired consultants for the development and implementation R&R plan and RAP. However AEGCL lags behind in the consideration of social aspects at project conceptualization, planning and implementation stages. Further, the monitoring of social aspects beyond compensation has suffered from delay of information/data from contractors and bureaucratic issues.

Considering the strengths, AEGCL has addressed environmental and social concerns based on principles of avoidance, minimization and mitigation in their past funded projects along with the support of consultant. Some common practices being followed by AEGCL include minimizing the loss to standing crops by avoiding any construction activity in harvesting season, to honor its commitments and to maintain the social fabric of the community, AEGCL tries to avoid Resettlement and Rehabilitation (R&R) in all its projects by trying to use Government waste land for most of their new proposed substation sites. As part of regulatory compliance AEGCL ensures proper valuation of land and assets of PAPs by the revenue department. All stakeholders including the public and the local authorities are consulted on socioeconomic issues that arise from its project activities prior to commencing the construction activity.

Recognizing its weaknesses which include lack of inhouse Environmental and Social expertise and greater dependency on E&S consultants, absence of a centralized Grievance redressal committee and mechanism for all the projects, incorporation of E&S aspects from project conceptualization stage, AEGCL has plans to incorporate appropriate changes by means of recruiting and capacity building of in house Environmental and Social Staff to oversee the work by consultant, development of GRC as well as defining criteria to include public consultation and E&S preliminary assessment activity part of project initiation stage to address the same, in view of the proposed project.

Consultations with AEGCL reveal the steps already being initiated in this direction. This largely involves expanding its ESC, and the coordination of both PIU and PMU under one authority (Project Director); and plans for orientation and training of its staff.

Proposed Trainings:

The PMC's E&S staff will liaise and coordinate with PMU staff to undertake the prescribed project activities. It is envisaged that field visits will be conducted jointly by PMC, PMU and PIU, on case basis. The PMC will report to Project Director on regular basis.

To strengthen the capacity of AEGCL's staff in E&S management, customized robust training (Refer **Table 52**) is to be conducted for both in-house (PMU and PIU), select/concerned Divisional-level Officers, and contractors. This would include:

Table 52: Proposed Trainings and Capacity Building Programs

Type of training	Aim	Stage
E&S orientation	To increase awareness and ensure the proper implementation of safeguard requirements.	Planning/Pre-construction/Pre-ESIA
Occupational and community health and	To enhance awareness and reduce potential incidents.	Pre-construction



safety		
Refresher	To hone existing skills and refresh newly acquired knowledge.	Monitoring Construction
Custom (on demand)	To cater to specific topics/issues as requested.	Construction to Maintenance

The training could be organized by the PMC in consultation with PMU-PIU through 1-3-day workshops with PMC's in-house and external resource persons. A separate budgetary allocation will be incorporated in the PMC's funding to this effect.

9. Consultation and Disclosure of Documentation

9.1. Consultation

In line with GoI's EIA Notification 2006 (including amendments), public consultation and information disclosure will be undertaken through public notice prior to the approval by MoEF&CC only for Category B1 and A projects. According to AIIB's ESP, Category B projects, public consultation and information disclosure is to be made during the initial stages by the client itself. This activity supports the view to understand the public's perception of the project and respond to their concerns and suggestions during the early stages of the project design. Incorporation of the environmental and social concerns of PAPs in the decision-making process through the public consultation will avoid or minimize conflict situation during the implementation process and facilitate the potential restoration of impacted livelihoods.

Public consultations including group discussions were conducted in project-affected area in December 2019 and January 2020 by the project ESMPF consultants. People participated in voluntary public consultation sessions to express their views about the proposed project.

As part of the social assessment, informal village-level consultation was carried with APs and concerned stakeholders (village elders, other community members) as part of continuous participation, at various locations under respective subprojects. **Table 53** lists the issues raised by stakeholders consulted.

Table 53: Summary of stakeholder consultations and issues raised⁴⁵

Sr. No	Location	Date	participants	Issues raised by people during Consultations
1	400/220 kV Sonapur Substation	05/11/2019	8	People were eager to provide the private land subject to getting adequate compensation at market rates. People expect maximum benefits in terms of employment during construction. Construction schedule should be chosen during the off-season to avoid lesser damage to standing crop. People should be given prior notice to harvest their crops. Any damage to local area during construction by movement of vehicles shall be restored post construction.
2	220/132/33 kV Khumtai Substation	07/11/2019	10	
3	220 kV Bihupuria Substation	08/11/2019	3	
4	400kV Rangia Substation and 220 kV Kukurmara Substation	12/11/2019	8	
5	132/33 kV Narangi Substation and Proposed 220/132 kV Sonapur Substation	10/01/2020	10	

Incorporation of environmental concerns of Affected Persons (APs) through the public consultation helps avoid or minimize conflict situations and enable them to provide meaningful inputs into the project design and implementation process. The results of the public consultation viewed the proposed project as a strategic step in improving the power scenario in the rural areas. However, concerns related to construction were raised during the consultation with regard to (i) compensation for land if acquired, (ii) damage to crops, (iii) damage to physical resources; and (iv) employment opportunities. These issues were addressed while developing this ESMPF, such as the details of compensation process are specified under entitlement matrix. The necessary design provisions as well as deferring construction during non-harvest season to avoid damage to crop and other infrastructure of the area while construction of transmission lines is addressed under ESMP. Emphasis is given on utilization of local labour under the ESMPF to allay the fear of neglecting local labour.

⁴⁵ Attendance sheets for public consultations and photographs for site visit are attached in **Appendix 10**

9.2. Information Disclosure

Information Disclosure by AEGCL

AIIB requires AEGCL to ensure ESMPF report containing relevant information about E&S risks and impacts of the Project, the Assamese and English versions of Executive Summary are disclosed on AEGCL's website in a timely and accessible manner. This information is to be conveyed in a form and language(s) understandable to PAPs, other stakeholders and the general public, so they can provide meaningful inputs into the design and implementation of the Project. The same arrangement shall apply for the disclosure of any potential A/RPs.

AIIB requires the Client to disclose the E&S monitoring results on a regular basis any updated information, along with information on any material changes in the Project.

Information Disclosure by AIIB

AIIB will disclose online the documentation on the Project as provided by AEGCL, prior to, or as early as possible during the AIIB's appraisal of the Project; and other documentation in a timely manner.

Incorporation of the E&S concerns of PAPs through the public consultation in the decision-making process will avoid or minimize conflict situations during the implementation process as well as enable them to provide meaningful inputs into the project design and its implementation. AEGCL can conduct public consultation and information disclosure through public interactions and notices.

Meaningful Consultations

AEGCL can disclose the information about the proposed project in print (local editions of newspapers, pamphlets, posters) and electronic (website) media. Additionally, AEGCL can disclose tentative project plans during public consultation sessions as well as create awareness on AP rights, effects on area and the action to be taken to mitigate the impact as part of AIIB's E&S requirements. The Environment and Social staff of PMU will hold discussions with focus groups and individuals to make them aware of the compensation procedures, impacts of lines, as well as proposed project timelines. This exercise shall continue during and after the construction of the project. Thus, the project-affected community residing along the proposed corridor of transmission line and substation locations can gain a sufficient knowledge about the potential grievances, which could arise in the future.

All public consultations shall be announced through local medias. Additional consultations are also recommended, depending on the potential impact:

- Public meetings with advisory groups, relevant stakeholders, relevant international or local institutions, etc. are recommended occasionally during Project planning and implementation.
- Meetings with local communities with an aim to include all comments and concerns of PAPs (individuals, households, business subjects, women) in the earliest stages of the Project.
- Individual meetings with PAPs regarding specific cases. These meetings can also be organized when needed upon request by PAPs.
- Public discussion on draft of this document. Minutes of the public discussion will become constituent part until final document and all grievances raised during the discussion shall be recorded in the Registry of Grievances.

As per the EIA notification, 2006 Information disclosure required to be undertaken through public notice prior to the approval by the MoEF&CC only for Category A and B1 projects and no such disclosure required for category B2 in which transmission line projects fall.

Under the Environmental Notification, the regulatory authority and the State or Union Territory Pollution Control Board (SPCB or UTPCC) required to make the Draft report available for Category A and B1 projects for inspection and a notified place during normal business hours prior to and up to the date of public hearing and prior to hearing.



The dissemination of information to the affected population and consultation with them is an important requirement of AIIB's Policy. It also requires effective local announcements of public meetings. Furthermore, the disclosure of information and the possibility to submit comments are important elements of the stakeholder engagement process. Hence, the provision of clear information in a suitable form for the local population is the essence of an ESMPF and ESIA process. Thus, a community awareness program at substation/transmission line location is to be collectively arranged for individual subprojects after development of Individual RAP and ESIA's for subprojects.

Follow-up meetings with PAPs and community should be conducted at least one month prior to construction by PMU and PMC regarding the, procedure/schedule of construction activities, utilization of resources, identified impacts and mitigation measures. These awareness programmes will help the community to resolve problems, and clarify their distrust related to the proposed project at initial stage.

AEGCL will disclose this ESMPF to all the stakeholders prior to the start of the project. This report will be made available to the stakeholders at PMU, Divisional offices and Circle offices of AEGCL. In addition, executive summary of the Report shall be translated into Assamese language and made available to the affected communities and locals. The copies shall also be kept at project sites for ease in accessibility of community members. This will ensure that the local populace is aware of the Project impacts, its mitigation, responsible staff and mode of implementation.



10. Grievance Redressal Framework

The power transmission project is not envisaged to involve the permanent acquisition of land and does not fall under Land Acquisition Act, 2013; hence the requirement stated under the Act such as GRM related to land acquisition is not applicable here. However, some of the substation locations will entail acquisition of private land where suitable government-owned land is not available. Thus, a multi-tiered GRM will be applicable to the project in its entirety.

AEGCL does not have its in-house Environment or Social Safeguards Policy regarding transmission subprojects currently. To honour the GRM, AEGCL will adopt the practice to resolve any major/ minor grievances, where AEGCL shall accept, review and address issues or problems raised by PAPs and Project workers arising from Project-related works.

Overall responsibility for timely implementation of GRM lies with the AEGCL involved in managing and supervising the civil works and other activities under the Project. Other than disputes relating to ownership rights under the court of law, GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost and other additional assistance for vulnerable groups including Indigenous People.

The GRM should have suitable grievance redressal procedure accessible for PAPs including IPs and project workers. It should address PAPs' and Project workers concerns, and complaints related to environmental and social impacts promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible at no costs and without retribution. This will consist of two-tier arrangement: First tier with site level persons responsible for accepting the grievances and Second tier comprising a Grievance Redressal Committee (GRC) to address the same. For handling grievances, GRCs shall be established at project/ scheme level. The GRCs shall include members from AEGCL field offices, local administration, head/representative of village-level institution (Panchayat), Representative from the autonomous council districts in case of tribal districts, Affected Persons representative under the chairmanship of project head or its representative. Information about GRCs is to be provided to panchayat of all the villages where AEGCL is executing the Project (Refer **Table 54**).

The GRM should be communicated to stakeholders by community consultation and as part of information disclosure both in English and Assamese language. Additionally, at the time of construction key project level details and primary grievance contact should also be posted on a notice board near the construction site, concerned electrical circle and office of district administration.

10.1. Roles and Responsibilities

- 1) *Focal Point for managing the Complaints Process*: Resident Engineer for the subproject and Representative of EPC contractor for individual subproject.
- 2) *Person who will manage the grievance database and record keeping*: Representative of contractor and E&S Specialist of PMU in direct interaction with Nodal E&S officers (AGM-Concerned Divisional offices).
- 3) *Person who will respond to and manage simple queries and complaints*: Nodal E&S officer (AGM) and E&S safeguard Specialist-PMU
- 4) *Person who will manage difficult complaints or grievances*: Grievance Redressal Committee under supervision of Project Director.
- 5) Person who will prepare grievance report for Half Yearly reporting: E&S Specialist PMU

Table 54: Constitution of Grievance Redressal Committee

1.	General Manager (Projects)	Chairman
2.	Sub District Magistrate/District Revenue Officer or their nominee	Deputy - Chairman
3.	AGM* of each Divisional office	Member



4.	Representative from the autonomous council districts in case of tribal districts	Member
5.	Representative of local Panchayat/Council	Member
6.	Women representative of village/council	Member
7.	Environmental and Social Specialist - PMU	Member
8.	Resident AEGCL Engineer	Focal Point of contact
9.	Representative of EPC* contractor	Focal Point of contact
10.	CBO/NGO representative TBD	Member

*EPC= Engineering, Procurement and Construction Contractor

*AGM=Assistant General Manager

The PMU shall formulate procedures for implementing the GRM (**Figure 15**), subject to Bank's approval. The Nodal E&S officers shall undertake GRM's initiatives that include procedures of communicating the existence of the GRM, taking/ recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders, escalating unresolved issues while paying particular attention to the impacts on vulnerable groups.

Environmental and social grievances shall be handled in accordance to the project's GRM. Open and transparent dialogue to be maintained with project-affected persons and project workers as and when needed, in compliance with ESP. The GRM for the project should provide an effective approach for complaints and resolution of issues made by the affected community and project workers in a reliable way. This mechanism shall remain active throughout the life cycle of the project. The proposed GRM does not replace the public mechanisms of complaint and conflict resolution envisaged by the legal system of the GoI but attempts to minimize use of it to the extent possible.

10.2. Mode of Communication for Raising Complaint

Complaints can be anonymous and can be communicated through the following means.

- 1) By Phone: (*Dedicated phone line to be announced by PMU prior to construction phase*)
 - 2) By email: (*Dedicated phone line to be announced by PMU prior to construction phase*) copy to aiibworks.aegcl@gmail.com
 - 3) In person: To EPC contractor, Resident Engineer (Concern office) & AGM (Nodal E&S officer) (*List of selected EPC contractors along with their contact number, email address to be made available at local offices of AEGCL*)
 - 4) Mail address: First Floor, PMU (AIIB Project), AEGCL, Paltan Bazaar, Guwahati, Assam - 781001
- Process of Addressing grievances

The complainant will be allowed to submit his/her complaint in writing or verbally to contractor, Revenue Department office, District Magistrate office and local project official who shall pass it to Nodal E&S officer or E& S Specialist of PMU-AEGCL within 2 working days from receiving the complaint. Receipt of grievances lodged in person or via phone will be acknowledged immediately, while those logged in person, email, and mail submissions will be acknowledged within two working days. The acknowledgment should provide the complainant with the basic information about the next steps. The officer will then investigate by trying to understand the issue from the perspective of the complainant and understand what action he/she requires. The officer will investigate facts and circumstances, interview all parties involved and confer with relevant stakeholders. Once investigated, and depending on the severity and type of grievance, a provisional decision shall be discussed with the complainant in the timeframe of 10 working days after the acknowledgement of the grievance. The final agreement should be specific and agreed with the complainant no later than 20 working days after the acknowledgement of the grievance. Closing out the grievance occurs after the implementation of the resolution has been verified. Even when an agreement is not reached, or the grievance was rejected, the Project officer shall document the result, actions and effort put into the attempted resolution.

If not resolved at this stage, the Nodal officer shall escalate it to the GRC committee meeting which shall convene every fortnight from the date of formation of GRC. The first meeting of GRC shall be organized within 15 days of its constitution/disclosure to formulate procedure and frequency of meetings. However, GRC

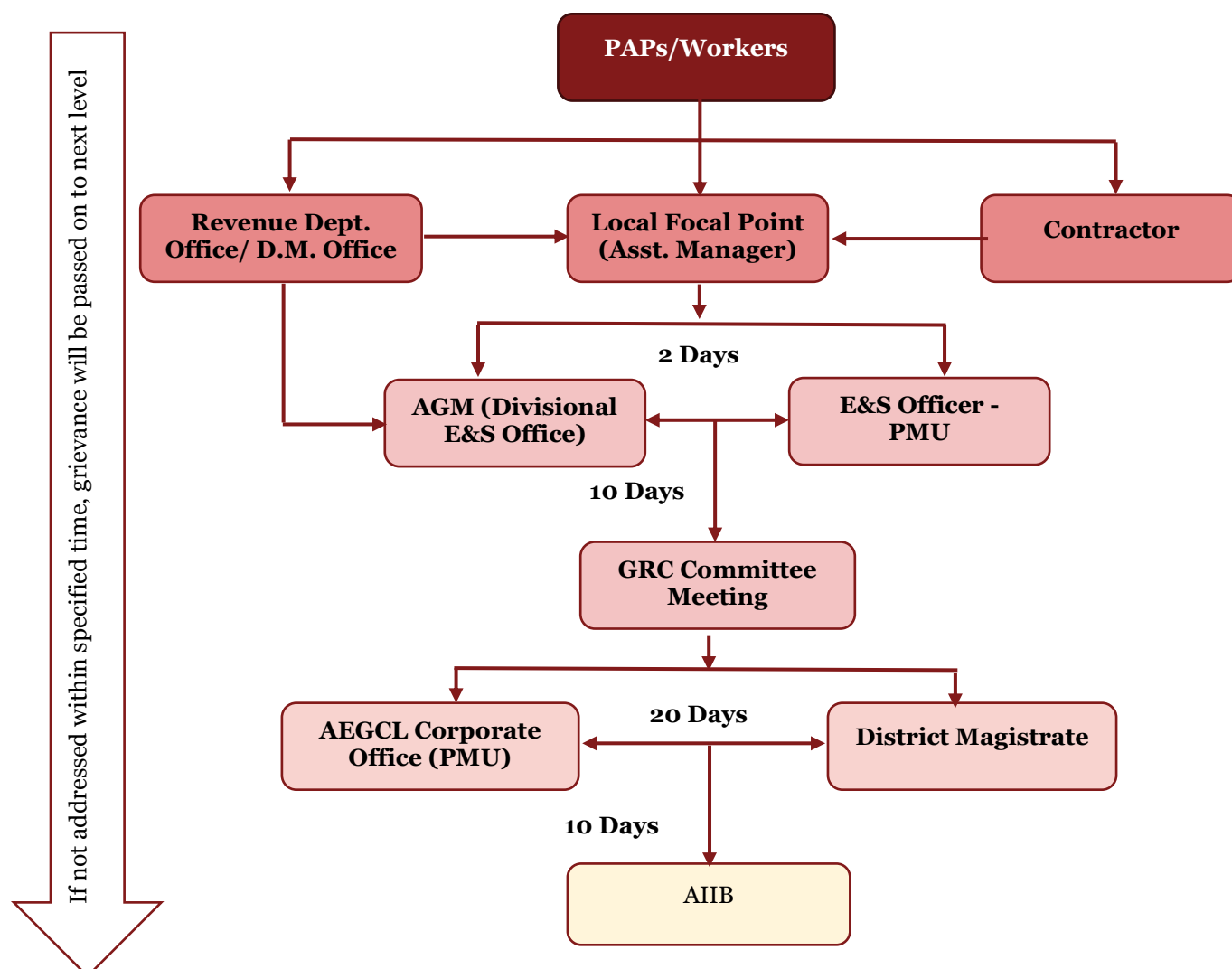


meeting shall be held within 20 days of receiving a grievance for its solution if not resolved by Nodal officer. Detailed report should be submitted for complaints resolved at local level. Such report should also be presented before the GRC during the meeting. In case complainant/appellant is not satisfied with the decision of GRC they can approach AEGCL - PMU /District Collector or Court of law for solution.

The corporate level GRC shall operate under the chairmanship of Director (PMU) who will nominate other members of GRC including one representative from corporate ESC who is conversant with the environment and social issues. The meeting of Corporate GRC shall be convened within 10 days of receiving the reference from project GRC or complainant directly and pronounce its decision within next 15 days. These GRCs shall act as a supplement and in no way substitute the legal systems, especially embedded within RFCTLARR Act 2013, The Electricity Act, 2003, and Right to Information Act.



Figure 15: Grievance Redress Mechanism



PAPs and Project workers can approach the court of law at time during the Grievance redressal process.

Note:

1. The grievance redress mechanism is also applicable to the workers under contractors and sub-contractors. Grievances raised by workers and staff will be forwarded to the project engineers and management.
2. Any fatality should be informed to PMU and AIIB immediately.

10.3. Recording, Monitoring, Reporting and Evaluation

The GRM system shall keep a grievance register log. Each grievance will be recorded in the register with the following information at the minimum:

- Type of grievance;
- Description of grievance;
- Gender-disaggregate data of complainant/grievance;
- Date of receipt acknowledgement returned to the complainant,
- Description of actions taken (investigation, corrective measures), and



- Date of resolution and closure / provision of feedback to the complainant OR Date of escalation to Tier II then
- Description of actions taken (investigation, corrective measures) by Tier II
- Date of resolution and closure / provision of feedback to the complainant by Tier II

The monitoring of Grievance management will be through a set of indicators ensuring effective and timely resolution of grievance. The indicators will be measures within the regular E&S Monitoring report. The indicators are listed below:

- Number of Grievances received;
- Number (%) of Grievances acknowledged within the timeframe;
- Number (%) of Grievances unilaterally decided;
- Number (%) of Grievances closed within the specified timeframe;
- Number (%) of grievance related to a same or repeated event and /or location to identify areas most affected by potentially negative impacts of the project.
- Number (%) of grievance received comparing to the previous reporting period.
- Number (%) of complainant satisfied with the process (timely, fair)
- Number (%) of complainant satisfied with the outcome.

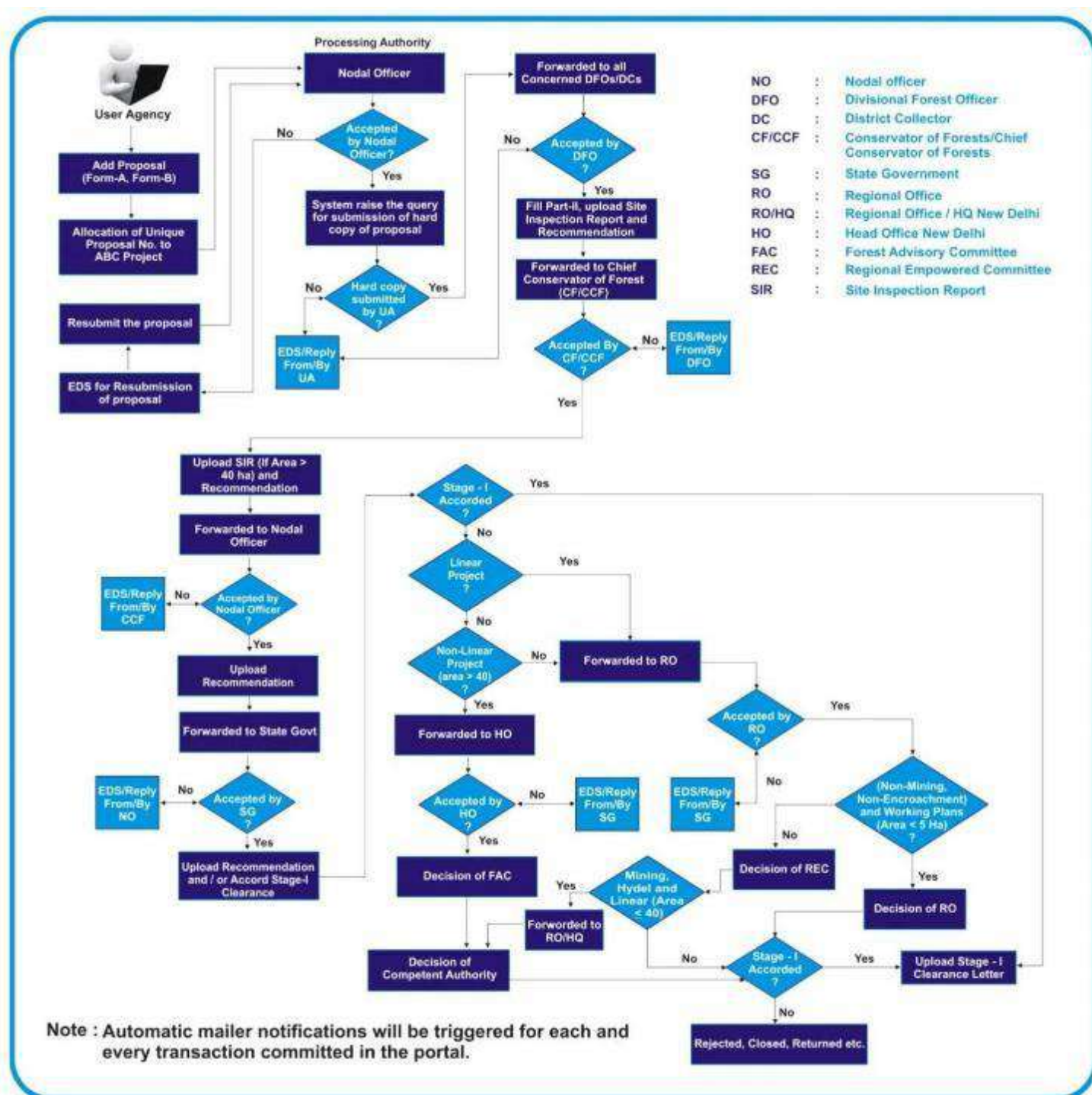
If there are more than 30 complaints / grievances recorded, the Project Manager may decide to investigate any patterns or repetition of issues that need addressing. The Project Manager may decide to get an independent consultant to review and provide advice.

APPENDIX



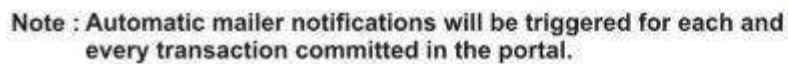
Appendix 1

Workflow for Forest Clearance Process (Stage – 1),



¹ <http://forestsclearance.nic.in>





Appendix 2

Form - 1 Application for Authorization/ Renewal of Authorization of Collection Receipt/ Treatment/ Transportation/ Storage Disposal of Hazardous Waste

FORM – I [See rules 5(3) and (7)]

APPLICATION FOR AUTHORIZATION/ RENEWAL OF AUTHORIZATION OF COLLECTION RECEIPT/ TREATMENT/ TRANSPORT/ STORAGE DISPOSAL OF HAZARDOUS WASTE.

From:

.....
.....
.....

To

Member Secretary,
Pollution Control Board, Assam,
Bamunimaidam, Guwahati- 781 001.

Sir,

I/we hereby apply for authorization/ renewal of authorization under sub-rule (3) of rule 5 of the Hazardous Waste (Management, Handling and Transboundary Movement) Rules, 2008 for collection/ reception/ treatment/ transport/ storage disposal of hazardous waste.

For Office use only

1. Code No. :
2. Whether the unit is situated in a critically :
polluted area as identified by Ministry of
Environment & Forests.

To be filled up by Applicant

PART A : GENERAL

3. (a) Name of Owner/ Occupier :
- (b) Name & Address of the unit & local :
activity.
- (c) Authorization required for (please tick mark
appropriate activity/ activities.)
(i) Collection
(ii) Reception
(iii) Treatment
(iv) Transport
(v) Storage
(vi) Disposal
(vii) Clearing of effluent storage tanks.
- (c) In case of renewal of authorization, :
provision authorization number and date
4. (a) Whether the process generating hazardous :
waste as defined in the these Rules.
- (b) If so the type and quantity of waste (in :
Tonnes/KL)

Contd..2



Environmental and Social Management Planning Framework

2

5. (a) Total capacity invested at on the project.(in :
Rupees)
- (b) Year of commencement of productions. :
- (c) Whether the industry works general/ 2 shifts/ :
round the clock.
6. (a) List and quantum of products & bye-products :
(in Tonnes/KL).
- (b) List and quantum of the raw materials used (in :
Tonnes/KL).
7. Furnish a flow diagram of manufacturing process :
showing input & output in terms of products, waste
generated including for captive power generation &
dematerialized water.

Part B: Hazardous Waste

8. (a) Type of hazardous wastes generated as defined :
under these Rules
- (b) Quantum of hazardous waste generated :
- (c) Sources and waste characteristics (also indicate :
wastes amenable to recycling, re-processing and
reuse)
- (d) Mode of storage within the plant, method of :
disposal and capacity (provide details)
9. Hazardous Wastes generated as per these Rules from :
storage of hazardous chemicals as defined under the
Manufacture, Storage and Import of Hazardous
Chemicals Rules, 1989.

Part C: Treatment, Storage and Disposal Facility

10. Detailed Proposal of the facility (to be attached) to :
include
 - (i) Location of site (provide map) :
 - (ii) Name of waste processing technology :
 - (iii) Details of waste processing technology :
 - (iv) Type and Quantity of waste to be processed per :
day.
 - (v) Site clearance (from local authority, if any) :
 - (vi) Utilization programme for waste processed :
(Product Utilization)
 - (vii) Method of disposal (details in brief be given). :
 - (viii) Quantity of waste to be disposed per day. :
 - (ix) Nature and composition of waste :
 - (x) Methodology and operational details of land :
filling/ incineration
 - (xi) Measures to be taken for prevention and control :
of environmental pollution including treatment
of leachate
 - (xii) Investment on Project and expected returns :
 - (xiii) Measures to be taken for safety of workers :
working in the plant.

Place :

Yours faithfully,

Date :

Name & Signature of the Applicant



Appendix 3

E&S Checklist of Existing Substations

S.No.	Name of Substation
1.	Narangi Substation
2.	Kukurmara Substation
3.	Agia Substation
4.	Boko Substation
5.	Gauripur Substation
6.	Depota Substation
7.	Moran Substation
8.	Dibrugarh Substation
9.	Shankardevnagar Substation
10.	Barnagar Substation
11.	Rangia Substation
12.	Panchgram Substation
13.	Kahilipara Substation
14.	Golaghat Substation



Environmental and Social Management Planning Framework

1. Narangi Substation

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132/33 kV NARANGI GRID SUB-STATION.

Geo Coordinates of Boundary: 26.1145°N, 91.7362°E

Current Area of Substation:

Details of Existing Facilities and Associated Lines: Connected with Two Grid - 1. 132 kV Khatipara Grid
2. 220 kV Sonapur Grid.

Details of Proposed Augmentation: 2x50 MVA

Confirmation of Land Within Existing Boundary: 44327 sq.ft.

Information Required

Guidelines Considered

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear	Good/2007/Marsons / 2	
Transformers	Condition/year/make/nos, indicate if PCB oil used	
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	No oil Switchgear
Safe disposal of oil	Storage location within yard	
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Fire Extinguishers.
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	
Oil leakage	Records of leakage of any (availability of pits)	Leakage from Core 4- Taps - L.
Use of SF ₆ and other greenhouse/hazardous gases	Six Nos of SF ₆ Circuit Breaker are present.	
Gas insulated switchgear	Condition/year/make/nos.	
Gas insulated T/I	Condition/year/make/nos	
Presence of SF ₆ in switchgear	Yes/No we have 4 nos. of SF ₆ Circuit Breakers	
SF ₆ retrieval arrangements	Yes/No. Give details if Yes	NO
Presence of other hazardous gases	Condition/year/make/nos	
Containment, Dikes, and Berms (e.g. for transformers)	Type	
Storage facility	Type	
Drainage	No. of leakages in last five years	
Oil leakage	Condition (Then gravel)	Need to improve.
Need for extra gravel	Good	
Workplace air quality	Any measurement undertaken if any	
Monitoring of workplace air quality		
Good ventilation (ensure)		
Maintenance of air quality		
Provision of respiratory equipment	Condition/year/make/nos	No
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit		Helmets, Safety shoes, Tools are present.
Noise control equipment	If any	
Ambient	Day Night	
Noise (dB)	Level within 70/45 dB limit	
Residential	55 45	
Industrial	75 70	
Maintenance of equipment	Condition/year/make/nos	



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Guidelines Considered	Information Required	
Use of protective gear when noise level exceeds 85 dB		
Safe working area (absence of radiation, magnetic fields)		yes
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.)		yes
Electrocution		
Strict procedure for de-energizing before working on electrical equipment	After proper discussion, breaker/breakers are opened then isolator/isolators are opened then the equipment is earthed	
Training of personnel for safety procedures	All the operational & maintenance personnel are trained well & a safety day is observed on 26 th of every month	
Physical factors in the workplace		
signage		
Lighting (including security lights)	lights are okay	
Fire detection mechanism/equipment	Assembly area and its capacity	No fire alarm
Firefighting equipment	Condition/year/make/nos	Refilled after every one year
Cleanness (inside and outside substation)	well maintained	
First Aid Kit	Locations in yard	Inside the control room
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	- Not any.
Fence or enclosure of the site (Restriction of unauthorized people)	The area of the substation was enclosed with concrete boundary wall & fencing	
Adequacy of signage (warning, caution signs)	Locations and pictures	Present-
Welfare Facilities		
Safe and clean drinking water	Locations	An aquaguard in the control room building
Toilets	Location	2 nos. of western toilets in the control room building
Guard kiosk		No Kiosk
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	
Head	Condition/year/make/nos	
Hearing	Condition/year/make/nos	
Hand	Condition/year/make/nos	
Respiratory	Condition/year/make/nos	
Leg and body	Condition/year/make/nos	
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	
Vibration	Visually within limits at the time of visit	
Illumination	Visually within limits at the time of visit	
Reflections	Visually within limits at the time of visit	
Temperature	Visually within limits at the time of visit	
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	
Training and Documentation	Details of training conducted (if any)	
Training (Learning materials, equipment and tools)		
Training on operational hazardous and how to control the hazards (fire, disaster)		



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Guidelines Considered	Information Required	
Training on health risks, hygiene, and exposure prevention		
Training on accidents and accident prevention, protective equipment and clothing		
OHSMS organization policy/Health and safety manual		
Emergency prevention, preparedness and response		
Incidents of work-related injuries, ill health, disease and accidents and their redressal		
Safety inspection, testing and calibration	Done Periodically.	
Storage	Locations in yard by capacity	✓✓✓
Labeling	Location in yard by capacity	
Handling	Location in yard by capacity	
Solid Waste/Scraps	Locations in yard by capacity	✓✓
Handling	Locations in yard by capacity	
Disposal	Locations in yard by capacity	
Space for Expansion	Locations in yard by capacity	
Availability of space for expansion	Locations in yard by capacity	
Existing Grievance mechanism (if any)	Location where GRM is displayed	Co 22

Date of Visit:

Designation and Signature of Official:

07/01/2020
Resident Engineer
13203 KV Harang Grid Sub Station
AECCL, Harang, Guwahati-78



Environmental and Social Management Planning Framework

2. Kukurmara Substation

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 400kV G/S/S Kukurmara ,Mirza**Geo Coordinates of Boundary:**

North:Latitude 26.066748000 Longitude 91.550330000

South: Latitude 26.062908000 Longitude 91.556364000

East: Latitude 26.066138000 Longitude 91.556870000

West: Latitude 26.062859000 Longitude 91.550235000

Current Area of Substation: Approximately 95Bighas**Details of Existing Facilities and Associated Lines:**

400kV :Mirza -Silchar Mirza -Bongaigaon

200kV: Mirza- sarusajai I & II, Mirza-Agia, Mirza-Boko

132kV: Mirza-Azara

33kv:Consortium Feeder, IIIT -G Feeder

400/220kV Transformers:2 x 315 MVA

220/132kV Transformers : 2 x 50MVA

132/33kV Transformers: 2 x 25 MVA

Details of Proposed Augmentation:**Confirmation of Land Within Existing Boundary:**

Land available moreover the existing 25 MVA transformers will be drawn out and new 50MVA will be placed.

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	25MVA tx1 Condition : in service Year of manufacture :2012 Make: ABB No PCB oil used 25MVA tx2 Condition : in service Year of manufacture :1980 Make: CGL No PCB oil used
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	No Oil Switchgear available
Safe disposal of oil	Storage location within yard	No Oil is disposed at our site
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Sand buckets available only
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	No labelling is done at site however the quantities of drums are been recorded in Price Stores Ledger



Environmental and Social Management Planning Framework

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Guidelines Considered			Information Required	
Oil leakage			Records of leakage of any (availability of pits)	No leakage observed
Use of SF ₆ and other greenhouse/hazardous gases				
Gas insulated switchgear			Condition/year/make/nos.	Not Available
Gas insulated t/f			Condition/year/make/nos	Not Available
Presence of SF ₆ in switchgear			Yes/No	Yes
SF ₆ retrieval arrangements				Not Available
Presence of other hazardous gases			Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)			Condition/year/make/nos	Yes
Storage facility			Type	Not available , however transformers can be Unloaded in the yard
Drainage			Type	Not applicable
Oil leakage			No. of leakages in last five years	Minor leakage (seepage) observed and has been rectified accordingly
Need for extra gravel			Condition	No extra gravel is required
Workplace air quality				Normal
Monitoring of workplace air quality			Any measurement undertaken if any	No monitoring device available at site
Good ventilation (ensure)				Yes
Maintenance of air quality				No
Providence of respiratory equipment			Condition/year/make/nos	Not available
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				Not available
Noise control equipment			If any	Not available
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	Not available
	Residential	55		Not available
	Industrial	75		Not available
Maintenance of equipment			Condition/year/make/nos	Not available
Use of protective gear when noise level exceeds 85 dB				Not available
Safe working area (absence of radiation, magnetic fields)				Not applicable, an EHV switchyard is by default an area with magnetic fields
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				Equipment for monitoring radiation not available however earthing, protective shield available
Electrocution				
Strict procedure for de-energizing before working on electrical equipment				Yes
Training of personnel for safety procedures				Yes
Physical factors in the workplace signage				



Environmental and Social Management Planning Framework

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Guidelines Considered	Information Required	
Lighting (including security lights)		Yes
Fire detection mechanism/equipment	Assembly area and its capacity	Available in control kiosks
Firefighting equipment	Condition/year/make/nos	All equipments are expired
Cleanliness (inside and outside substation)		Done periodically
First Aid Kit	Locations in yard	Yes
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	No
Fence or enclosure of the site (Restriction of unauthorized people)		Yes
Adequacy of signage (warning, caution signs)	Locations and pictures	Yes
Welfare Facilities		
Safe and clean drinking water	Locations	Yes
Toilets	Location	yes
Guard kiosk		Yes
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	Not available
Head	Condition/year/make/nos	Not available
Hearing	Condition/year/make/nos	Not available
Hand	Condition/year/make/nos	Not available
Respiratory	Condition/year/make/nos	Not available
Leg and body	Condition/year/make/nos	Not available
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Equipment for measurement not available
Vibration	Visually within limits at the time of visit	Equipment for measurement not available
Illumination	Visually within limits at the time of visit	Equipment for measurement not available
Reflections	Visually within limits at the time of visit	Equipment for measurement not available
Temperature	Visually within limits at the time of visit	Equipment for measurement not available
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Equipment for measurement not available
Training and Documentation	Details of training conducted (if any)	
Training (Learning materials, equipment and tools)		Not available
Training on operational hazardous and how to control the hazards (fire, disaster)		Not available
Training on health risks, hygiene, and exposure prevention		Not available
Training on accidents and accident prevention, protective equipment and clothing		Not available
OHSMS organization policy/Health and safety manual		Not available
Emergency prevention, preparedness and response		Not available
Incidents of work-related injuries, ill		No



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Guidelines Considered	Information Required	
health, disease and accidents and their redressal		
Safety inspection, testing and calibration		No
Storage	Locations in yard by capacity	one location available as a roofed shed
Labelling	Location in yard by capacity	No
Handling	Location in yard by capacity	No
Solid Waste/Scraps		
Handling	Locations in yard by capacity	No
Disposal	Locations in yard by capacity	No
Space for Expansion		Not applicable
Availability of space for expansion	Locations in yard by capacity	Not applicable
Existing Grievance mechanism (if any)	Location where GRM is displayed	Not applicable

Date of Visit:

Designation and Signature of Official:


 20/12/2019
 Assistant General Manager
 400 KV Grid Sub-Station
 Kukurmara (Mirza), AEGCL



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework

3. Agai Substation

Name of Substation: 220KV Agia GSS

Geo Coordinates of Boundary: 26.096902, 90.568660 -26.095911, 90.568679-26.095808, 90.567279-26.093336, 90.565569-26.094102, 90.563074-26.097749, 90.565663

Current Area of Substation: Agia, Goalpara-783120

Details of Existing Facilities and Associated Lines: 220/133KV voltage level-(1x100, 1x50)MVA Transformers, 133/33KV voltage level-(1x40, 1x16)MVA Transformers, 4nos 220KV Feeders, 2nos-132KV Feeders, 5nos-33KV Feeders, 1no of 132KV feeder is under construction.

Details of Proposed Augmentation: 50MVA, 220/132KV transformer to be replaced by 160MVA, 220/132KV Transformer.

Confirmation of Land Within Existing Boundary: Owned by AEGCL (100 bighas)

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	(1)Good/2012/Bharat Bijlee/5299/01- (2)Good/2006/CG L/T-8265/4 (3)Good/2010/Kanohar Electricals/KT-40000/54 (4)Good/1982/General Electric Com. Ind. Ltd/B-22868
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	NA
Safe disposal of oil	Storage location within yard	Yes
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Yes
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	Open Storage Area available
Oil leakage	Records of leakage of any (availability of pits)	Pits are available at transformer pads
Use of SF ₆ and other greenhouse/hazardous gases		
Gas insulated switchgear	Condition/year/make/nos.	Good/1984,2005,11,12,13,16,17/Siemens-CGL-Areva-ABB/19nos
Gas insulated t/f	Condition/year/make/nos	No
Presence of SF ₆ in switchgear	Yes/No	Yes
SF ₆ retrieval arrangements		Available
Presence of other hazardous gases	Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	-
Storage facility	Type	Small shed available inside switchyard area
Drainage	Type	Open type



Environmental and Social Management Planning Framework

Guidelines Considered			Information Required	
Oil leakage			No. of leakages in last five years	Oil leakage from transformer reported in 2018-19/ rectified
Need for extra gravel			Condition	Extra gravelling work is under progress
Workplace air quality				Normal
Monitoring of workplace air quality			Any measurement undertaken if any	No
Good ventilation (ensure)				Yes
Maintenance of air quality				No
Providence of respiratory equipment			Condition/year/make/nos	NA
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit			.	Gloves, gum boots etc are available
Noise control equipment			If any	No
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	-
Residential	55	45		-
Industrial	75	70		-
Maintenance of equipment			Condition/year/make/nos	-
Use of protective gear when noise level exceeds 85 dB				NA
Safe working area (absence of radiation, magnetic fields)				Yes
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				No
Electrocution				-
Strict procedure for de-energizing before working on electrical equipment				Yes
Training of personnel for safety procedures				Yes
Physical factors in the workplace signage				Yes
Lighting (including security lights)				Yes
Fire detection mechanism/equipment			Assembly area and its capacity	No fire detection system/NIFPS, sand buckets, fire extinguishers available
Firefighting equipment			Condition/year/make/nos	
Cleanness (inside and outside substation)				Moderate
First Aid Kit			Locations in yard	Control Room
Features that pose safety risks (missing or broken slabs, dogged			Locations in yard	Yes, 220KV side have certain



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
holes, etc.)		broken slabs
Fence or enclosure of the site (Restriction of unauthorized people)		Yes
Adequacy of signage (warning, caution signs)	Locations and pictures	Gate of switchyard area and at the necessary points of switchyard
Welfare Facilities		
Safe and clean drinking water	Locations	Available
Toilets	Location	Available
Guard kiosk		Available
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	Face shield available
Head	Condition/year/make/nos	Helmets available
Hearing	Condition/year/make/nos	No
Hand	Condition/year/make/nos	Gloves available
Respiratory	Condition/year/make/nos	No
Leg and body	Condition/year/make/nos	Gum boots available
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Yes
Vibration	Visually within limits at the time of visit	Yes
Illumination	Visually within limits at the time of visit	Yes
Reflections	Visually within limits at the time of visit	Yes
Temperature	Visually within limits at the time of visit	Yes
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Yes
Training and Documentation	Details of training conducted (if any)	Safety of personnel & switchgears being trained regularly
Training (Learning materials, equipment and tools)		Do
Training on operational hazardous and how to control the hazards (fire, disaster)		Do
Training on health risks, hygiene, and exposure prevention		Do
Training on accidents and accident prevention, protective equipment and clothing		Do
OHSMS organization policy/Health and safety manual		Not available
Emergency prevention, preparedness and response		-
Incidents of work-related injuries, ill health, disease and accidents and their redressal		No records available at the time of visit
Safety inspection, testing and calibration		Routine testing is done periodically/



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
		Calibration is done as per the calibrated date
Storage	Locations in yard by capacity	Open storage area, small shed
Labelling	Location in yard by capacity	Done
Handling	Location in yard by capacity	Handled but need improvement
Solid Waste/Scraps		
Handling	Locations in yard by capacity	Dustbins available
Disposal	Locations in yard by capacity	Thrown outside station at proper garbage storage
Space for Expansion		Yes
Availability of space for expansion	Locations in yard by capacity	-
Existing Grievance mechanism (if any)	Location where GRM is displayed	-



Transformer Oil Drums at open store area



Store Shed beside Control Room



Environmental and Social Management Planning Framework



Safety Sign Boards



Environmental and Social Management Planning Framework



Fire protection Systems/Equipments



Environmental and Social Management Planning Framework



Switchyard Area Entrance



Control Room



Switchyard

Date of Visit: 19.12.2019

Designation and Signature of Official:

Asstt. General Manager
Grid/para Trans. Division
AEGCL: Agla



4. Boko Substation

Name of Substation: 220/132KV Boko Grid Sub-station



Geo Coordinates of Boundary: N-26° 00' 59.73// E- 91° 10' 58.70//

Current Area of Substation: Bhalukghata, Boko-781123

Details of Existing Facilities and Associated Lines: 1X100MVA, 1X50MVA, 2X40MVA / 220KV Boko-Mirza and 220KV Boko-Agia Transmission lines, 6 nos. of 33KV Line feeders.



Details of Proposed Augmentation: New 1X100MVA+1X160 MVA 220/132 kV in place of old 1x50 MVA transformers under newly proposed augmentation of transformer capacity under AIIB scheme.

Confirmation of Land within Existing Boundary: 14.018 acre (35 bighas)

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	1X100MVA-Healthy/2013/Crompton



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
		Greaves/1/ No PCB oil used 1X50MVA- Healthy/2007/Crompton Greaves/1/No PCB oil used 1X40MVA- Healthy/2010/Kanohar/1/ No PCB oil used 1X40MVA- Healthy/2017/Aditya Vidyut/1/No PCB oil used
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	No
Safe disposal of oil	Storage location within yard	Yes
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Equipped with NIFPS/fire extinguishers, sand buckets available in Control room, Admin block and yard.
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	No proper storage facility available in the station. Oil is being stored in open in the yard. Few oil filled drums are stored in a small available store.
Oil leakage	Records of leakage of any (availability of pits)	Minor leakage reported in 2018. Lined pits available for the emergency oil leakage situations.
Use of SF ₆ and other greenhouse/hazardous gases		
Gas insulated switchgear	Condition/year/make/nos.	Good/2007-08 -09-13-15-17/ABB-CGL/30 numbers
Gas insulated t/f	Condition/year/make/nos	N/A
Presence of SF ₆ in switchgear	Yes/No	Yes
SF ₆ retrieval arrangements		Available
Presence of other hazardous gases	Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	Good/2015/3 nos.
Storage facility	Type	Small shed available inside the switchyard premise
Drainage	Type	Open drainage
Oil leakage	No. of leakages in last five years	Partial Leakage reported in 2018 in a transformer/rectified
Need for extra gravel	Condition	Good/No need for extra gravel
Workplace air quality		
Monitoring of workplace air quality	Any measurement undertaken if any	No
Good ventilation (ensure)		Yes
Maintenance of air quality		Sufficient exhaust fans available.
Providence of respiratory equipment	Condition/year/make/nos	-
Enforcement of the application of personal protective equipment	.	Belts, ropes, gloves, helmets etc. are available for



Environmental and Social Management Planning Framework

Guidelines Considered			Information Required	
whenever exposure levels of fumes, solvents and other materials exceed threshold limit				workers
Noise control equipment			If any	No
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	No
Residential	55	45		
Industrial	75	70		
Maintenance of equipment			Condition/year/make/nos	-
Use of protective gear when noise level exceeds 85 dB				-
Safe working area (absence of radiation, magnetic fields)				-
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				No such measurements being done
Electrocution				
Strict procedure for de-energizing before working on electrical equipment				Strict procedure for de-energizing followed
Training of personnel for safety procedures				Periodic safety training conducted
Physical factors in the workplace signage				Available
Lighting (including security lights)				Available/ Fully functional
Fire detection mechanism/equipment			Assembly area and its capacity	No fire detection mechanism available /Equipment available: NIFPS, Fire extinguishers, sand buckets
Fire fighting equipment			Condition/year/make/nos	NIFPS/fire extinguishers/sand buckets
Cleanness (inside and outside substation)				Maintained but need need strengthening
First Aid Kit			Locations in yard	Available at the time of visit
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)			Locations in yard	Not available
Fence or enclosure of the site (Restriction of unauthorized people)				Compound Wall mounted & chain link fencing
Adequacy of signage (warning, caution signs)			Locations and pictures	Installed/ Near Main gate, Control room & switchyard entrance
Welfare Facilities				
Safe and clean drinking water			Locations	Available



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
Toilets	Location	Available
Guard kiosk		Available
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	No
Head	Condition/year/make/nos	Safety helmets available
Hearing	Condition/year/make/nos	No
Hand	Condition/year/make/nos	Safety protective gloves available
Respiratory	Condition/year/make/nos	No
Leg and body	Condition/year/make/nos	No
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Yes
Vibration	Visually within limits at the time of visit	Yes
Illumination	Visually within limits at the time of visit	Yes
Reflections	Visually within limits at the time of visit	Yes
Temperature	Visually within limits at the time of visit	Yes
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Presence of SF ₆ gas & Transformer oil
Training and Documentation	Details of training conducted (if any)	Safety of personnel & switchgears being trained regularly
Training (Learning materials, equipment and tools)		-do-
Training on operational hazardous and how to control the hazards (fire, disaster)		-do-
Training on health risks, hygiene, and exposure prevention		-do-
Training on accidents and accident prevention, protective equipment and clothing		-do-
OHSMS organization policy/Health and safety manual		Not available
Emergency prevention, preparedness and response		-
Incidents of work-related injuries, ill health, disease and accidents and their redressal		No record available at the station at the time of visit
Safety inspection, testing and calibration		Routine testing is done periodically/ Calibration is done as per the calibrated date
Storage	Locations in yard by capacity	Small store available
Labelling	Location in yard by capacity	Done
Handling	Location in yard by capacity	Handled but need improvement
Solid Waste/Scraps		-
Handling	Locations in yard by capacity	Dustbins available
Disposal	Locations in yard by capacity	Thrown outside station at proper garbage storage
Space for Expansion		-



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
Availability of space for expansion	Locations in yard by capacity	Available
Existing Grievance mechanism (if any)	Location where GRM is displayed	

Photo Gallery:



Main Entrance Gate



Sub-station Entrance Gate



Environmental and Social Management Planning Framework



Control-room



Safety Sign boards



Storage yard



Switchyard

Environmental and Social Management Planning Framework



Signboards

Date of Visit: 19.12.2019

Designation and Signature of Official:

Asstt. General Manager
Gr. Oper. Trans. Division
AEGCL : Agla



Environmental and Social Management Planning Framework

5. Gauripur Substaion

EHS Checklist for Existing AEGCI Facilities

Name of Substation: 232 KV Gauripur Grid Sub-Station.

Geo Coordinates of Boundary: 26.0916°N, 89.9055° E.

Current Area of Substation: 53 B 3K 11 L.

Details of Existing Facilities and Associated Lines:

Details of Proposed Augmentation:

Confirmation of Land Within Existing Boundary: Yes.

Information Required	Information Required	
Guidelines Considered	Information Required	
Type of oil in transformers and switchgear	Condition/year/make/nos, indicate if PCB oil used	Good/2014/technical associates limited/2 nos.
Transformers	Condition/year/make/nos, indicate if PCB oil used	No
Oil Switchgear	Storage location within yard	Yes
Safe disposal of oil	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Fire extinguisher available at control room
Prevention of fires	Storage of oil drums (quantity and number of drums)	7 drums
Oil Labelling for storage at site	Records of leakage of any (availability of pits)	No
Oil leakage	Use of SF ₆ and other greenhouse/hazardous gases	In circuit breaker
Use of SF ₆ and other greenhouse/hazardous gases	Condition/year/make/nos.	Good/2016/ABB/11 nos.
Gas insulated switchgear	Condition/year/make/nos	Nil
Gas insulated L/F	Presence of SF ₆ in switchgear	Yes
Presence of SF ₆ in switchgear	SF ₆ retrieval arrangements	Available
SF ₆ retrieval arrangements	Presence of other hazardous gases	No
Presence of other hazardous gases	Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos
Containment, Dikes, and Berms (e.g. for transformers)	Storage facility	Type
Storage facility	Drainage	Type
Drainage	Oil leakage	No. of leakages in last five years
Oil leakage	Need for extra gravel	Condition
Need for extra gravel	Workplace air quality	Any measurement undertaken if any
Workplace air quality	Monitoring of workplace air quality	Good
Monitoring of workplace air quality	Good ventilation (ensure)	No
Good ventilation (ensure)	Maintenance of air quality	Being measure
Maintenance of air quality	Provision of respiratory equipment	Sufficient exhaust fans available in control room, battery room
Provision of respiratory equipment	Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit	Belts, ropes, gloves, helmets for workers available



Environmental and Social Management Planning Framework

Noise control equipment	If any		Not available
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit
Residential	55	45	
Industrial	75	70	
Maintenance of equipment	Condition/year/make/mos		Yes
Use of protective gear when noise level exceeds 85 dB			
Safe working area (absence of radiation, magnetic fields)			Yes
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.)			No such measurements being done
Electrocution			1 no of employee was died due to electrocution on 02.04.19
Strict procedure for de-energizing before working on electrical equipment			Strict procedure for de-energizing followed.
Training of personnel for safety procedures			Required
Physical factors in the workplace signage			Available
Lighting (including security lights)			Needs to be improved
Fire detection mechanism/equipment	Assembly area and its capacity		No fire detection system available. Fire fighting equipment available: CO ₂ Injection Fire Protection System for transformers, Sand buckets & Fire extinguishers
Fire-fighting equipment	Condition/year/make/mos		Available
Cleanliness (inside and outside substation)			Good
First Aid Kit	Locations in yard		Available at control room
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard		At many places around the yard
Fence or enclosure of the site (Restriction of unauthorized people)			Compound boundary wall and fencing available around the switchyard.
Adequacy of signage (warning,	Locations and pictures		Work in progress



Environmental and Social Management Planning Framework

caution signs)		
Welfare Facilities		
Safe and clean drinking water	Locations	Available in Control room & guest house
Toilets	Location	Available in Control room & Office
Guard kiosk		Available
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	No
Head	Condition/year/make/nos	Helmet available
Hearing	Condition/year/make/nos	No
Hand	Condition/year/make/nos	Hand gloves available
Respiratory	Condition/year/make/nos	No
Leg and body	Condition/year/make/nos	No
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Apparently within limits at the time of visit
Vibration	Visually within limits at the time of visit	Apparently within limits at the time of visit
illumination	Visually within limits at the time of visit	Needs to be improved
Reflections	Visually within limits at the time of visit	Nil
Temperature	Visually within limits at the time of visit	Apparently within limits at the time of visit
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Presence of SF ₆ Gas and Transformer oil in Switchgears and transformers. Extra transformer oil stored in yard and little store room. No extra SF ₆ Gas stored at the time of visit.
Training and Documentation	Details of training conducted (if any)	
Training (Learning materials, equipment and tools)		Required
Training on operational hazards and how to control the hazards (fire, disaster)		Required
Training on health risks, hygiene, and exposure prevention		Required
Training on accidents and incident prevention, protective equipment and clothing		Required



Environmental and Social Management Planning Framework

OH/SMS organization policy/health and safety manual		Required
Emergency prevention, preparedness and response		Good
Incidents of work related injuries, ill health, disease and accidents and their redressal		Required
Safety inspection, testing and calibration		Special maintenance being carried out by another wing (T&C)
Storage	Locations in yard by capacity	Oil being stored in the yard
Labeling	Location in yard by capacity	Needs to be improved
Handling	Location in yard by capacity	Being handled in yard.
Solid Waste/Scraps Handling	Locations in yard by capacity	Dustbins only available in office, control room & along the road side.
Disposal	Locations in yard by capacity	Thrown outside station compound
Space for Expansion		
Availability of space for expansion	Locations in yard by capacity	Available on the back side of switchyard
Existing Grievance mechanism (if any)	Location where GRM is displayed	No

Date of Visit: 23/12/19

Designation and Signature of Official:




Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework

6. Depota Substation

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132kV Depota GSS .

Geo Coordinates of Boundary: 1. N 26°40'12.64", E 092°45'00.64"

2. N 26°40'08.39", E 092°45'03.16"

3. N 26°40'07.61", E 092°44'58.25"

4. N 26°40'11.79", E 092°44'58.94"

Current Area of Substation: 6680.625 sqm.

Details of Existing Facilities and Associated Lines: 2*31.5MVA, 132/33kV transformer, 12 nos. Of 33kV feeders, 4 nos. Of 132kV feeders, including all associated equipments.

Details of Proposed Augmentation: 2*50MVA, 132/33kV transformers.

Confirmation of Land Within Existing Boundary: Confirmed.

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	Good/1994/ EMCO Transformers Ltd./Trafo-1. (Picture 1) Good/ 2005/ Marson's Limited/Trafo-2. (Picture 2) PCB oil not used
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	-----
Safe disposal of oil	Storage location within yard	Not available
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Fire extinguishers/sand buckets present at Substation (Picture 3)
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	15 nos. Of drum present , stored in open(Picture 4)
Oil leakage	Records of leakage of any (availability of pits)	Trafo-1: Leakage observed in 2016 and 2018. At present some amount of leakage is observed. (Picture 5) Trafo-2: Leakage observed in 2015. Pits not available.
Use of SF ₆ and other greenhouse/hazardous gases		SF ₆ gas used.
Gas insulated switchgear	Condition/year/make/nos.	SF ₆ gas breaker total 22 nos. Good condition/CGL make/ 9 nos. Good condition/ABB make/ 9 nos. Good condition/SIEMENS make/ 4 nos. (Picture 6)



Environmental and Social Management Planning Framework

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Guidelines Considered			Information Required	
Gas insulated t/f			Condition/year/make/nos	Not available
Presence of SF ₆ in switchgear			Yes/No	Yes
SF ₆ retrieval arrangements				Not available
Presence of other hazardous gases			Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)			Condition/year/make/nos	Not available
Storage facility			Type	Store room in dilapidated condition(Picture 7)
Drainage			Type	Not available
Oil leakage			No. of leakages in last five years	Trafo-1: 3 times Trafo-2: 1 time
Need for extra gravel			Condition	Not required at present
Workplace air quality				Normal
Monitoring of workplace air quality			Any measurement undertaken if any	No
Good ventilation (ensure)				Yes
Maintenance of air quality				Normal air quality
Providence of respiratory equipment			Condition/year/make/nos	Not available
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				Yes
Noise control equipment			If any	Not available
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	
Residential	55	45		
Industrial	75	70		
Maintenance of equipment			Condition/year/make/nos	Not available
Use of protective gear when noise level exceeds 85 dB				Not available
Safe working area (absence of radiation, magnetic fields)				-----
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				Earthing present. No such measurement is being done.
Electrocution				No recent report
Strict procedure for de-energizing before working on electrical equipment				Yes
Training of personnel for safety procedures				No
Physical factors in the workplace signage				Yes
Lighting (including security lights)				Yes (Picture 8)
Fire detection mechanism/equipment			Assembly area and its capacity	Not available
Firefighting equipment			Condition/year/make/nos	Present. 1.Sand buckets present . 2. 95% AFFF 150ltr capacity fire fighting device: Good



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*OFFICIAL USE C

Guidelines Considered	Information Required	
		condition/2016/ 2 nos. 3. CO2 4.5 kg fire extinguisher : Good condition/2016/ 5 nos. (Picture 3 & 9)
Cleanliness (inside and outside substation)		Yes
First Aid Kit	Locations in yard	Present
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	Present near transformer bay and 33kV bay (Picture 10)
Fence or enclosure of the site (Restriction of unauthorized people)		Present. (Picture 11)
Adequacy of signage (warning, caution signs)	Locations and pictures	Present. (Picture 12, 13,14 & 15)
Welfare Facilities		Not available
Safe and clean drinking water	Locations	Aquaguard present in Control room (Picture 16)
Toilets	Location	Present near Control room (Picture 17)
Guard kiosk		Present (Picture 18)
Personal Protective Equipment		Available but not adequate (Picture 19)
Eye and face	Condition/year/make/nos	Not available
Head	Condition/year/make/nos	Helmet in good condition. Details not available
Hearing	Condition/year/make/nos	Not available
Hand	Condition/year/make/nos	Gloves in good condition. Details not available
Respiratory	Condition/year/make/nos	Not available
Leg and body	Condition/year/make/nos	Boots in good condition. Details not available
Ambient factors in the workplace		Yes
Noise	Visually within limits at the time of visit	Yes
Vibration	Visually within limits at the time of visit	Yes
Illumination	Visually within limits at the time of visit	Yes (Picture 17)
Reflections	Visually within limits at the time of visit	Yes
Temperature	Visually within limits at the time of visit	Yes
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Yes
Training and Documentation	Details of training conducted (if any)	No
Training (Learning materials, equipment and tools)		Not available
Training on operational hazardous and how to control the hazards (fire, disaster)		No
Training on health risks, hygiene, and exposure prevention		No
Training on accidents and accident prevention, protective equipment and clothing		No
OHSMS organization policy/Health and		No



Environmental and Social Management Planning Framework

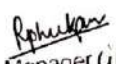
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Guidelines Considered	Information Required	
safety manual		
Emergency prevention, preparedness and response		Yes
Incidents of work-related injuries, ill health, disease and accidents and their redressal		No recent report
Safety inspection, testing and calibration		Yes
Storage	Locations in yard by capacity	Store room in dilapidated condition(Picture 7)
Labelling	Location in yard by capacity	Not available
Handling	Location in yard by capacity	Approx 50m*50m area available.
Solid Waste/Scraps		Kept at different Locations in the substation(Picture 20)
Handling	Locations in yard by capacity	Approx 50m*50m area available
Disposal	Locations in yard by capacity	No proper area available for disposal
Space for Expansion		Not available
Availability of space for expansion	Locations in yard by capacity	Not available
Existing Grievance mechanism (if any)	Location where GRM is displayed	Not available

Date of Visit: 21.12.19

Designation and Signature of Official:


Assistant Manager
 Type-I HV Grid Sub-Station
 AEGCL, Depota


 Manager (I) of
 Maintenance Sub-Division
 AEGCL, Depota


Asstt. General Manager
 Type - I Grid - Sub - Station
 AEGCL, Depota



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework

7. Moran Substation

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132KV AEGCL Moran

Geo Coordinates of Boundary:

Boundary point 1: Latitude 27.084095, Longitude 94.533468;

Boundary point 2: Latitude 27.084095; Longitude 94.533654;

Boundary point 3: Latitude 27.083766; Longitude 94.533468;

Boundary point 4: Latitude 27.083766; Longitude 94.53336.

Current Area of Substation : 1 acre

Details of Existing Facilities and Associated Lines:

Total Capacity : 2x16MVA Transformers

132KV Moran- Lakasa; 132KV Moran- Behiating.



Details of Proposed Augmentation: 2x50 MVA Transformer in place of old 2x16MVA Transformer

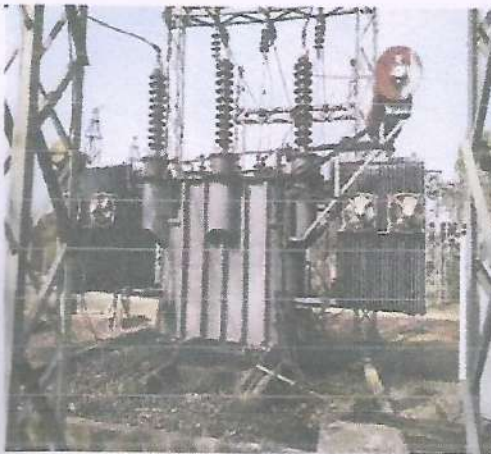
Confirmation of Land Within Existing Boundary: Applied for land Zamabandi.

Information Required	Information Required	
Guidelines Considered	Guidelines Considered	
Type of oil in transformers and switchgear	Condition/year/make/nos, indicate if PCB oil used	Transformer 1 Condition : high and OTI indicate to its ageing. Year:1982 Make: GEC
Transformers		Transformer 2 Condition :OK. Year:2007 Make: CGL



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16MVA, GEC make, Transformer 1



16MVA, CGL make, Transformer 2



Switchyard view

Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	Good
Safe disposal of oil	Storage location within yard	Sump pit available
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Fire extinguisher and sand bucket



Environmental and Social Management Planning Framework

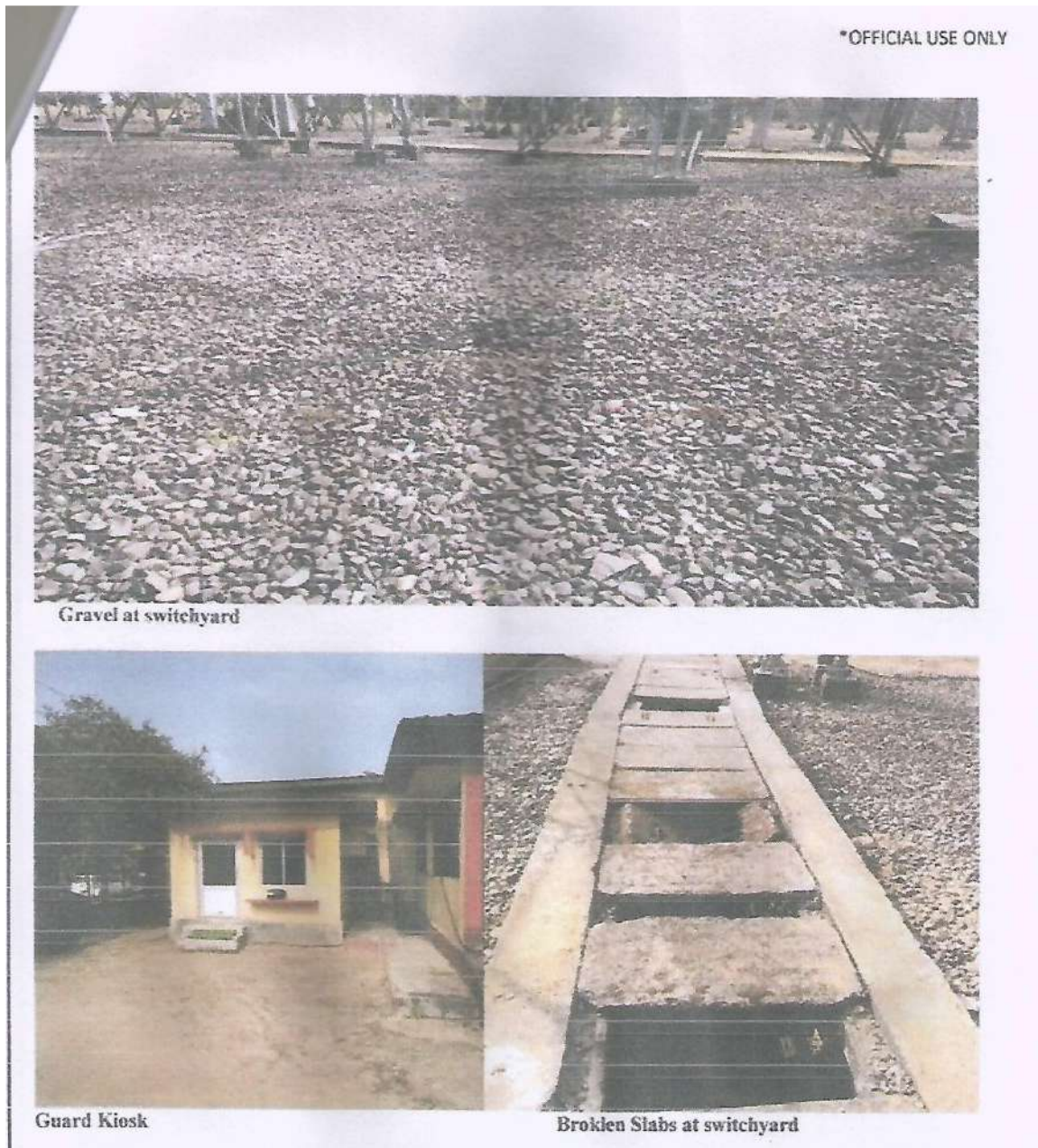
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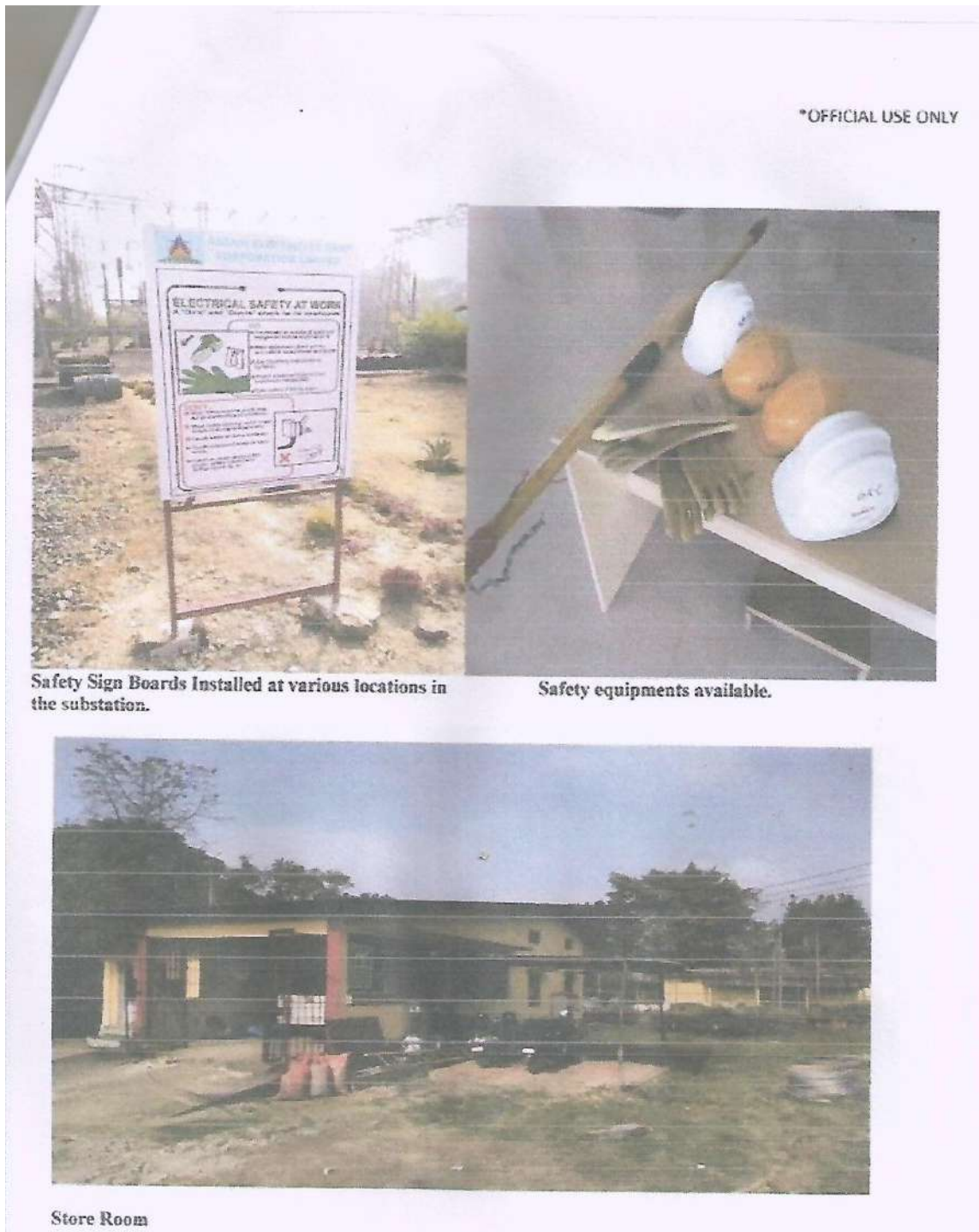

Filter at Control Room. **Control room Toilet.**

Fence or enclosure of the site (Restriction of unauthorized people)		Proper boundary wall and fence installed all sides
Adequacy of signage (warning, caution signs)	Locations and pictures	YES
Welfare Facilities		N/A
Safe and clean drinking water	Locations	Filter provided
Toilets	Location	In control room And Hostels
Guard Kiosk		YES
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	Good
Head	Condition/year/make/nos	Good
Heating	Condition/year/make/nos	N/A
Hand	Condition/year/make/nos	Good
Respiratory	Condition/year/make/nos	N/A
Leg and body	Condition/year/make/nos	Good
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	YES
Vibration	Visually within limits at the time of visit	NO
Illumination	Visually within limits at the time of visit	YES
Reflections	Visually within limits at the time of visit	YES
Temperature	Visually within limits at the time of visit	YES
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	YES
Training and Documentation	Details of training conducted (if any)	N/A
Training (Learning materials, equipment and tools)		N/A
Training on operational hazardous and how to control the hazards (fire, disaster)		N/A

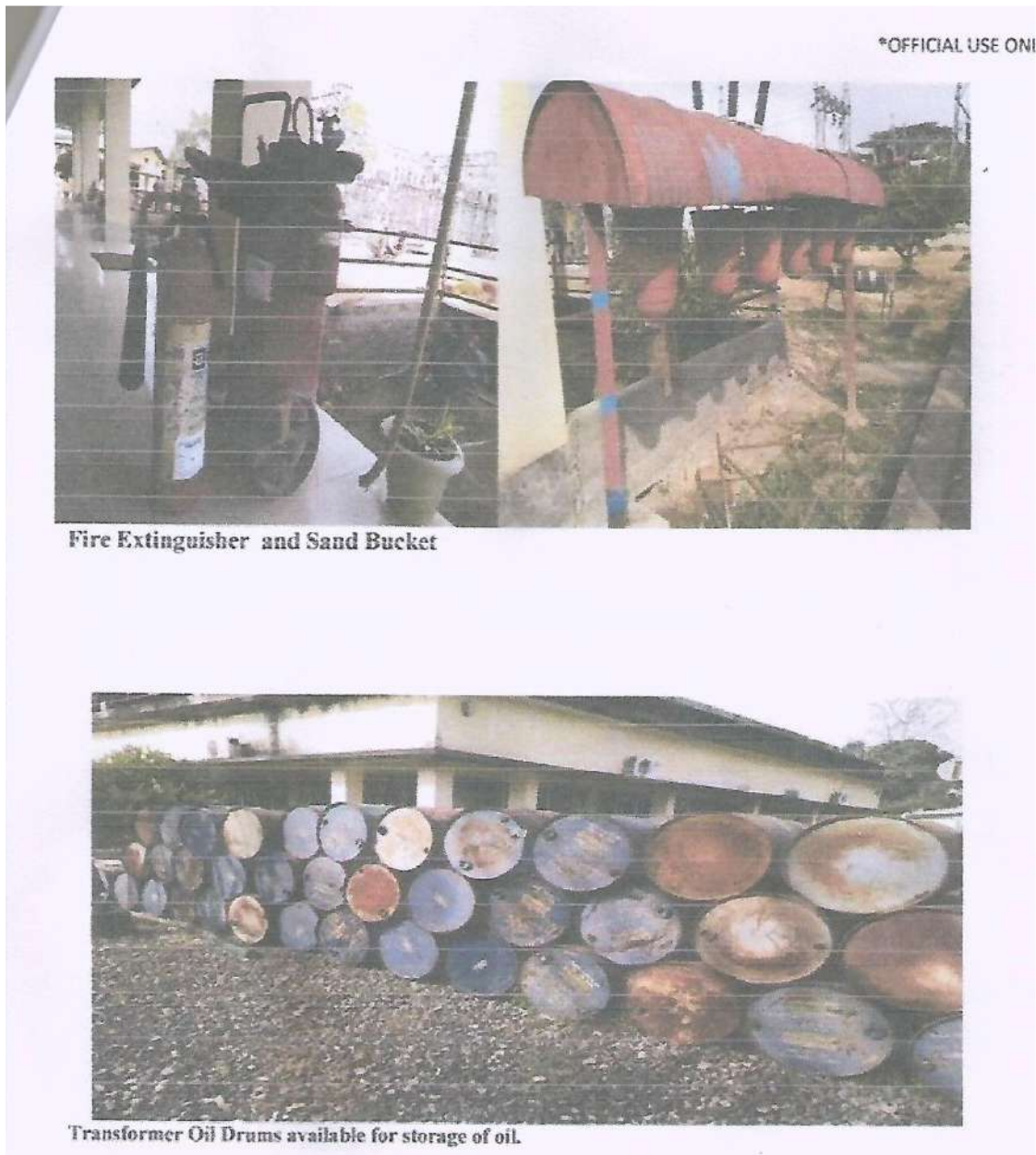
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Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	Transformer Oil drums available
Oil leakage	Records of leakage of any (availability of pits)	No oil leakage
Use of SF ₆ and other greenhouse/hazardous gases		SF ₆ gas used for re-filling of the sf6 CB from time to time.
Gas insulated switchgear	Condition/year/make/nos.	N/A
Gas insulated t/f	Condition/year/make/nos	N/A
Presence of SF ₆ in switchgear	Yes/No	YES
SF ₆ retrieval arrangements		NO
Presence of other hazardous gases	Yes/No. Give details if Yes	NO
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	No
Storage facility	Type	
Drainage	Type	Not available
Oil leakage	No. of leakages in last five years	No oil leakage
Need for extra gravel	Condition	Sufficient
Workplace air quality		Good
Monitoring of workplace air quality	Any measurement undertaken if any	NO
Good ventilation (ensure)		YES
Maintenance of air quality		Ok
Providence of respiratory equipment	Condition/year/make/nos	Not available
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit		
Noise control equipment	If any	NO
Ambient Noise (dB)	Day Night	Level within 70/45 dB limit
Residential	55 45	
Industrial	75 70	
Maintenance of equipment	Condition/year/make/nos	
Use of protective gear when noise level exceeds 85 dB		NA
Safe working area (absence of radiation, magnetic fields)		
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.		
Electrocution		
Strict procedure for de-energizing before working on electrical equipment		YES
Training of personnel for safety procedures		YES
Physical factors in the workplace signage		
Lighting (including security lights)		Good
Fire detection mechanism/equipment	Assembly area and its capacity	
Firefighting equipment	Condition/year/make/nos	Fire Extinguisher
Cleanliness (inside and outside substation)		Good
First Aid Kit	Locations in yard	In Control Room
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	




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Training on health risks, hygiene, and exposure prevention		N/A
Training on accidents and accident prevention, protective equipment and clothing		N/A
OHSMS organization policy/Health and safety manual		Available
Emergency prevention, preparedness and response		Available
Incidents of work-related injuries, ill health, disease and accidents and their redressal		Nil
Safety inspection, testing and calibration		Conducted
Storage		
Labelling	Locations in yard by capacity	
Handling	Location in yard by capacity	
Solid Waste/Scraps	Location in yard by capacity	
Handling		
Disposal	Locations in yard by capacity	
Space for Expansion	Locations in yard by capacity	Nil
Availability of space for expansion	Locations in yard by capacity	Nil
Existing Grievance mechanism (if any)	Location where GRM is displayed	Nil

Date of Visit: 10/12/2019 .

Designation and Signature of Official:


 Resident Engineer
 32/33 KV Grid Sub-station
 A.E.G.C.L., Moran


 Asst. General Manager
 132 KV GRID SUB-STATION
 AEGCL, DBR



8. Dibrugarh Substation

*OFFICIAL USE ONLY

BHS Checklist for Existing AEGCL Facilities

Name of Substation: 132 KV Grid Substation, Dibrugarh

Geo Coordinates of Boundary: Boundary point 1- LATITUDE – N 272829.25 LONGITUDE- E945612.15
 Boundary point 2- LATITUDE – N 272831.90 LONGITUDE- E945614.46
 Boundary point 3- LATITUDE – N 272827.65 LONGITUDE - E945612.73
 Boundary point 4- LATITUDE – N 272827.68 LONGITUDE - E945610.28

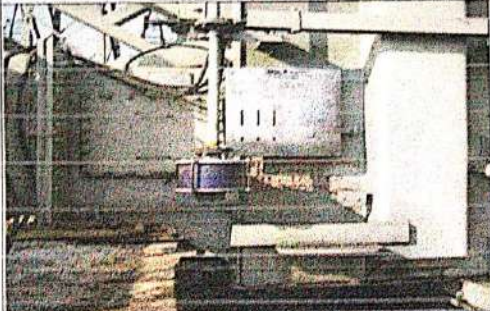
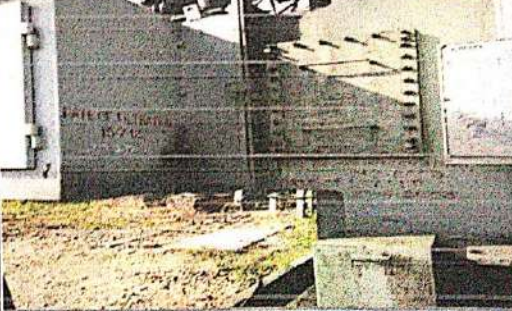
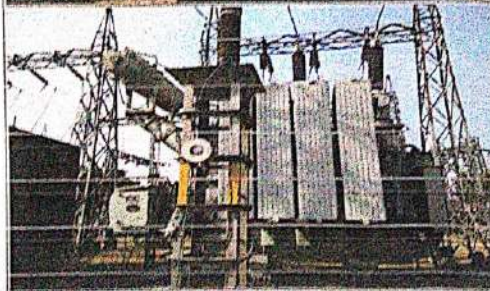
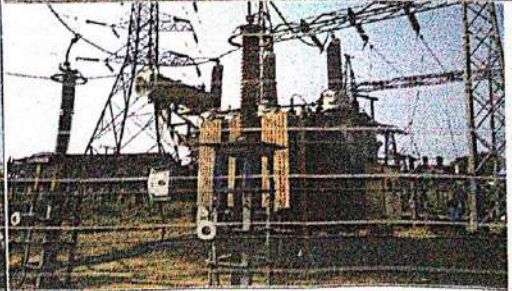
Current Area of Substation: 15006.14 m²

Details of Existing Facilities and Associated Lines: 2 x 31.5 MVA Transformer; 132 KV Tinsukia- Dibrugarh and
 132 KV Dibrugarh - Bihaiting line

Details of Proposed Augmentation: 2 x 50 MVA Transformer in place of old 2 x 31.5 MVA Transformers





Confirmation of Land Within Existing Boundary: Applied for mutation (Namjari).

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and Switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	31.5 MVA Tr. no-1 : In running condition; DOC-11-4-2008; Crompton Greaves 31.5 MVA Tr. no-2 : In running condition; DOC-31-3-2003; EMCO
		
Transformer no-1	Condition/year/make/nos, indicate if PCB oil used	Good
Oil Switchgear		
		



Environmental and Social Management Planning Framework

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Guidelines Considered	Information Required	
Safe disposal of oil	Storage location within yard	Sump pit available
		
Sump pit		
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Fire extinguishers and Sand buckets
		
	Fire Extinguishers Refilled on: 13-11-2019	

Environmental and Social Management Planning Framework


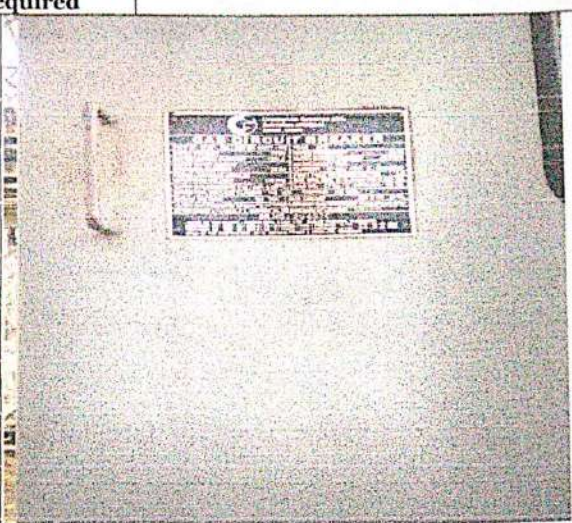


*OFFICIAL USE ONLY

Guidelines Considered	Information Required	
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	Transformer oil Drums available
		Total 9 (Nine) Drums of Transformer oil available
Oil leakage	Records of leakage of any (availability of pits)	No oil leakage
Use of SF ₆ and other greenhouse/hazardous gases		SF ₆ Gas
		SF₆ Gas cylinder
Gas insulated switchgear	Condition/year/make/nos.	N/A
Gas insulated t/f	Condition/year/make/nos	N/A
Presence of SF ₆ in switchgear	Yes/No	Yes





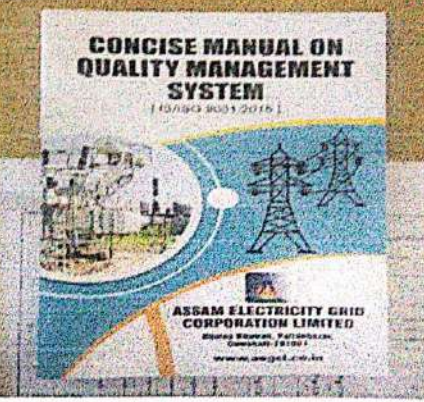


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Guidelines Considered	Information Required	
		
SF ₆ retrieval arrangements		No
Presence of other hazardous gases	Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	Dike pole available (good condition)
Storage facility	Type	
Drainage	Type	Not available
Oil leakage	No. of leakages in last five years	No oil leakage
Need for extra gravel	Condition	Sufficient
 		
PCC and Graveling work in progress		
Workplace air quality		Good
Monitoring of workplace air quality	Any measurement undertaken if any	No
Good ventilation (ensure)		Yes
Maintenance of air quality		NA

Environmental and Social Management Planning Framework





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Guidelines Considered			Information Required	
Providence of respiratory equipment			Condition/year/make/nos	Not available
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				Yes
Noise control equipment			If any	NA
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	
Residential	55	45		
Industrial	75	70		
Maintenance of equipment			Condition/year/make/nos	
Use of protective gear when noise level exceeds 85 dB				No
Safe working area (absence of radiation, magnetic fields)				
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				Yes
Electrocution				
Strict procedure for de-energizing before working on electrical equipment				Yes
				
Training of personnel for safety procedures				Yes
				



Environmental and Social Management Planning Framework

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Guidelines Considered	Information Required	
Physical factors in the workplace signage		Good
Lighting (including security lights)		Not available
Fire detection mechanism/equipment	Assembly area and its capacity	GOOD
Firefighting equipment	Condition/year/make/nos	Yes
Cleanness (inside and outside substation)		
		
First Aid Kit	Locations in yard	Control Room and switchyard
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	Yes
	Maximum no of slabs are broken	
Fence or enclosure of the site (Restriction of unauthorized people)		Yes
Adequacy of signage (warning, caution signs)	Locations and pictures	YES





Environmental and Social Management Planning Framework

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Guidelines Considered 	Information Required 	
Welfare Facilities Safe and clean drinking water	Locations	Playground Office building
		
Available of Aquaguard		
Toilets	Location	Near Control room, Office Building
	Toilet near control Room	
Guard kiosk	Main Gate (Temporary made of CI sheet)	



Environmental and Social Management Planning Framework

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Guidelines Considered		Information Required
		
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	Good
Head	Condition/year/make/nos	Good
Hearing	Condition/year/make/nos	Nil
Hand	Condition/year/make/nos	Yes
Respiratory	Condition/year/make/nos	Yes
Leg and body	Condition/year/make/nos	Yes
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	YES
Vibration	Visually within limits at the time of visit	No
Illumination	Visually within limits at the time of visit	YES
Reflections	Visually within limits at the time of visit	YES
Temperature	Visually within limits at the time of visit	YES
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Yes
Training and Documentation	Details of training conducted (if any)	Yes
Training (Learning materials, equipment and tools)		Yes
Training on operational hazardous and how to control the hazards (fire, disaster)		Yes
Training on health risks, hygiene, and exposure prevention		Yes
Training on accidents and accident prevention, protective equipment and clothing		Yes

Environmental and Social Management Planning Framework

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Guidelines Considered	Information Required	
		
HSMS organization policy/Health and safety manual		Available
Emergency prevention, preparedness and response		Available
Incidents of work-related injuries, ill health, disease and accidents and their redressal		Nil
Safety inspection, testing and calibration		Conducted
Storage	Locations in yard by capacity	Yes
Labelling	Location in yard by capacity	Yes
Handling	Location in yard by capacity	Yes
Solid Waste/Scraps		
Handling	Locations in yard by capacity	Yes
Disposal	Locations in yard by capacity	Yes
Space for Expansion		
Availability of space for expansion	Locations in yard by capacity	Nil
Existing Grievance mechanism (if any)	Location where GRM is displayed	Nil

Date of Visit: 18 - 12 - 2019

Designation and Signature of Official:


Junior Manager
132 KV GSS, Kodamani
AEGCL, Dibrugarh


Asstt. General Manager
132 KV GSS SUB-STATION
AEGCL, DBR



9. Shankardevnagar Substation

Name of Sub-Station: 132 kV Sankardevnagar Grid Sub-Station.

Geo Co-ordinates of boundary: N25.9869325 E 92.9252258

Current area of the Sub-Station: 50 Bigha

Details of existing facilities and associated lines: 132/33kV, 2x 25 MVA Transformer with SAS integration facility, 4 numbers of 132kV lines, 7 numbers of 33 kV feeders, Capacitor Bank 2 numbers 5 MVAR/ each

Details of proposed Augmentation: 132/33KV 2X50MVA Transformer

Confirmation of land within existing boundary: 50 Bigha

Table A: Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	Good/ 2013/ Crompton Greaves Ltd - 2 Numbers
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	No
Safe disposal of oil	Storage location within yard	Yes
Prevention of fires	Equipment at site	Fire extinguishers and Sand bucket available for Equipments and Control Room, Admin block and Yard.
Oil Labelling for storage at site		No proper storage facility available in the station. Oil is being stored in open in the yard (Refer pictures) Few drums are also found stored in small available store room in the station premises
Oil leakage		No oil leakage.
Retrofitting		No
Use of SF ₆ and other greenhouse/hazardous gases		
Gas insulated switchgear	Condition/year/make/nos.	Good/ 2010/ AREVA/ 2 Number Good/2013/CGL/3 Numbers Good/2010/CGL/1 Number Rated Voltage: 132 kV
Gas insulated t/f	Condition/year/make/nos	-
Presence of SF ₆ in switchgear		Yes
SF ₆ retrieval arrangements		Available
Presence of other hazardous gases		No
Storage of liquid fuels, raw and in-process materials, solvents, wastes: to prevent spills, to prevent soil contamination and to prevent ground and surface water contamination		
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	Not Available
Storage facility	Type	Small store room available
Drainage	Type	Open drains
Oil leakage	No. of leakages in last five years	No leakage
Need for extra gravel	Condition	PCC & gravelling in the switch yard is in process.
Workplace air quality		
Monitoring of workplace air quality	Any measurement undertaken if	No



Environmental and Social Management Planning Framework

Guidelines Considered			Information Required	
			any	
Good ventilation (ensure)				Being ensured.
Maintenance of air quality				Sufficient air conditioners are available in the control room & exhaust fan is available in control room.
Providence of respiratory equipment			Condition/year/make/nos	-
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				Belts, ropes, gloves, helmets for workers available
Workplace noise				
Noise control equipment			Locations in yard by capacity	No
IFC/ EHS Noise levels			Any measurement undertaken since last 5 years	No measurement
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	No measurement
Residential	55	45		
Industrial	70	70		
Maintenance of equipment			Condition/year/make/nos	-
Use of protective gear when noise level exceeds 85 dB				-
Other Physical Agents				
Safe working area (absence of radiation, magnetic fields)				-
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				No such measurements being done
Electrocution				
Strict procedure for de-energizing before working on electrical equipment				Strict procedure for de-energizing followed.
Training of personnel for safety procedures				Periodic safety training being conducted by Engineers
Occupational health and safety guidelines				
Physical factors in the workplace signage				Available but need strengthening
Lighting (including security lights)				Available but need strengthening
Fire detection mechanism/equipment			Locations in yard by capacity	No fire detection system available. Fire fighting equipment available: Sand buckets & Fire extinguishers available.
Firefighting equipment			Condition/year/make/nos	Available. Sand buckets & Fire extinguishers, etc. available in yard Fire extinguishers available in control room and Admin block
Cleanness (inside and outside)				Need strengthening



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
substation)		
First Aid Kit	Locations in yard	Reportedly available in the control room at the time of visit.
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	At many places around the yard
Fence or enclosure of the site (Restriction of unauthorized people)		Compound wall and switch yard fencing available around the station.
Welfare Facilities		
Safe and clean drinking water	Locations	Available
Toilets	Location	Available in side Admin block and Control room
TV/Radio/internet		Internet facility available
Guard kiosk		Under construction
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	No
Head	Condition/year/make/nos	Helmets are available but need strengthening
Hearing	Condition/year/make/nos	No
Hand	Condition/year/make/nos	Gloves available and used in Control room
Respiratory	Condition/year/make/nos	No
Leg and body	Condition/year/make/nos	Safety shoe available
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Apparently within limits at the time of visit
Vibration	Visually within limits at the time of visit	Apparently within limits at the time of visit
Illumination	Visually within limits at the time of visit	Available but need strengthening
Reflections	Visually within limits at the time of visit	-
Temperature	Visually within limits at the time of visit	Apparently within limits at the time of visit
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Presence of SF ₆ Gas and Transformer oil in Switchgears and transformers. Extra transformer oil stored in yard and little store room. No extra SF ₆ Gas stored at the time of visit.
Ionization radiation	-	
Training and Documentation		Regular trainings being conducted. Safety classes register available.
Training (Learning materials, equipment and tools)		-do-
Training on operational hazardous and how to control the hazards		-do-
Training on health risks, hygiene, and exposure prevention		-do-



Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
Training on accidents and accident prevention, protective equipment and clothing		-do-
Performance Monitoring		
OHSMS organization policy		No OHSMS organization Policy available.
Emergency prevention, preparedness and response		Not available
Investigation of work related injuries, ill health, disease and accidents		No record available at station at the time of visit
Safety inspection, testing and calibration		Special maintenance being carried out by another wing (MRT)
Material handling (Hazardous and non-hazardous materials)		
Storage	Locations in yard by capacity	Small store available, Oil being stored in the yard
Labelling	Location in yard by capacity	Need strengthening.
Handling	Location in yard by capacity	Being handled in yard.
Solid Waste/Scraps		
Handling	Locations in yard by capacity	Dustbins only available in Admin block. Littering observed across yard.
Disposal	Locations in yard by capacity	Thrown outside station compound
Space for Expansion		
Availability of space for expansion	Locations in yard by capacity	Available on the IB side.



Environmental and Social Management Planning Framework

TABLE - B PHOTO GALLERY



Near Main Gate



Field



Switchyard Gate



Store



PLCC Room



132KV Switchyard

Environmental and Social Management Planning Framework



25MVA Tr.-1



25MVA Tr.-2



33KV Bay



132kV Tr Breaker with CT



132kV Outgoing Bay



132kV Incoming Bay

Environmental and Social Management Planning Framework



Control Room SAS



Fire Fighting



Environmental and Social Management Planning Framework

10. Barnagar Substation

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132/33KV Grid Sub-Station, Barnagar

Geo Coordinates of Boundary: 26.4932N & 90.9054E

Current Area of Substation: Sorbhog, District-Barpeta, Assam

Details of Existing Facilities and Associated Lines:

Sl.No.	Details of Transmission Lines	Remarks
1	132KV Rangia-Barnagar Single circuit Line	
2	132KV Dhaligaon-Barnagar Single circuit Line	

Details of Proposed Augmentation: New 2x50 MVA 132/33 KV in place of old 2x25 MVA Transformers.

Confirmation of Land within Existing Boundary: Yes

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos., indicate if PCB oil used	1) Good/2007/Crompton Greaves Ltd./2 nos. 2) Good/2015/T.Associates/1no.
Oil Switchgear	Condition/year/make/nos., indicate if PCB oil used	Not Available
Safe disposal of oil	Storage location within yard	
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Fire extinguishers and sand buckets are present in switchyards
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	Not available
Oil leakage	Records of leakage of any (availability of pits)	No such leakage were occurred
Use of SF ₆ and other greenhouse/hazardous gases		
Gas insulated switchgear	Condition/year/make/nos.	Not Available
Gas insulated t/f	Condition/year/make/nos	Not Available
Presence of SF ₆ in switchgear	Yes/No	Yes
SF ₆ retrieval arrangements		
Presence of other hazardous gases	Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	Not Available
Storage facility	Type	
Drainage	Type	
Oil leakage	No. of leakages in last five years	No such leakage were occurred
Need for extra gravel	Condition	Good, not required
Workplace air quality		
Monitoring of workplace air quality	Any measurement undertaken if any	No such measurements done yet.
Good ventilation (ensure)		Being ensured
Maintenance of air quality		Sufficient exhaust fans/Normal ventilation available



Environmental and Social Management Planning Framework

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Guidelines Considered			Information Required	
Providence of respiratory equipment			Condition/year/make/nos	Not Available
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit			.	Safety Belts, Ropes, Gloves, Helmets, Gumboots are available.
Noise control equipment			If any	Not Available
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	
Residential	55	45		
Industrial	75	70		
Maintenance of equipment			Condition/year/make/nos	
Use of protective gear when noise level exceeds 85 dB				Not Available
Safe working area (absence of radiation, magnetic fields)				Safe working area exist
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				Earthing, lockouts are monitored regularly
Electrocution				No such incidents were occurred
Strict procedure for de-energizing before working on electrical equipment				Strictly Followed
Training of personnel for safety procedures				Periodically maintained
Physical factors in the workplace signage				
Lighting (including security lights)				Good
Fire detection mechanism/equipment			Assembly area and its capacity	
Fire fighting equipment			Condition/year/make/nos	Good/2019/RD Associates/7nos.
Cleanness (inside and outside substation)				Good
First Aid Kit			Locations in yard	Available
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)			Locations in yard	No such safety risks
Fence or enclosure of the site (Restriction of unauthorized people)				Available
Adequacy of signage (warning, caution signs)			Locations and pictures	Available at various locations within the switchyard
Welfare Facilities				Available
Safe and clean drinking water			Locations	Present
Toilets			Location	Present
Guard kiosk				
Personal Protective Equipment				
Eye and face			Condition/year/make/nos	Eyeglasses are available
Head			Condition/year/make/nos	Helmets available
Hearing			Condition/year/make/nos	Not Available
Hand			Condition/year/make/nos	Gloves available
Respiratory			Condition/year/make/nos	Not Available
Leg and body			Condition/year/make/nos	Gumboots and safety belts are available



Environmental and Social Management Planning Framework

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Guidelines Considered	Information Required	
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	
Vibration	Visually within limits at the time of visit	<i>Within limits</i>
Illumination	Visually within limits at the time of visit	<i>Within limits</i>
Reflections	Visually within limits at the time of visit	<i>Good</i>
Temperature	Visually within limits at the time of visit	<i>Within limits</i>
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	<i>Within limits</i>
Training and Documentation	Details of training conducted (if any)	<i>Present</i>
Training (Learning materials, equipment and tools)		<i>Periodically done</i>
Training on operational hazardous and how to control the hazards (fire, disaster)		<i>Periodically conducted</i>
Training on health risks, hygiene, and exposure prevention		<i>Periodically conducted</i>
Training on accidents and accident prevention, protective equipment and clothing		<i>Periodically conducted</i>
OHSMS organization policy/Health and safety manual		<i>Available</i>
Emergency prevention, preparedness and response		
Incidents of work-related injuries, ill health, disease and accidents and their redressal		<i>No such incidents were occurred</i>
Safety inspection, testing and calibration		<i>Carried out by MRT wing of AEGCL</i>
Storage	Locations in yard by capacity	<i>Store is available</i>
Labelling	Location in yard by capacity	<i>Need strengthening</i>
Handling	Location in yard by capacity	<i>Being handled in yard</i>
Solid Waste/Scraps		
Handling	Locations in yard by capacity	<i>Dustbin Available</i>
Disposal	Locations in yard by capacity	<i>Disposed in suitable place from time to time</i>
Space for Expansion		
Availability of space for expansion	Locations in yard by capacity	<i>Available</i>
Existing Grievance mechanism (if any)	Location where GRM is displayed	<i>Not Available</i>

Date of Visit:

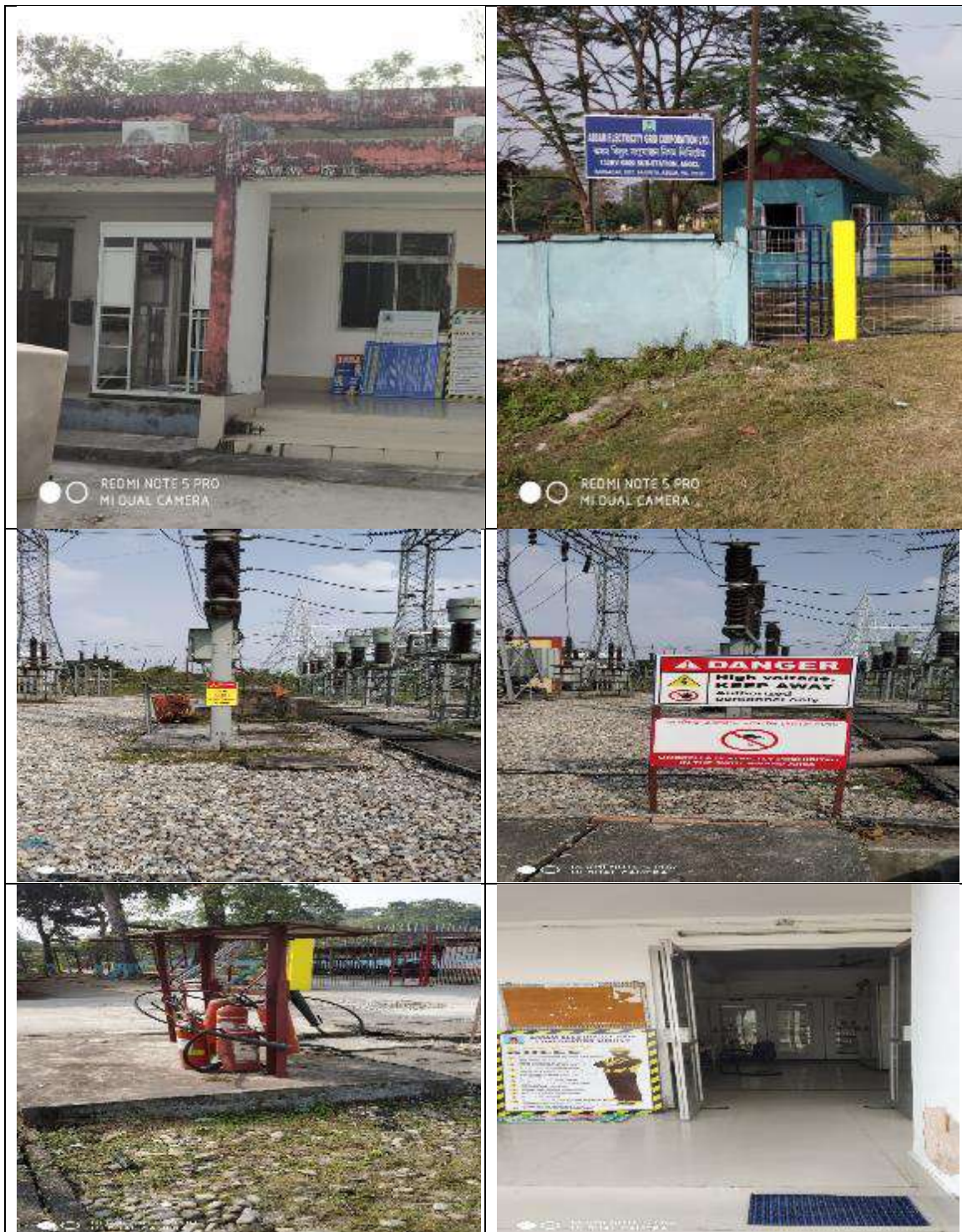
Designation and Signature of Official:



Asstt. General Manager
132 KV Grid Sub-Station
AEGCL, Rangia



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework



11. Rangia Substation



Environmental and Social Management Planning Framework

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 220/132/33KV Grid Sub-Station, Rangia

Geo Coordinates of Boundary: 26.45148 N & 91.6391E

Current Area of Substation: Chirakhundi, Rangia, Assam

Details of Existing Facilities and Associated Lines:

Sl.No.	Details of Transmission Lines	Remarks
1	220KV Salakati-Rangia Double Circuit Line	
2	132KV Rangia-Kamalpur Double Circuit Line	
3	132KV Rangia-Sipajhar Single circuit Line	
4	132KV Rangia-Nalbari Single circuit Line	
5	132KV Rangia-Barnagar Single circuit Line	
6	132KV Rangia-Deothang Single circuit Line	
7	132KV Rangia-Rowta Single circuit Line	

Details of Proposed Augmentation: New 2x50 MVA 132/33 KV in place of old 2x25 MVA Transformers.

Confirmation of Land within Existing Boundary: Yes

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	1) Good/2007/Crompton Greaves Ltd./2 nos. 2) Good/2012/Transformers & rectifiers Ltd./2 nos.
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	Not Available
Safe disposal of oil	Storage location within yard	
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Nitrogen injection fire protection system in 220KV switchyard only. Fire extinguishers and sand buckets are present in both 220KV & 132KV switchyards
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	5225 Litres (25 drums each containing 209litres)
Oil leakage	Records of leakage of any (availability of pits)	No such leakage were occurred
Use of SF ₆ and other greenhouse/hazardous gases		
Gas insulated switchgear	Condition/year/make/nos.	Not Available
Gas insulated t/f	Condition/year/make/nos	Not Available
Presence of SF ₆ in switchgear	Yes/No	Yes
SF ₆ retrieval arrangements		
Presence of other hazardous gases	Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)	Condition/year/make/nos	Not Available
Storage facility	Type	
Drainage	Type	
Oil leakage	No. of leakages in last five years	No such leakage were



Environmental and Social Management Planning Framework

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Guidelines Considered			Information Required	
				<i>occurred</i>
Need for extra gravel			Condition	<i>Good, not required</i>
Workplace air quality				
Monitoring of workplace air quality			Any measurement undertaken if any	<i>No such measurements done yet.</i>
Good ventilation (ensure)				<i>Good</i>
Maintenance of air quality				
Providence of respiratory equipment			Condition/year/make/nos	<i>Not Available</i>
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				<i>Safety Belts, Ropes, Gloves, Helmets, Gumboots are available.</i>
Noise control equipment			If any	<i>Not Available</i>
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	
Residential	55	45		
Industrial	75	70		
Maintenance of equipment			Condition/year/make/nos	
Use of protective gear when noise level exceeds 85 dB				<i>Not Available</i>
Safe working area (absence of radiation, magnetic fields)				<i>Safe working area exist</i>
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				<i>Earthing, lockouts are monitored regularly</i>
Electrocution				<i>No such incidents were occurred</i>
Strict procedure for de-energizing before working on electrical equipment				<i>Strictly Followed</i>
Training of personnel for safety procedures				<i>Periodically maintained</i>
Physical factors in the workplace signage				
Lighting (including security lights)				<i>Good</i>
Fire detection mechanism/equipment			Assembly area and its capacity	
Firefighting equipment			Condition/year/make/nos	<i>Good/2018/CTR/02 nos.</i>
Cleanness (inside and outside substation)				<i>Good</i>
First Aid Kit			Locations in yard	<i>Available</i>
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)			Locations in yard	<i>No such safety risks</i>
Fence or enclosure of the site (Restriction of unauthorized people)				<i>Available</i>
Adequacy of signage (warning, caution signs)			Locations and pictures	<i>Available at various locations within the switchyard</i>
Welfare Facilities				
Safe and clean drinking water			Locations	<i>Available</i>
Toilets			Location	<i>Present</i>
Guard kiosk				<i>Present</i>



Environmental and Social Management Planning Framework

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Guidelines Considered	Information Required	
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	<i>Eyeglasses are available</i>
Head	Condition/year/make/nos	<i>Helmets available</i>
Hearing	Condition/year/make/nos	<i>Not Available</i>
Hand	Condition/year/make/nos	<i>Gloves available</i>
Respiratory	Condition/year/make/nos	<i>Not Available</i>
Leg and body	Condition/year/make/nos	<i>Gumboots and safety belts are available</i>
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	<i>Within limits</i>
Vibration	Visually within limits at the time of visit	<i>Within limits</i>
Illumination	Visually within limits at the time of visit	<i>Good</i>
Reflections	Visually within limits at the time of visit	<i>Within limits</i>
Temperature	Visually within limits at the time of visit	<i>Within limits</i>
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	<i>Present</i>
Training and Documentation	Details of training conducted (if any)	
Training (Learning materials, equipment and tools)		<i>Periodically done</i>
Training on operational hazardous and how to control the hazards (fire, disaster)		<i>Periodically conducted</i>
Training on health risks, hygiene, and exposure prevention		<i>Periodically conducted</i>
Training on accidents and accident prevention, protective equipment and clothing		<i>Periodically conducted</i>
OHSMS organization policy/Health and safety manual		<i>Available</i>
Emergency prevention, preparedness and response		
Incidents of work-related injuries, ill health, disease and accidents and their redressal		<i>No such incidents were occurred</i>
Safety inspection, testing and calibration		<i>Carried out by MRT wing of AEGCL</i>
Storage	Locations in yard by capacity	<i>Store is available</i>
Labelling	Location in yard by capacity	<i>Need strengthening</i>
Handling	Location in yard by capacity	<i>Being handled in yard</i>
Solid Waste/Scraps		
Handling	Locations in yard by capacity	<i>Dustbin Available</i>
Disposal	Locations in yard by capacity	<i>Disposed in suitable place from time to time</i>
Space for Expansion		
Availability of space for expansion	Locations in yard by capacity	<i>Available</i>
Existing Grievance mechanism (if any)	Location where GRM is displayed	<i>Not Available</i>

Date of Visit:

Designation and Signature of Official:

[Signature]
 Asstt. General Manager
 132 KV Grid Sub-Station
 AEGCL Rangia



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework

12. Panchgram Substation

EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132 KV Panchgram GSS

Geo Coordinates of Boundary:

Sl no	Latitude	Longitude	Elevation Angle
1	N24°51'54.39"	E092°35'34.21"	72
2	N24°52'00.64"	E092°35'34.94"	61
3	N24°52'01.85"	E092°35'35.43"	66
4	N24°52'02.47"	E092°35'34.14"	71
5	N24°52'01.93"	E092°35'33.47"	64
6	N24°52'02.90"	E092°35'31.10"	66
7	N24°52'02.90"	E092°35'30.60"	62
8	N24°52'02.95"	E092°35'32.44"	63
9	N24°52'00.42"	E092°35'32.51"	64
10	N24°52'01.24"	E092°35'32.11"	58

Current Area of Substation: 9000 sqm (Approx)

Details of Existing Facilities and Associated Lines: 05 (Five) nos of 132 KV Bay, 07 (Seven) nos of 33 KV Bay, 03 nos of 132/33 KV Transformer.

Details of Proposed Augmentation: 02 X 50 MVA Transformer in place of old 2 X 25 MVA Transformer.

Confirmation of Land within Existing Boundary:

Information Required

Guidelines Considered	Information Required	
Type of oil in transformers and switchgear		
Transformers	Condition/year/make/nos, indicate if PCB oil used	25 MVA TX-I: Condition: In service Yr. of Mfg: 2011 Make: Marsons Limited No PCB Oil used 25 MVA TX-II: Condition: In service Yr. of Mfg: 2011 Make: Marsons Limited No PCB Oil used 16 MVA TX-III: Condition: Re commissioned on 01.12.19, At present in idle charged condition Yr. of Mfg: 1989 Make: Bharat Bijulee No PCB Oil used
Oil Switchgear	Condition/year/make/nos, indicate if PCB oil used	No oil switchgear available
Safe disposal of oil	Storage location within yard	Yes
Prevention of fires	Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	Sand Buckets & Fire extinguisher available.
Oil Labelling for storage at site	Storage of oil drums (quantity and number of drums)	No proper storage facility available in the station. Oil is being stored in open in the yard (Refer pictures)
Oil leakage	Records of leakage of any (availability of pits)	No oil leakage. Minor seepage of oil is however visible



Environmental and Social Management Planning Framework

Guidelines Considered			Information Required	
Use of SF ₆ and other greenhouse/hazardous gases				SF ₆ gas is used for breakers only.
Gas insulated switchgear			Condition/year/make/nos.	Not Available
Gas insulated t/f			Condition/year/make/nos	Not Available
Presence of SF ₆ in switchgear			Yes/No	Yes
SF ₆ retrieval arrangements				Not Available
Presence of other hazardous gases			Yes/No. Give details if Yes	No
Containment, Dikes, and Berms (e.g. for transformers)			Condition/year/make/nos	Not Available
Storage facility			Type	Store room is available
Drainage			Type	Open drain
Oil leakage			No. of leakages in last five years	No leakage.
Need for extra gravel			Condition	Condition: Very old and of inappropriate size. Existing old gravel may can be replaced
Workplace air quality				Normal
Monitoring of workplace air quality			Any measurement undertaken if any	No such measurement has been taken till date.
Good ventilation (ensure)				Being ensured
Maintenance of air quality				No
Providence of respiratory equipment			Condition/year/make/nos	Not Available
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				Belts, ropes, Helmets, Gloves available for workers only.
Noise control equipment			If any	Not Available
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit	Not Available
Residential	55	45		Not Available
Industrial	75	70		Not Available
Maintenance of equipment			Condition/year/make/nos	Not Available
Use of protective gear when noise level exceeds 85 dB				Not Available
Safe working area (absence of radiation, magnetic fields)				Not Available.
Monitor regularly for radiation and field levels and equipment integrity (earthing, protective shields, lockouts etc.				Earthing & Protective shield available
Electrocution				
Strict procedure for de-energizing before working on electrical equipment				Yes
Training of personnel for safety procedures				Yes
Physical factors in the workplace signage				
Lighting (including security lights)				Available
Fire detection mechanism/equipment			Assembly area and its capacity	Available in control Kiosk
Firefighting equipment			Condition/year/make/nos	Fire extinguishing cylinders & sand buckets only available.
Cleanness (inside and outside substation)				Done periodically
First Aid Kit			Locations in yard	Yes
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)			Locations in yard	No
Fence or enclosure of the site (Restriction of unauthorized people)				Yes
Adequacy of signage (warning, caution signs)			Locations and pictures	Yes
Welfare Facilities				
Safe and clean drinking water			Locations	Available
Toilets			Location	Available
Guard kiosk				Available at the entrance of the gate.




Environmental and Social Management Planning Framework

Guidelines Considered	Information Required	
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	Not Available
Head	Condition/year/make/nos	Safety Helmet Available
Hearing	Condition/year/make/nos	Not Available
Hand	Condition/year/make/nos	Gloves Available
Respiratory	Condition/year/make/nos	Not Available
Leg and body	Condition/year/make/nos	Gumboot Available
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Apparently within limits at the time of visit.
Vibration	Visually within limits at the time of visit	Apparently within limits at the time of visit.
Illumination	Visually within limits at the time of visit	Apparently within limits at the time of visit.
Reflections	Visually within limits at the time of visit	Apparently within limits at the time of visit.
Temperature	Visually within limits at the time of visit	Apparently within limits at the time of visit.
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	Presence of SF ₆ gas and transformer oil in switchgears and transformers. Extra transformer oil is stored in Yard.
Training and Documentation	Details of training conducted (if any)	
Training (Learning materials, equipment and tools)		No
Training on operational hazardous and how to control the hazards (fire, disaster)		No
Training on health risks, hygiene, and exposure prevention		No
Training on accidents and accident prevention, protective equipment and clothing		No
OHSMS organization policy/Health and safety manual		No
Emergency prevention, preparedness and response		Not Available
Incidents of work-related injuries, ill health, disease and accidents and their redressal		NIL
Safety inspection, testing and calibration		Not available
Storage	Locations in yard by capacity	Store available. Oil barrels are stored in switchyard area.
Labelling	Location in yard by capacity	No
Handling	Location in yard by capacity	No
Solid Waste/Scraps		No
Handling	Locations in yard by capacity	No
Disposal	Locations in yard by capacity	No
Space for Expansion		Not Available
Availability of space for expansion	Locations in yard by capacity	Not Available
Existing Grievance mechanism (if any)	Location where GRM is displayed	Not Available

Date of Visit: 24/12/2019

Designation and Signature of Official:


 Assistant General Manager
 Panchgram Substation Division
 AEGCL, Panchgram



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework



Environmental and Social Management Planning Framework

13. Kahilipara Substation



EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132/33kV EHV GSS, AEGCL, Kahilipara, Guwahati-19.

Geo Coordinates of Boundary: 26.140294, 91.758967

Current Area of Substation: 25,159.64 sqmtr

Details of Existing Facilities and Associated Lines:

1. 132/33kV Transformer Details:- 2x40MVA, 132/33kV Transformer, 1x31.5MVA, 132/33kV Transformer, 2x30MVA, 132/33kV Transformer, 2x10MVA 132/33/11kV Transformer(*Not charged; earlier used for delivering power at 11kV)
2. 132kV Line feeder names:- 132kV Sarusajai-I, 132kV Sarusajai-II, 132kV Sarusajai-III, 132kV Sarusajai-IV, 132kV Kamalpur, 132kV Kamakhya, 132kV Narengi, 132kV Capital. 132kV MeSEB-I, 132kV MeSEB-II, 132kV GMCH-I(proposed), 132kV GMCH-II(proposed), 132kV Bus Coupler
3. 33kV Line feeder names:- 33kV Ulubari-I, 33kV Jalukbari, 33kV Medical(Mains), 33kV Jawahar Nagar-I, 33kV Nabard, 33kV Jawahar Nagar-II, 33kV Borbari, 33kV Medical(alt), 33kV Paltan Bazar(alt), 33kV Ulubari-II, 33kV Ulubari-III, 33kV Barsapara, 33kV Kamakhya, 33kV Dispur.

Details of Proposed Augmentation:-

- 1). 33kV Tubular Bus to replace existing 33kV Bus over head conductors.
- 2). 2x5MVAR Capacitor Bank.

Confirmation of Land within Existing Boundary: 25,159.64 sqmtr

Information Required

Guidelines considered	Information required	
Type of oil in transformers and switchgear		
Transformer	2x40MVA 132/33kV Tr.(Make: CGL, YoM: 2013, Condition: OK);	Paraffin based Tr. Oil.
	1x31.5MVA, 132/33kV Tr.(Make: EMCO, YoM: 2001, Condition: OK),	
	1x30MVA, 132/33kV Tr. (Make: CGL, YoM: 1978(Tr.-4), Condition: Not working since 13.06.2019;	
	1x30MVA, 132/33kV Tr. (Make: CGL, YoM: 1993(Tr.-5), Condition: Ok	
	2x10MVA, 132/33/11kV Transformers; Make: Elin, YoM: , Condition:Not in service	Askarel Oil
Oil switchgear	CT, PT, CVT	
Safe disposal of oil	Yes	Kept in oil drums inside switchyard
Prevention of fire	Fire extinguishers, sand bucket	
Oil labelling for storage at site	No	Total = 44 nos. (used + empty) * No new oil drum.



Environmental and Social Management Planning Framework

Oil leakage	Slight leakage in 40MVA, 132/33kV Tr.-2.	Pit available for 2x40MVA, 132/33kV Tr. NA for 31.5MVA, 2x30MVA 132/33kV Tr.
Use of SF6 and other greenhouse/hazardous gases	Yes	
Gas insulated switchgear	SF6 Circuit Breakers(CB), Make: CGL, ABB), Condition: Ok	
Gas insulated t/f	NA	
Presence of SF6 in switchgear	Yes	
SF6 retrieval arrangement	No	
Presence of other hazardous gases	NA	
Containment, Dikes, and Berms(e.g for transformer)	Available for 2x40MVA 132/33kV Tr.; Condition: OK	NA for 2x30, 1x31.5MVA, 132/33kV Tr.
Storage facility	NA	
Drainage	Available for 2x40MVA 132/33kV Tr.	NA for 2x30, 1x31.5MVA, 132/33kV Tr.
Oil leakage	No	
Need for extra gravel	No	
Workplace air quality	Normal	
Monitoring of workplace air quality	NA	
Good ventilation(ensure)	Yes	
Maintenance of air quality	NA	
Providence of respiratory equipment	NA	
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit	NA	Available safety shoes, helmets(shortage), Safety belts.
Noise control equipment	NA	
Ambient noise(db)	Day night	
Residential	55 45	
Industrial	75 70	
Maintenance equipment		Available toolbox, 1kV & 5kV megger, thermovision camera, earth resistance tester.
Use of protective gear when noise level exceeds 85db	NA	
Safe working area(absence of radiation, magnetic field)	NA	
Monitor regularly for radiation and fiend level and equipment integrity(earthing, protective shields, lockouts etc.)	NA	
Electrocution	No	
Strict procedure for de-energizing before working on electrical equipment	Yes	
Training of personal for safety procedure	Yes	



Environmental and Social Management Planning Framework

Physical factors in the workplace signage	Yes	
Lightning(including security light)	Available	Needs augmentation.
Fire detection mechanism/equipment	Smoke detectors available inside kiosks.	
Fire fighting equipment	Yes	
Cleanliness(inside and outside substation)	Yes	
First Aid Kit	Yes	
Features that pose safety risk(missing or broken slabs, dogged holes etc)	Yes	On process of repairing.
Fence or enclosure of the site(restriction of unauthorised people)	Yes	
Adequacy of signage(warning, caution signs)	Yes	
Welfare facilities	NA	
Safe and clean drinking water	Available	
Toilets	Yes	
Guard kiosk	Yes	
Personal protective equipment	Available safety shoes, helmets(shortage), Safety belts.	
Eye and face	NA	
Head	Available safety helmets(Shortage).	Needs more safety helmets.
Hearing	NA	
Hand	NA	Handglove available for Operation personnel only.
Respiratory	NA	
Legs and body	Safety shoes available(shortage).	Needs additional safety shoes including for shift personnel.
Ambient factors in the workplace	Normal	
Noise	Normal	
Vibration	OK	
Illumination	Yes	Needs additional illumination.
Reflection	No	
Temperature	Normal	
Hazardous materials	Available.	Transformer oil, SF6 gas.
Training and documentation	No	
Training(learning materials, equipment and tools)	NA	
Training on operational hazardous and how to control the hazardous(fire, disaster)	Yes	
Training on health risks, hygiene and exposure prevention	Yes	
Training on accidents and accident prevention, protective equipment and clothing	Yes	
OHSMS organisation	Yes	



Environmental and Social Management Planning Framework



14. Golaghat Substation

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EHS Checklist for Existing AEGCL Facilities

Name of Substation: 132kV Golaghat GSS

Geo Coordinates of Boundary:

Current Area of Substation: 15 Bigha, 1 Katha, 11 Lasha

Details of Existing Facilities and Associated Lines: 132/33kV, 2 X 25 MVA transformers, LILO of 132kV Mariani-Dimapur

S/C Line at Golaghat GSS

Details of Proposed Augmentation: 132/33kV, 2 X 50 MVA transformers

Confirmation of Land Within Existing Boundary: Yes

Information Required

Guidelines Considered			Information Required		
Type of oil in transformers and switchgear					
Transformers			Condition/year/make/nos, indicate if PCB oil used	Good/2009/Bharat Bijlee/2 Nos.	
Oil Switchgear			Condition/year/make/nos, indicate if PCB oil used	Good	
Safe disposal of oil			Storage location within yard	Available	
Prevention of fires			Equipment at site (Nitrogen injection fire protection system/fire extinguishers/sand buckets)	5 Nos. of fire extinguishers, 4 Nos. of sand buckets	
Oil Labelling for storage at site			Storage of oil drums (quantity and number of drums)	4 Nos. of oil filled drums	
Oil leakage			Records of leakage of any (availability of pits)	2 Nos. of transformer sump pit	
Use of SF ₆ and other greenhouse/hazardous gases					
Gas insulated switchgear			Condition/year/make/nos.	Not available	
Gas insulated t/f			Condition/year/make/nos	Not available	
Presence of SF ₆ in switchgear			Yes/No	Yes	
SF ₆ retrieval arrangements				Not available	
Presence of other hazardous gases			Yes/No. Give details if Yes	No	
Containment, Dikes, and Berms (e.g. for transformers)			Condition/year/make/nos	Not available	
Storage facility			Type		
Drainage			Type		
Oil leakage			No. of leakages in last five years	There are minor leakage in transformer	
Need for extra gravel			Condition	Extra gravel required	
Workplace air quality					
Monitoring of workplace air quality			Any measurement undertaken if any	No	
Good ventilation (ensure)					
Maintenance of air quality					
Providence of respiratory equipment			Condition/year/make/nos	Not available	
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit			.		
Noise control equipment			If any	Not available	
Ambient Noise (dB)	Day	Night	Level within 70/45 dB limit		
Residential	55	45			
Industrial	75	70			
Maintenance of equipment			Condition/year/make/nos.		
Use of protective gear when noise level exceeds 85 dB					
Safe working area (absence of radiation, magnetic fields)					
Monitor regularly for radiation and field levels and equipment integrity				Regular monitoring of earthing, lockouts done.	



Guidelines Considered	Information Required	
(earthing, protective shields, lockouts etc.		
Electrocution		
Strict procedure for de-energizing before working on electrical equipment		Yes
Training of personnel for safety procedures		Yes
Physical factors in the workplace		
signage		
Lighting (including security lights)		HPSV lamps at switchyard
Fire detection mechanism/equipment	Assembly area and its capacity	Not available
Firefighting equipment	Condition/year/make/nos	Available, Sand buckets & Fire extinguishers
Cleanliness (inside and outside substation)		Good
First Aid Kit	Locations in yard	Control room
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	Yes switchyard
Fence or enclosure of the site (Restriction of unauthorized people)		Available but not in good condition
Adequacy of signage (warning, caution signs)	Locations and pictures	Yes
Welfare Facilities		
Safe and clean drinking water	Locations	Yes but need renovation
Toilets	Location	Yes
Guard kiosk		Yes
Personal Protective Equipment		
Eye and face	Condition/year/make/nos	Not available
Head	Condition/year/make/nos	
Hearing	Condition/year/make/nos	Not available
Hand	Condition/year/make/nos	Insulated hand gloves- 2018/1 pair
Respiratory	Condition/year/make/nos	Not available
Leg and body	Condition/year/make/nos	Gumboot- Duckback/2018/2 pairs
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Yes
Vibration	Visually within limits at the time of visit	Yes
Illumination	Visually within limits at the time of visit	
Reflections	Visually within limits at the time of visit	
Temperature	Visually within limits at the time of visit	
Hazardous materials	Presence of SF ₆ Gas and Transformer oil	
Training and Documentation	Details of training conducted (if any)	
Training (Learning materials, equipment and tools)		Not adequate
Training on operational hazardous and how to control the hazards (fire, disaster)		Not adequate
Training on health risks, hygiene, and exposure prevention		Not adequate
Training on accidents and accident prevention, protective equipment and clothing		
OHSMS organization policy/Health and safety manual		
Emergency prevention, preparedness and response		
Incidents of work-related injuries, ill health, disease and accidents and their redressal		
Safety inspection, testing and		



Guidelines Considered	Information Required	
calibration		
Storage	Locations in yard by capacity	Store not present. Equipments kept at switchyard
Labelling	Location in yard by capacity	Not available
Handling	Location in yard by capacity	Not available
Solid Waste/Scraps		Not available
Handling	Locations in yard by capacity	Not available
Disposal	Locations in yard by capacity	Not available
Space for Expansion		
Availability of space for expansion	Locations in yard by capacity	Not available
Existing Grievance mechanism (if any)	Location where GRM is displayed	

Date of Visit:

Designation and Signature of Official:



Photo Gallery

Frontage



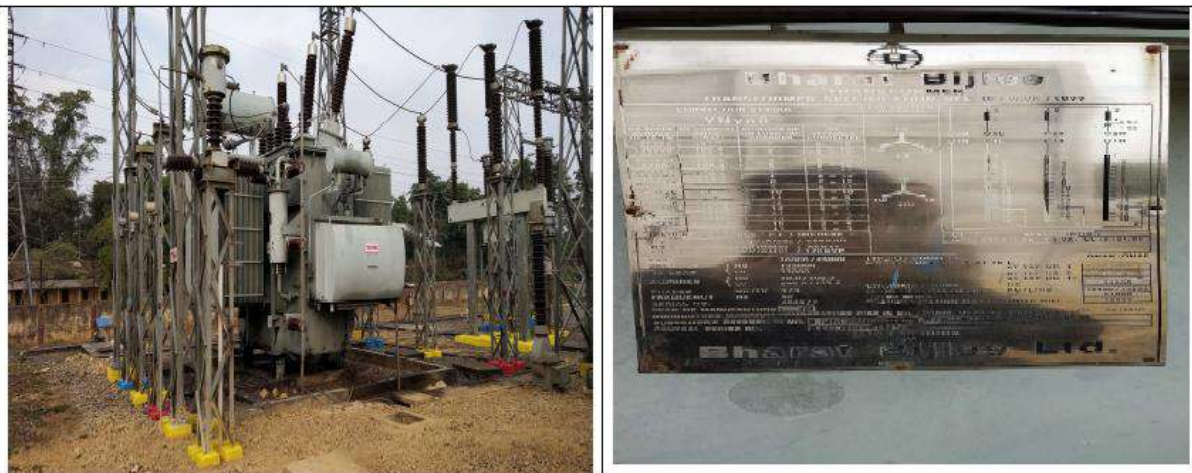
Switchyard



Fire Extinguishers



Transformers 2x25 MVA



Drainage System



Control Room



Battery Room





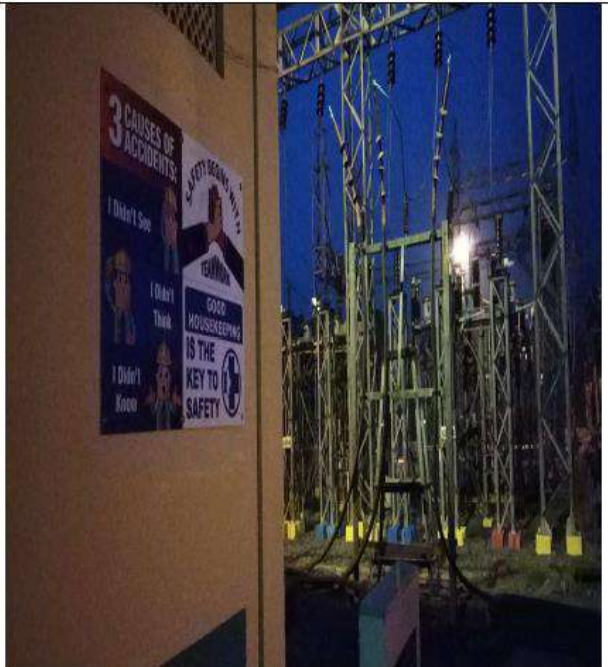
Storage of Transformer oil



Gravels



Broken slabs in yard causing health and safety hazard to workers



Sign boards in yard

EHS Checklist for Existing AEGCL Facilities

Name of Sub-Station:- 132 KV Grid Sub-Station, AEGCL, Gohpur.

Geo Coordinates of Boundary: South-East side N26°52'.12.3" E93° 35'.41.2"

North-East side N26°52'.17.2" E93° 35'.36.5"

North-West side N26°52'.15.8" E93° 35'.33.1"

South West side N26°52'.10.1" E93° 35'.37.0"

Current Area of Sub-Station: Gohpur TEA State grant , Gohpur, Biswnath, Assam.

Details of Existing Facilities and Associated Line : 132/33 KV Voltage level (2x25 MVA) Transformers , 5 nos of 132 KV feeders, 5 Nos of 33 KV feeders.

Details of Proposed Augmentation: No.

Confirmation of Land Within Existing Boundary: 49 Bigha 4 kotha 9 lescha.

Information Required

Guidelines Considered	Information Required	To be filled up by respective AGM of Field Office
Type of oil in transformers and switchgear		
Transformers	Condition/Year/Make/nos., indicate if PCB oil used	Good/2014/CGL/2x25 MVA
Oil Switchgear	Condition/Year/Make/nos., indicate if PCB oil used	NA
Safe disposal of oil	Storage location within yard.	Yes
Prevention of fires	Equipment at site (Nitrogen injection fire protection system / fire extinguishers/ sand buckets)	NIFPS - NA, fire extinguishers - Available, Sand buckets - Available
Oil labeling for storage at site	Storage of oil drums (Quantity and number of drums)	Open storage are available, 3 nos. of drums available at switchyard area.
oil leakage	Records of leakage of any (availability of pits)	No
Use of SF6 and other greenhouse/hazardous gases		No
Gas insulated switchyard	Condition/Year/Make/nos.	No
Gas insulated t/f	Condition/Year/Make/nos.	No
Presence of SF6 in switchyard	Yes/No	Yes
SF6 retrieval arrangements		NA
Presence of other hazardous gases	Yes/No. Give details if any	No
Containment, Dikes and Berms (e.g. for transformers)	Condition/Year/Make/nos	
Storage facility	Type	Small shed available inside switchyard area
Drainage	Type	Open type

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Guidelines Considered			Information Required	To be filled up by respective AGM of Field Office
oil leakage			No. of leakages in last five years	No any leakage found
Need for extra gravel			Condition	Not required
Workplace air quality				Normal
Monitoring of workplace air quality			Any measurement undertaken if any	No
Good ventilation (ensure)				Yes
Maintenance of air quality				No
Providence of respiratory equipment			Condition/Year/Make/nos.	No
Enforcement of the application of personal protective equipment whenever exposure levels of fumes, solvents and other materials exceed threshold limit				Gloves, gum boots, helmet, rain coat .
Noise control equipment			If any	No
Ambient Noise (DB)	Day	Night		-
Residential	55	45		-
Industrial	75	70		-
Maintenance of equipment			Condition/Year/Make/nos.	-
Use of protective gear when noise level exceeding 85 DB				NA
Safe working area (absence of radiation, magnetic fields)				Yes
Monitor regularly for radiation and field levels and equipment integrity (earthling, protective shields, lockouts etc.)				No
Electrocution				
Strict procedure for de-energizing before working on electrical equipment				Yes
Training of personnel for safety procedures				Yes
Physical factors in the workplace signage				Yes
Lighting (including security lights)				Yes
Fire detection mechanism/equipment			Assembly area and its capacity	No fire detection system/fire extinguishers available.
Firefighting equipment			Condition/Year/Make/nos.	Good/2020/OMEX/8
Cleanness (inside and outside substation)				Yes
First Aid Kit			Locations in yard	Control Room

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Guidelines Considered	Information Required	To be filled up by respective AGM of Field Office
Features that pose safety risks (missing or broken slabs, dogged holes, etc.)	Locations in yard	-
Fence or enclosure of the site (Restriction of unauthorized people)		Yes
Adequacy of signage (warning , caution signs)	Locations and pictures	Gate of switchyard area and at the necessary points of switchyard.
Welfare facilities		
Safe and clean drinking water	Locations	Available
Toilets	Location	Available
Guard kiosk		Yes
Personal Protective Equipment		
Eye and face	Condition/Year/Make/nos.	No
Head	Condition/Year/Make/nos.	Helmets available
Hearing	Condition/Year/Make/nos.	No
Hand	Condition/Year/Make/nos.	Gloves available
Respiratory	Condition/Year/Make/nos.	No
Leg and body	Condition/Year/Make/nos.	Gum boots available
Ambient factors in the workplace		
Noise	Visually within limits at the time of visit	Yes
Vibration	Visually within limits at the time of visit	Yes
Illumination	Visually within limits at the time of visit	Yes
Reflections	Visually within limits at the time of visit	Yes
Temperature	Visually within limits at the time of visit	Yes
Hazardous materials	Presence of SF6 Gas and Transformer oil	Yes
Training and Documentation	Details of training conducted (if any)	Safety of personnel & switchgears being trained regularly along with monitoring of SAS.
Training (Learning materials, equipments and tools)		Do
Training on operational hazardous and how to control the hazards (fire, disaster)		Do
Training on health risks, hygiene, and exposure prevention		Do


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Guidelines Considered	Information Required	To be filled up by respective AGM of Field Office
Training on accidents and accident prevention, protective equipment and clothing.		Do
OHSMS organization policy/ Health and safety manual		Not available
Emergency prevention, preparedness and response		-
Incidents of work-related injuries, ill health, disease and accidents and their redressal		No records found
Safety inspection , testing and calibration		Routine testing is done periodically / Calibration is done as per the celebrated date
Storage	Locations in yard by capacity	Open storage area, small shed
Labelling	Locations in yard by capacity	Done
Handling	Locations in yard by capacity	Handled but need improvement
Solid waste/Scraps		Yes
Handling	Locations in yard by capacity	Dustbins available
Disposal	Locations in yard by capacity	Thrown outside station at proper garbage storage.
Space for Expansion		Yes
Availability of space for expansion	Locations in yard by capacity	Available space for 132 KV Bay extensions.
Existing Grievance mechanism (If any)	Location where GRM is displayed	-

Date of Visit: 10/10/2020

Designation & Signature of officials:


 Resident Engineer
 132 KV Grid Sub-Station
 AEGCL, Gohpur


 Asstt. General Manager
 Type - 1 Grid - Sub - Station
 AEGCL, Dapur



Main Gate



Firefighting equipment Yard



Control Room Building



2x25 MVA PTR



Switchyard Area



DG Changeover Panel



DC Source



132 KV Switchyard Area

Date of Visit: 18/10/2020

Designation & Signature of officials:

[Signature]
Resident Engineer
132 KV Grid Sub-Station
AEGCL, Gohpur

[Signature]
Asstt. General Manager
Type - 1 Grid - Sub - Station
AEGCL, Deopur

Appendix 4 Checklist for Subprojects Selection

E&S Due Diligence Checklists for Subprojects Selection

Subproject Details

Subproject Name: _____

Block Name: _____

District Name: _____

Division/Subdivision: _____

Total Length of the line: _____ km

Total Area of substation: _____ ha

Construction time: _____

Subprojects Selection Criterial (Fundamental)

- All subprojects included in the AIIB Environmental and Social Exclusion List should be excluded from the Project;
- The environmental criteria in accordance with AIIB's ESP will be followed in the selection and development of new subprojects;
- Subprojects located within any sensitive areas like national parks, wildlife sanctuaries and nature reserves, or wetlands will not be selected;
- Clearing of any existing forest resources will be avoided;
- All equipment procured under the Project shall be free from polychlorinated biphenyl (PCBs);
- All civil works will be undertaken in line with the Community and Occupational Health and Safety requirements listed in the EMSPF;
- Resources of cultural or historical importance¹ will be avoided;
- All subprojects with high E&S risks and significant E&S impacts should be excluded;
- Potential E&S impacts will be minimized by routing and siting to avoid E&S sensitive areas;
- For any proposed new substations, the land shall be on government land free from informal settlers or shall be on private land to be purchased through negotiated settlement or shall be donated voluntarily without coercion by the beneficiaries;
- Only if there is no alternative land available in the area, which restricts continuation of the system, then involuntary land acquisition will be considered, after consulting with AIIB.
- E&S instruments will be disclosed in compliance with the ESP;
- Project will have a functioning GRM covering project affected people and communities;
-

¹ Cultural resources include movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance.



List of the Permits/Clearances Required Prior to Commencing the Civil Work

Type of permits	Yes	No	Explanations on the recommended time to apply for the permits
SPCB–Non objection Certificate			
Forest Department			
MoEF&CC			
For water extraction			
For Quarry			
For Disposing Spoil Materials			
Other, please describe in the last columns			



Appendix 5 Checklist for Impact Identification and Mitigations

Checklist for Identification of Environmental Impacts

Screening Checklist	Yes	No	Remarks
A. Project Siting: Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
1. Cultural heritage site			
2. Legally protected Area (core zone or buffer zone)			
3. Wetland/ Mangrove/ Estuarine			
4. Special area for protecting biodiversity			
B. Potential Environmental Impacts: Will the Project cause			
1. impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?			
2. disturbance to precious ecology (e.g. sensitive or protected areas)?			
3. alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?			
4. deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?			
5. increased air pollution due to project construction and operation?			
6. noise and vibration due to project construction or operation?			
7. involuntary resettlement of people? (physical displacement and/or economic displacement)			
8. disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			
9. poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?			
10. creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?			
11. social conflicts if workers from other regions or countries are hired?			
12. large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
13. risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
14. risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			
15. community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			
16. generation of solid waste and/or hazardous waste?			
17. use of chemicals?			
18. generation of wastewater during construction or operation?			



Checklist for Identification of Social Impacts

Particulars		Observation
A. Proposed Site Location		
1.	Land requirement for the project (GPS parcel border for Substation)	
2.	Landownership of the project area: Govt. / Private lands	
3.	Does the project require acquisition of land or transfer of Govt. land/structures? If yes please mention the area of land, number of affected structures, Households	
4.	Present usage of the land parcels is for: Agricultural purposes Residential purposes Commercial purposes Other purposes (Indicate)	
5.	Will the project lead to loss of housing?	
6.	Will the project lead to loss of agricultural land?	
7.	Will the project cause damage to private property/assets? (structures, crops, trees, etc.)	
8.	Will the project lead to loss of common property resources?	
9.	Will the project lead to loss of livelihood – directly or indirectly?	
10.	Does the project require relocation of encroachers/squatters? If yes, please elaborate number, gender and nature, if possible.	
11.	Does the project require relocation of community facilities/Govt. establishment or any object that are of religious, cultural and historical significance	
12.	Is the proposed project site encountering any site of archaeological/historical value? Cultural/Symbolic value?	
13.	Proposed project onsite/off-site support infrastructures are located in an area where residents are: All Mainstream /All Indigenous peoples/ Majority Mainstream or Non-indigenous peoples/ Majority Indigenous peoples	
B. Potential Social Impacts- Will the Project cause		
1.	involuntary resettlement of people? (physical displacement and/or economic displacement)	
2.	impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?	
3.	Will community facilities require relocation?	
4.	poor sanitation and solid waste disposal in construction camps and work sites	
5.	large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	
6.	social conflicts relating to inconveniences in living conditions where construction interferes with preexisting roads	



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Particulars		Observation
7.	Will a Resettlement Plan be required?	
8.	Impact on local economy – Fisheries, local tourism related businesses, market places, etc.?	
9.	Livelihood- Direct impact due to loss of land and structures?	
10.	Indirect impact due to loss of commercial grounds, market places, places for hawker stalls, etc.?	
11.	Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	
12.	Other social concerns relating to inconveniences in living conditions in the project areas?	
13.	Social concerns relating to local inconveniences associated with project operation, if any? (e.g. increased volume of traffic, greater risk of accidents, GBV/SE communicable disease transmission)	
14.	Does the project related work affect any objects that are of religious and cultural significance to the IPs?	
15.	Which are the 3 main economic activities that are conducted by the IP population? Will these be affected by the proposed project development and how?	
16.	Is there a requirement for an in-depth Indigenous people's plan? (IPP)	
17.	Describe any other impacts that have not been covered in this screening form	
18.	Describe alternatives, if any, to avoid or minimize displacement from private and public lands	



Project Impact Assessment Checklist

S.No.	Potential Environmental Impacts Will the Project cause	Yes	No	Remarks (If yes, what is the proposed mitigation measures and indicate which Environmental Management Standard will be implemented)
1.	encroachment on historical/cultural areas, disfiguration of landscape and increased waste generation?			
2.	encroachment on precious ecosystem (e.g. sensitive or protected areas)?			
3.	alteration of surface water hydrology of waterways crossed by roads and resulting in increased sediment in streams affected by increased soil erosion at the construction site?			
4.	deterioration of surface water quality due to silt runoff, sanitary wastes from worker-based camps and chemicals used in construction?			
5.	increased local air pollution due to rock crushing, cutting and filling?			
6.	risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
7.	chemical pollution resulting from chemical clearing of vegetation for construction site?			
8.	noise and vibration due to civil works?			
9.	dislocation or involuntary resettlement of people?			
10.	disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			
11.	social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing roads?			
12.	hazardous driving conditions where construction interferes with pre-existing roads?			
13.	creation of temporary breeding habitats for vectors of disease such as mosquitoes and rodents?			
14.	dislocation and compulsory resettlement of people living in right-of-way of the power transmission lines?			
15.	environmental disturbances associated with the maintenance of lines (e.g. routine control of vegetative height under the lines)?			
16.	facilitation of access to protected areas in case corridors traverse protected areas?			
17.	disturbances (e.g. noise and chemical pollutants) if herbicides are used to control vegetative height?			
18.	large population influx during project construction and operation that cause increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
19.	social conflicts if workers from other regions or countries are hired?			



Environmental and Social Management Planning Framework

20.	poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases from workers to local populations?			
21.	risks to community safety associated with maintenance of lines and related facilities?			
22.	community health hazards due to electromagnetic fields, land subsidence, lowered groundwater table, and salinization?			
23.	risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			
24.	community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project (e.g., high voltage wires, and transmission towers and lines) are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			
Involuntary Resettlement Screening				
25.	Will the activity be undertaken in public land or existing right of way (RoW)?			
26.	If no 1 is yes, are there any non-titled people (squatters) who live at the site or within the public land/RoW? Please provide gender disaggregated number.			
27.	Will the activity be undertaken in private land but acquired, then it has been acquired in the anticipation of the program or in the last three years?			
28.	If no 3 is yes, when the private land was acquired, the land acquired legally under GoI law? (unknown = No)			
29.	If no 3 is yes, are there any outstanding complaints about the land acquired?			
30.	Will the activity require new private land acquisition or use?			
31.	If no 6 is yes, the land will be obtained through negotiated settlement or donation?			
32.	If no 6 is yes, will it require compulsory land acquisition?			
33.	If no 6 is yes, then will the activity require permanent or temporary relocation or displacement of any people (titled or non-titled)?			
34.	If no 8 is yes, then will there be any loss of housing/accommodation or severely affected households more than 10% of their productive asset?			
35.	In all cases, will there be any loss of vegetable gardens or agriculture?			
36.	In all cases, will there be any losses of crops, fruit trees or private structures?			
37.	In all cases, will any small or informal businesses have to be moved or closed temporarily or permanently?			
38.	In all cases, will there be temporary or permanent loss of employment as a result of the renovation?			



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39.	In all cases, will there be temporary or permanent impact on women or vulnerable groups?			
Note: Project which requires compulsorily land acquisition should not be considered. Only if there is no alternative land available in the area, which restricts continuation of the system, then direct purchase through negotiation following state government act is regarded. Project which requires compulsorily housing relocation or land acquisition more than 10% of the productive assets from more than 200 persons should not be considered to exclude category A. Project marked as yes, please see the due diligence checklists and the other attachments as applicable.				
Indigenous Peoples Screening		Yes	No	Not Known
40.	1. Are the subproject areas located in scheduled tribe area?			
41.	2. Do the applicants belong to scheduled tribes?			
42.	3. Will the project directly or indirectly affect Indigenous Peoples' traditional socio-cultural and belief practices? (e.g. child-rearing, health, education, arts, and governance)			
43.	4. Will the project affect the livelihood systems of Indigenous Peoples? (e.g., food production system, natural resource management, crafts and trade, employment status)			
44.	5. Commercial development of the cultural resources and knowledge of Indigenous Peoples?			
45.	6. Physical displacement from traditional or customary lands?			
46.	7. Commercial development of natural resources (such as minerals, hydrocarbons, forests, water, hunting or fishing grounds) within customary lands under use that would impact the livelihoods or the cultural, ceremonial, spiritual uses that define the identity and community of Indigenous Peoples?			
47.	8. Establishing legal recognition of rights to lands and territories that are traditionally owned or customarily used, occupied or claimed by indigenous peoples?			
48.	9. Acquisition of lands that are traditionally owned or customarily used, occupied or claimed by indigenous peoples?			
Note: If the projects are located in scheduled tribe area or the applicants are from schedule tribes, then consultation and consent process should be carefully implemented and documented. If the projects have impacts regarding number 3-9 questions, the subproject will be categorized as B and A and cannot proceed.				



Appendix 6 Public Consultation Format

Site/Location: -----Village ----- Circle/Block-----

Districts----- Region -----

Date of Consultation: -----

Type of Area (Urban/Rural/Highly Congested Urban: -----

S.No.	ISSUES	PARTICIPANTS' OPINION, COMMENTS AND SUGGESTIONS
SOCIAL		
1	Have you heard about the Project or Do you have any information about the project?	
2	What is your opinion about this Project?	
3	Do you support this Project?	
4	Do you think that the Project is necessary?	
5	What are your main concerns/issues about the project?	
6	Can you suggest how best to address your concerns/issues?	
7	The proposed new land which may be government or privately owned. Would you volunteer to donate or sell the land for the Project?	
8	Do you expect any kind of compensation if there is loss to land or crops or trees during construction?	
9	If you need compensation, what kind of compensation will you be expecting (cash or kind) in case of land acquisition?	
10	Health status, Availability of Hospitals and over all environmental condition. Is there any chronic disease prevalent in this area and are you aware about HIV/AIDS and STP?	
11	What positive impacts and/or benefits do you think the project will have?	
12	What negative impacts do you think the project will have?	



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S.No.	ISSUES	PARTICIPANTS' OPINION, COMMENTS AND SUGGESTIONS
13	How safe do you think or consider the distribution feeder?	
14	Any criteria you would like to be considered for project design, construction and operation stage?	
15	How long have you been living in this area?	
16	Are there any indigenous people/ tribal people or ethnic minority living in this area? If yes, how far and what is the name of tribe group and what is their number of households etc.?	
17	If you are from indigenous people/tribal do you expect any impacts from projects on your culture, territory, and livelihood impacts?	
ENVIRONMENT		
1	Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites), if any	
2	Access to the forest land and the use of the forest land (if any)	
3	Current environmental conditions in the area – air, dust, noise conditions in the area.	
4	Will the project siting adversely impact the water or soil resource in the locality	
5	Type of trees in the area: Fruit/non fruit/forest/ rare/endangered species etc.	
6	Wild, endemic, endangered animals in the area.	
7	Is the consultation useful	
8	Would you support and participate during the implementation of Project	
9	Any other Suggestions?	

LIST OF PARTICIPANTS

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S.No.	Name	Age	Sex (M/F)	IP (Y/N)	Education	Occupation	Project Affected (yes/No)	Signature



Public Consultations Review Checklist

Consultation Activities	Yes	No	Issues Raised by the community
Consultations with community was conducted before finalizing the alignment			
Any suggestion received in finalizing the alignment			
At least 45% of the participants were women			
If suggestions received, are they incorporated into design			
Are there any special consultations conducted in the tribal area and are there any consents received from the tribal people (in case subprojects passing through tribal area)			

Submitted by:

(PIU or its consultant)

Name and signature:

Position:

Date:

Reviewed by:

(Either staff from AEGCL)

Name and signature:

Position:

Date:

Note from the Reviewer, if any:



Appendix 7 E&S Monitoring Report Template

Environmental and Social Monitoring Report

Reporting Period {From Month Year to Month Year}

Date {Month Year}

Title of the Project

{Example: India: Enhancement of Intra State Transmission System of Assam}

Prepared by AEGCL for the Asian Infrastructure Investment Bank

This environmental and Social monitoring report is a document of the borrower and made publicly available in accordance with AIIB's Environmental and Social Framework. The views expressed herein do not necessarily represent those of AIIB's Board of Directors, Management, or staff.



Environmental and Social Monitoring Report

{Red text serves as guide for report preparation, please delete when report is finalized.}

TITLE PAGE**TABLE OF CONTENTS****LIST OF ABBREVIATIONS** {All abbreviations in the report test should be listed here}**EXECUTIVE SUMMARY**

{One-page summary of the project's status and environmental compliance during the reporting period}

1.0 Introduction**1.1 Brief Project Description** {Include maps showing site location and vicinity and table with GPS coordinates}**1.2 Project Progress Status and Implementation Schedule**

{Describe the project milestones during the reporting period and highlight any change from original scope, alignment, methodology, and/or schedule.}

{The project Gantt chart may be included}

{Include a simplified table like the sample below}

Project Component • Stage	Target Date {and Revised Target Date if delayed}	Progress Status {not yet started; on-going; completed}	Percent Completed	Remarks
Substation Component	Example for reporting period Jan-June 2020			
• Contract Award	31 Jan 2020	Completed	100%	Contract Awarded to XYZ Contractor
• Construction (civil works, installation of equipment, ...)	31 Mar 2020(original target completion was 31 Dec 2020)	On-going	85%	There was a delay in the delivery of equipment...
•				



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•				

2.0 Compliance to Applicable Regulations/Standards

{Include the applicable Regulations/Standards following the sample table below}

Regulations/Standards	Compliance Requirements under the Regulation	Compliance Status {complied; not complied; n/a at current stage of the project}	Remarks {provide details to show how compliance was achieved; or explain the corrective action done if there was non-compliance}

3.0 Compliance to Environmental and Social Covenants from the AIIB Loan Agreement

{Include Loan Agreement covenants on environment and social following the sample table below}

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

4.0 Compliance to the Civil Work Contract Agreement

{Include EHS Clauses following the sample table below}

Schedule #, Para. #	EHS Clauses	Compliance Status {complied; not complied; n/a at current stage of the project}	Remarks {provide details to show how compliance was achieved; or explain the corrective action done if there was non-compliance}

5.0 Compliance to Environmental and Social Management Plan

{With reference to the ESMP and its cost, include a table with the compliance status during the reporting period, with remarks to show how compliance was achieved or not}

6.0 Compliance to Resettlement Action Plan and Indigenous People's Plan (If Any)

{With reference to the RAP and its budget, include a table with the compliance status during the reporting period, with remarks to show how compliance was achieved or not}

7.0 Summary of Monitoring Results

7.1 Environmental and Social Monitoring

{With reference to the Environmental and Social Monitoring Plan (ESMoP) (if any) of the project, include a table to summarize the results of the monitoring done during the reporting period. Please indicate the monitoring location, date, time (or duration as applicable), parameters measured, the standards, tests and limits used, and provide the corrective action plan if there was any exceedance to the standards}

7.2 Capacity Building Monitoring

{With reference to the ESMP of the project, include the trainings/drills/inspections conducted during the reporting period following the table below. Include as appendices the training/drill/inspection agenda, attendance sheets, and photos}

Trainings/Drills/Inspections	Number and Position of Participant/s	Location/s and Date/s	Remarks
Example: Fire Drill	50 Laborers	15 Aug 2018	Participants safely evacuated the site...

7.3 Accident Monitoring

{If there was any accident, near-miss, illness, or other incidents during the reporting period (or previously reported accident with ongoing rectification), provide the corrective action done following the table below. Include as appendices the work safety checklists, incident reports, and other relevant supporting documents}

Occupational Accident	Number and Position of Person/s Involved	Location/s and Date/s of Incident	Description of Incident	Corrective Action
Fatality				
Non-fatal Injury				
Near-miss				
Illness				
Other Incidents				

7.4 Highlighted Actions



Items	Description
Gender	
Disability	
Climate	
Others	

8.0 Implementation of Grievance Redress Mechanism and Complaints Received

{Include a description of the GRM, provide a flowchart and list of grievance redress committee members}

{If there was any grievance or complaint during the reporting period (or previously reported complaint with ongoing rectification), provide remarks following the table below}

Complainant/s or Affected Persons	Location/s and Date/s of Complaint	Description of Grievance/Complaint	Timeline*	Remarks

- As specified in the GRM arrangement of ESMPF

9.0 Corrective Action Plan

{Based on the analysis, prepare a time-bound corrective action plan if there was non-compliance or unanticipated environmental and social impacts, and check the implementation status in the subsequent phase monitoring}

10.0 Conclusion and Recommendations

{Limit the conclusion to safeguards highlights or issues resolution during the reporting period, and the recommendations or actions to be done in the next period}

APPENDICES

Photographs {Include photographs of the project site taken during the reporting period. For each photo, provide a caption with description, location and date}

Supporting Documents {Laboratory results, meeting agenda and attendance, checklists, etc.}



Appendix 8 Ambient Environmental Standards

Ambient Air Quality Standards

S.No.	Pollutant	Time Weighted Average	New Standards (Schedule VII, Rule 3 (3B) 16th Nov 2009		Methods of measurement
			Concentration in Ambient Air		
			Industrial Area, Residential, Rural & other Areas	Ecologically sensitive area (Notified by Central Govt)	
1.	Sulphur Dioxide (SO2)	Annual*	50	20	Improved West & Geake, Ultraviolet fluorescence
		24 Hours**	80	80	
2.	Nitrogen Dioxide (NO2)	Annual *	40	30	Modified Jacob & Hochheiser (Na-Arsenite) Chemiluminescence
		24 Hours**	80	80	
3.	Particulate matter (Size less than 10 µm) or PM10	Annual*	60	60	Gravimetric, TEOM, Beta attenuation
		24 Hours**	100	100	
4.	Particulate matter (Size less than 2.5 µm) or PM2.5	Annual*	40	40	Gravimetric, TEOM, Beta attenuation
		24 Hours**	60	60	

*Annual Arithmetic mean of minimum 104 measurements in a year taken twice a Week 24 hourly at uniform interval

** 24 hourly / 8 hourly or 1 hourly monitored value as applicable shall be complied with 98 % of the time in a year. However, 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

Comparison of GoI and WHO standards

AQ Parameters 24 hour max content	SO ₂ in ug/m ³	NO ₂ in ug/m ³	TSP PM ₁₀ in ug/m ³	TSP PM _{2.5} in ug/m ³
GoI regulations -24 hour	80	80	100	60
WHO Ambient Air Quality (WB EHS 2007) Guidelines-24 hour	20	40 (Annual)	50	25

Between the GoI regulations and WHO (IFC/World Bank EHS) guidelines, the latter, which is more stringent will be followed for monitoring purposes. Data suggest that several locations would be Degraded Airshed for PM. Careful attention will be paid to dust management in vicinity of receptors for construction phase.

Ambient Noise Level Standards

(The Principal Rules were published in the Gazette of India, vide S.O. 123(E), dated 14.2.2000 and subsequently amended vide S.O. 1046(E), dated 22.11.2000, S.O. 1088(E), dated 11.10.2002, S.O. 1569 (E), dated 19.09.2006 and S.O. 50 (E) dated 11.01.2010 under the Environment (Protection) Act, 1986.)



SCHEDULE (rule 3(1) and 4(1))

Area	Limits in db (A) Leq*	
	Day Time	Night Time
Industrial Area	75	70
Commercial Area	65	55
Residential Area	55	45
Silence Zone	50	40

Note: - 1. Day time shall mean from 6.00 a.m. to 10.00 p.m.
 2. Night time shall mean from 10.00 p.m. to 6.00 a.m.
 3. Silence zone is an area comprising not less than 100m around hospitals, educational institutions, courts, religious places or any other area which is declared as such by the competent authority
 4. Mixed categories of areas may be declared as one of the four above mentioned categories by the competent authority.

* dB(A) Leq denotes the time weighted average of the level of sound in decibels on scale A which is relatable to human hearing.

A “decibel” is a unit in which noise is measured.

“A”, in dB(A) Leq, denotes the frequency weighting in the measurement of noise and corresponds to frequency response characteristics of the human ear.

Leq: It is an energy mean of the noise level over a specified period.

Comparison of GoI and WHO standards

Area Code	Category of Area/Zone	CPCB Limits in dB(A) Leq *		IFC One Hour LAeq (dBA)	
		Day Time	Nighttime	Day Time	Nighttime
(A)	Industrial area	75	70	70	70
(B)	Commercial area	65	55	70	70
(C)	Residential area	55	45	55	45
(D)	Silence Zone	50	40	55	45

The more stringent standards among the GoI, IFC/World Bank EHS/WHO guidelines will be followed for monitoring purposes. Data suggest that all locations would have noise levels exceeding the existing limits. Careful attention will be paid to Noise pollution Management in vicinity of receptors during construction phase



Ground Water Quality Standards

Indian Standard IS: 10500:2012 (Ground Water)

Table I Organoleptic and Physical Characters

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 3025	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Colour, Hazen units, <i>Max</i>	5	15	Part 4	Extended to 15 only, if toxic substances are not suspected in absence of alternate sources
ii)	Odour	Agreeable	Agreeable	Part 5	a) Test cold and when heated b) Test at several dilutions
iii)	pH value	6.5-8.5	No relaxation	Part 11	—
iv)	Taste	Agreeable	Agreeable	Parts 7 and 8	Test to be conducted only after safety has been established
v)	Turbidity, NTU, <i>Max</i>	1	5	Part 10	—
vi)	Total dissolved solids, mg/l, <i>Max</i>	500	2 000	Part 16	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.



Table II: General Parameters Concerning Substances Undesirable in Excess

Sl No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Aluminium (as Al), mg/l, <i>Max</i>	0.03	0.2	IS 3025 (Part 55)	—
ii)	Ammonia (as total ammonia-N), mg/l, <i>Max</i>	0.5	No relaxation	IS 3025 (Part 34)	—
iii)	Anionic detergents (as MBAS) mg/l, <i>Max</i>	0.2	1.0	Annex K of IS 13428	—
iv)	Barium (as Ba), mg/l, <i>Max</i>	0.7	No relaxation	Annex F of IS 13428* or IS 15302	—
v)	Boron (as B), mg/l, <i>Max</i>	0.5	1.0	IS 3025 (Part 57)	—
vi)	Calcium (as Ca), mg/l, <i>Max</i>	75	200	IS 3025 (Part 40)	—
vii)	Chloramines (as Cl_2), mg/l, <i>Max</i>	4.0	No relaxation	IS 3025 (Part 26)* or APHA 4500-Cl G	—
viii)	Chloride (as Cl), mg/l, <i>Max</i>	250	1 000	IS 3025 (Part 32)	—
ix)	Copper (as Cu), mg/l, <i>Max</i>	0.05	1.5	IS 3025 (Part 42)	—
x)	Fluoride (as F) mg/l, <i>Max</i>	1.0	1.5	IS 3025 (Part 60)	—
xi)	Free residual chlorine, mg/l, <i>Min</i>	0.2	1	IS 3025 (Part 26)	To be applicable only when water is chlorinated. Tested at consumer end. When protection against viral infection is required, it should be minimum 0.5 mg/l
xii)	Iron (as Fe), mg/l, <i>Max</i>	0.3	No relaxation	IS 3025 (Part 53)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xiii)	Magnesium (as Mg), mg/l, <i>Max</i>	30	100	IS 3025 (Part 46)	—
xiv)	Manganese (as Mn), mg/l, <i>Max</i>	0.1	0.3	IS 3025 (Part 59)	Total concentration of manganese (as Mn) and iron (as Fe) shall not exceed 0.3 mg/l
xv)	Mineral oil, mg/l, <i>Max</i>	0.5	No relaxation	Clause 6 of IS 3025 (Part 39) Infrared partition method	—
xvi)	Nitrate (as NO_3), mg/l, <i>Max</i>	45	No relaxation	IS 3025 (Part 34)	—
xvii)	Phenolic compounds (as C_6H_5OH), mg/l, <i>Max</i>	0.001	0.002	IS 3025 (Part 43)	—
xviii)	Selenium (as Se), mg/l, <i>Max</i>	0.01	No relaxation	IS 3025 (Part 56) or IS 15303*	—
xix)	Silver (as Ag), mg/l, <i>Max</i>	0.1	No relaxation	Annex J of IS 13428	—
xx)	Sulphate (as SO_4) mg/l, <i>Max</i>	200	400	IS 3025 (Part 24)	May be extended to 400 provided that Magnesium does not exceed 30
xxi)	Sulphide (as H_2S), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 29)	—
xxii)	Total alkalinity as calcium carbonate, mg/l, <i>Max</i>	200	600	IS 3025 (Part 23)	—
xxiii)	Total hardness (as $CaCO_3$), mg/l, <i>Max</i>	200	600	IS 3025 (Part 21)	—
xxiv)	Zinc (as Zn), mg/l, <i>Max</i>	5	15	IS 3025 (Part 49)	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.



Table III: Parameters Concerning Toxic Substances

SI No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Cadmium (as Cd), mg/l, <i>Max</i>	0.003	No relaxation	IS 3025 (Part 41)	—
ii)	Cyanide (as CN), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 27)	—
iii)	Lead (as Pb), mg/l, <i>Max</i>	0.01	No relaxation	IS 3025 (Part 47)	—
iv)	Mercury (as Hg), mg/l, <i>Max</i>	0.001	No relaxation	IS 3025 (Part 48) Mercury analyser	—
v)	Molybdenum (as Mo), mg/l, <i>Max</i>	0.07	No relaxation	IS 3025 (Part 2)	—
vi)	Nickel (as Ni), mg/l, <i>Max</i>	0.02	No relaxation	IS 3025 (Part 54)	—
vii)	Pesticides, µg/l, <i>Max</i>	See Table 5	No relaxation	See Table 5	—
viii)	Polychlorinated biphenyls, mg/l, <i>Max</i>	0.000 5	No relaxation	ASTM 5175*	—
ix)	Polynuclear aromatic hydrocarbons (as PAH), mg/l, <i>Max</i>	0.000 1	No relaxation	APHA 6440	or APHA 6630 —
x)	Total arsenic (as As), mg/l, <i>Max</i>	0.01	0.05	IS 3025 (Part 37)	—
xi)	Total chromium (as Cr), mg/l, <i>Max</i>	0.05	No relaxation	IS 3025 (Part 52)	—
xii)	Trihalomethanes:				
a)	Bromoform, mg/l, <i>Max</i>	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
b)	Dibromochloromethane, mg/l, <i>Max</i>	0.1	No relaxation	ASTM D 3973-85* or APHA 6232	—
c)	Bromodichloromethane, mg/l, <i>Max</i>	0.06	No relaxation	ASTM D 3973-85* or APHA 6232	—
d)	Chloroform, mg/l, <i>Max</i>	0.2	No relaxation	ASTM D 3973-85* or APHA 6232	—

NOTES

1 In case of dispute, the method indicated by '*' shall be the referee method.

2 It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table IV: Parameters Concerning Radioactive Substances

SI No.	Characteristic	Requirement (Acceptable Limit)	Permissible Limit in the Absence of Alternate Source	Method of Test, Ref to Part of IS 14194	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
i)	Radioactive materials:				
a)	Alpha emitters Bq/l, <i>Max</i>	0.1	No relaxation	Part 2	—
b)	Beta emitters Bq/l, <i>Max</i>	1.0	No relaxation	Part 1	—

NOTE — It is recommended that the acceptable limit is to be implemented. Values in excess of those mentioned under 'acceptable' render the water not suitable, but still may be tolerated in the absence of an alternative source but up to the limits indicated under 'permissible limit in the absence of alternate source' in col 4, above which the sources will have to be rejected.

Table V: Pesticides Residue Limits and Test Method

Sl No.	Pesticide	Limit µg/l	Method of Test, Ref to	
			USEPA	AOAC/ ISO
(1)	(2)	(3)	(4)	(5)
i)	Alachlor	20	525.2, 507	—
ii)	Atrazine	2	525.2, 8141 A	—
iii)	Aldrin/ Dieldrin	0.03	508	—
iv)	Alpha HCH	0.01	508	—
v)	Beta HCH	0.04	508	—
vi)	Butachlor	125	525.2, 8141 A	—
vii)	Chlorpyrifos	30	525.2, 8141 A	—
viii)	Delta HCH	0.04	508	—
ix)	2,4- Dichlorophenoxyacetic acid	30	515.1	—
x)	DDT (<i>o, p</i> and <i>p, p</i> – Isomers of DDT, DDE and DDD)	1	508	AOAC 990.06
xi)	Endosulfan (alpha, beta, and sulphate)	0.4	508	AOAC 990.06
xii)	Ethion	3	1657 A	—
xiii)	Gamma — HCH (Lindane)	2	508	AOAC 990.06
xiv)	Isoproturon	9	532	—
xv)	Malathion	190	8141 A	—
xvi)	Methyl parathion	0.3	8141 A	ISO 10695
xvii)	Monocrotophos	1	8141 A	—
xviii)	Phorate	2	8141 A	—

NOTE — Test methods are for guidance and reference for testing laboratory. In case of two methods, USEPA method shall be the reference method.

Table VI: Bacteriological Quality of Drinking Water

Sl No.	Organisms	Requirements
(1)	(2)	(3)
i)	All water intended for drinking:	
a)	<i>E. coli</i> or thermotolerant coliform bacteria ^{25, 31}	Shall not be detectable in any 100 ml sample
ii)	Treated water entering the distribution system:	
a)	<i>E. coli</i> or thermotolerant coliform bacteria ²⁹	Shall not be detectable in any 100 ml sample
b)	Total coliform bacteria	Shall not be detectable in any 100 ml sample
iii)	Treated water in the distribution system:	
a)	<i>E. coli</i> or thermotolerant coliform bacteria	Shall not be detectable in any 100 ml sample
b)	Total coliform bacteria	Shall not be detectable in any 100 ml sample

¹⁰Immediate investigative action shall be taken if either *E.coli* or total coliform bacteria are detected. The minimum action in the case of total coliform bacteria is repeat sampling; if these bacteria are detected in the repeat sample, the cause shall be determined by immediate further investigation.

²⁰Although, *E. coli* is the more precise indicator of faecal pollution, the count of thermotolerant coliform bacteria is an acceptable alternative. If necessary, proper confirmatory tests shall be carried out. Total coliform bacteria are not acceptable indicators of the sanitary quality of rural water supplies, particularly in tropical areas where many bacteria of no sanitary significance occur in almost all untreated supplies.

³⁰It is recognized that, in the great majority of rural water supplies in developing countries, faecal contamination is widespread. Under these conditions, the national surveillance agency should set medium-term targets for progressive improvement of water supplies.

Source: Indian Standard (IS: 10500:2012)



Surface Water Quality Standards

The classification of water based on designated use is prescribed below:

Designated-Best-Use	Class of Water	Criteria
Drinking Water Source without conventional treatment but after disinfection	A	Total Coliforms Organism MPN/100ml shall be 50 or less pH between 6.5 and 8.5 Dissolved Oxygen 6mg/l or more Biochemical Oxygen Demand 5 days 20C 2mg/l or less
Outdoor bathing (Organized)	B	Total Coliforms Organism MPN/100ml shall be 500 or less pH between 6.5 and 8.5 Dissolved Oxygen 5mg/l or more Biochemical Oxygen Demand 5 days 20C 3mg/l or less
Drinking water source after conventional treatment and disinfection	C	Total Coliforms Organism MPN/100ml shall be 5000 or less pH between 6 to 9 Dissolved Oxygen 4mg/l or more Biochemical Oxygen Demand 5 days 20C 3mg/l or less
Propagation of Wild life and Fisheries	D	pH between 6.5 to 8.5 Dissolved Oxygen 4mg/l or more Free Ammonia (as N) 1.2 mg/l or less
Irrigation, Industrial Cooling, Controlled Waste disposal	E	pH between 6.0 to 8.5 Electrical Conductivity at 25C micro mhos/cm Max.2250 Sodium absorption Ratio Max. 26 Boron Max. 2mg/l

As per Bureau of Indian Standards has also recommended water quality parameters for different uses in the standard **IS 2296:1992**.

Water Quality Standards in India (Source IS 2296:1992)						
Characteristics	Unit	A	B	C	D	E
Biochemical Oxygen demand (BOD)	mg/l	2	3	3	-	-
Total coliform organisms	MPN/100ml	50	500	5000	-	-
pH value		6.5-8.5	6.5-8.5	6.0-9.0	6.5-8.5	6.0-8.5
Colour	Hazen units	10	300	300	-	-
Odour		Un-objectionable			-	-
Taste		Tasteless	-	-	-	-
Total dissolved solids	mg/l	500	-	1500	-	2100
Total hardness (as CaCO ₃)	mg/l	200	-	-	-	-
Calcium hardness (as CaCO ₃)	mg/l	200	-	-	-	-
Magnesium hardness (as CaCO ₃)	mg/l	200	-	-	-	-
Copper (as Cu)	mg/l	1.5	-	1.5	-	-
Iron (as Fe)	mg/l	0.3	-	0.5	-	-
Manganese (as Mn)	mg/l	0.5	-	-	-	-
Chlorides (as Cu)	mg/l	250	-	600	-	600
Sulphates (as SO ₄)	mg/l	400	-	400	-	1000
Nitrates (as NO ₃)	mg/l	20	-	50	-	-
Fluorides (as F)	mg/l	1.5	1.5	1.5	-	-
Phenolic compounds (as C ₂ H ₅ OH)	mg/l	0.002	0.005	0.005	-	-
Mercury (as Hg)	mg/l	0.001	-	-	-	-
Cadmium (as Cd)	mg/l	0.01	-	0.01	-	-



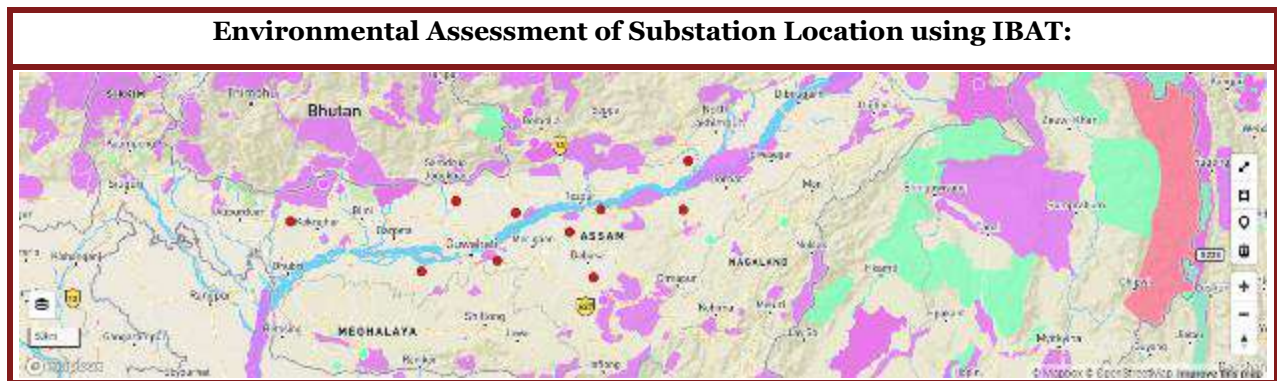
Environmental and Social Management Planning Framework

Water Quality Standards in India (Source IS 2296:1992)						
Characteristics	Unit	A	B	C	D	E
Selenium (as Se)	mg/l	0.01	-	0.05	-	-
Arsenic (as As)	mg/l	0.05	0.2	0.2	-	-
Cyanide (as Pb)	mg/l	0.05	0.05	0.05	-	-
Lead (as Pb)	mg/l	0.1	-	0.1	-	-
Zinc (as Zn)	mg/l	15	-	15	-	-
Chromium (as Cr6+)	mg/l	0.05	-	0.05	-	-
Anionic detergents (as MBAS)	mg/l	0.2	1	1	-	-
Barium (as Ba)	mg/l	1	-	-	-	-
Free Ammonia (as N)	mg/l	-	-	-	1.200	-
Electrical conductivity	micromhos/cm	-	-	-	-	2,250
Sodium absorption ratio	max	-	-	-	-	26
Boron	mg/l	-	-	-	-	2



Appendix 9 Assessment of Proposed Substations and Transmission lines (BEE line) using IBAT

BEE Line Assessment of Proposed Transmission Lines



Source: <https://ibat-alliance.org/>

Proposed Substation Locations do not fall under IBA's or any designated Protected Areas



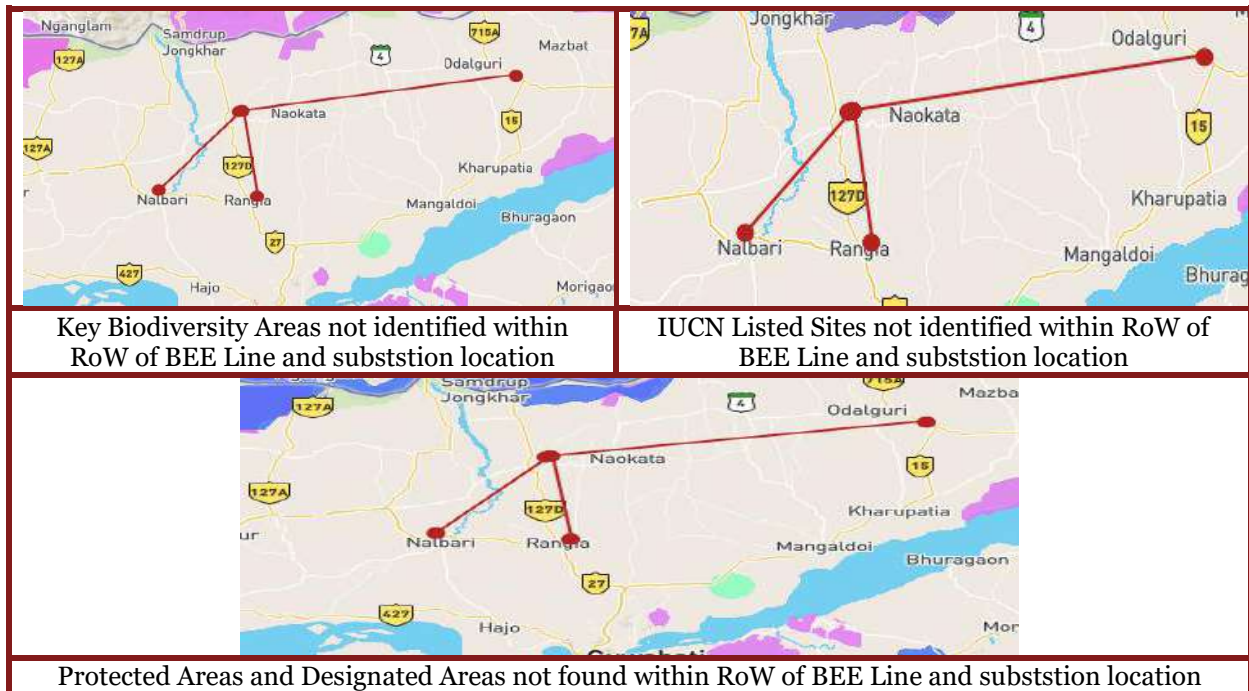
Key Biodiversity Areas not identified within RoW of BEE Line and substion location

IUCN Listed Sites not identified within RoW of BEE Line and substion location

Protected Areas and Designated Areas not found within RoW of BEE Line and substion location

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2. Proposed 400/220 kV Substation at Rangia and Associated Lines (Bee Line) & Proposed 132/33kV Substation at Kumarikata and Associated Lines

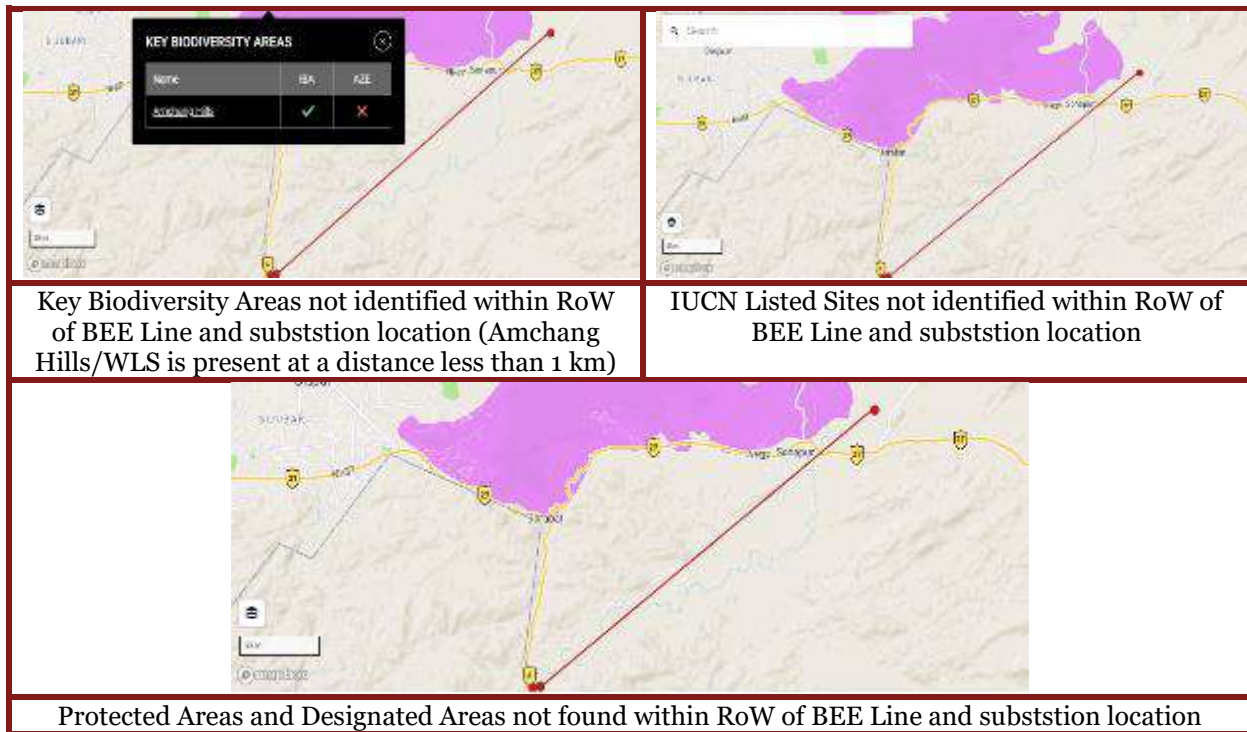


Source: <https://ibat-alliance.org>



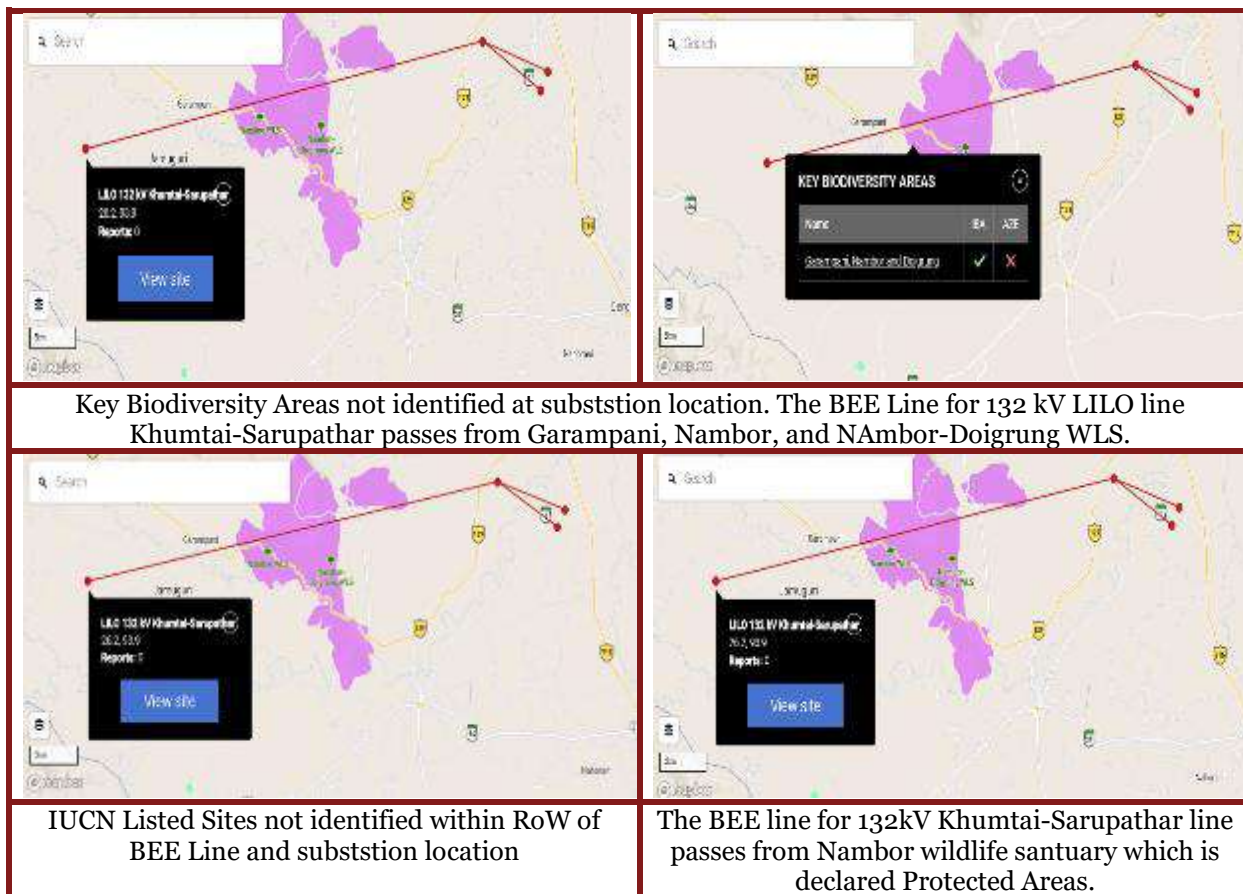
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3. 400/220 kV (2 X 500 MVA) Substation at Sonapur and Associated Lines (Bee Line)



Environmental and Social Management Planning Framework

4. 220/132 kV (2 X 160 MVA) & 132/33 kV (2 X 50 MVA) S/s at Khumtai and Associated Lines (Bee Line)



Name: Garampani, Nambor and Nambor-Doigrung WLS

Area: 1500 Ha

Summary: This site has been identified as an Important Bird and Biodiversity Area and Key Biodiversity Area based on the presence of significant populations of globally threatened species, listed below:

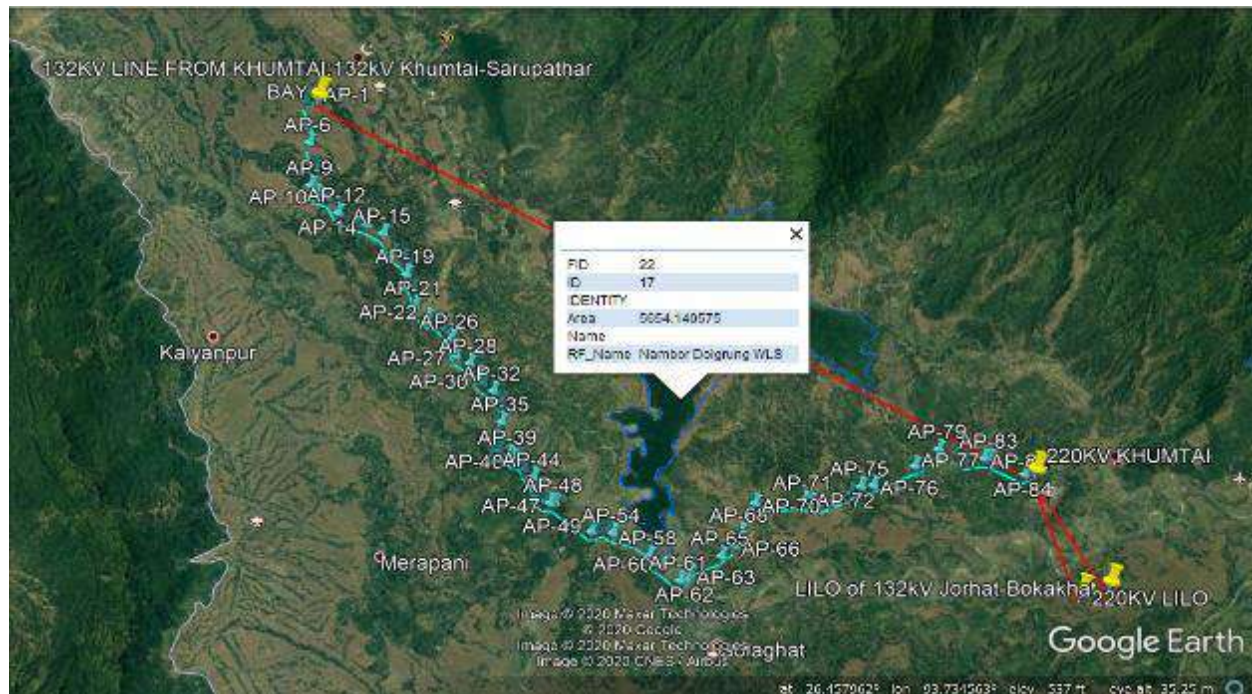
Species (Birds)	Common name	IUCN Red List Category
<i>Asarcornis scutulata</i>	White-winged Duck	EN
<i>Leptoptilos javanicus</i>	Lesser Adjutant	VU

Note: To avoid traversing the transmission line route through WLS, AEGCL has carries out another route selection study. The results of alternative assessment (below) suggest that the alternative proposed route does not pass from Nambor wildlife sanctuary. Careful consideration is made to keep the tower footing as well as stringing of conductors outside the Nambor wildlife sanctuary.



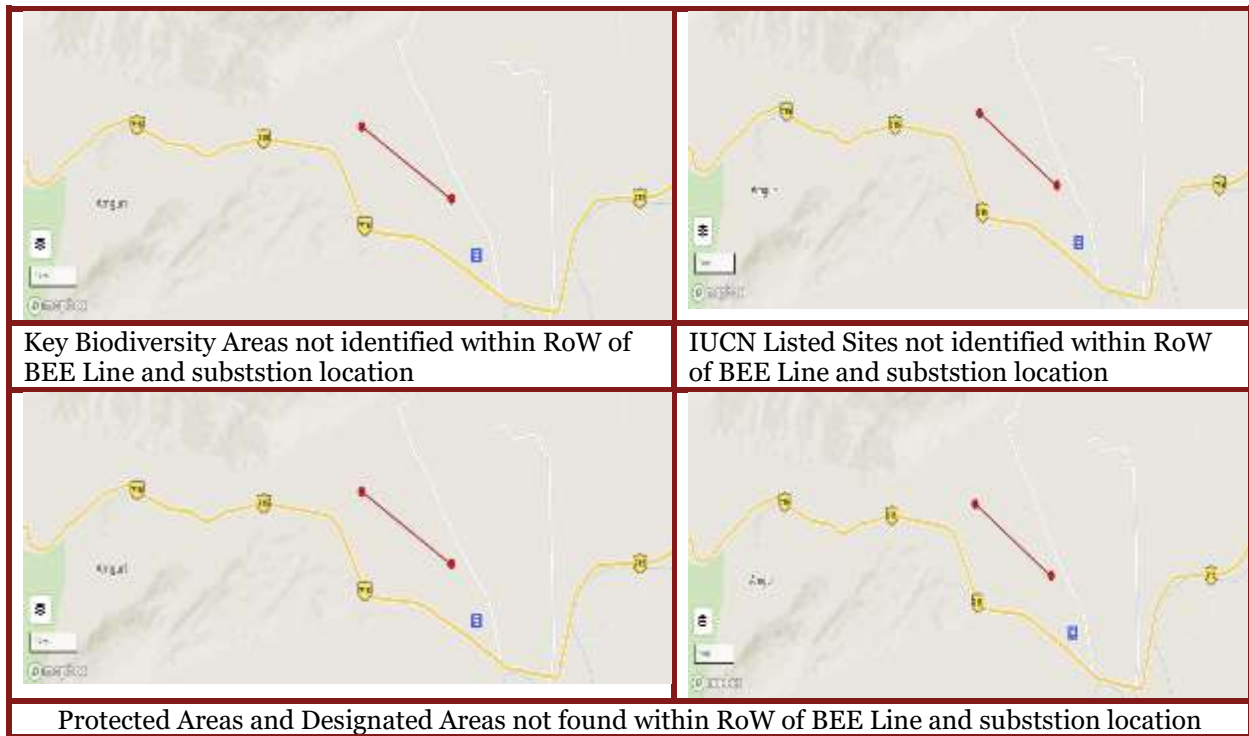
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The proposed alternative route (marked in Berylline) and Bee line (Marked in Red) with superimposition on PA map (Boundary marked in Blue) is as follows:







Environmental and Social Management Planning Framework

5. Proposed 220kV Substation at Jakhalabandha and Associated Lines (Bee Line)



Environmental and Social Management Planning Framework

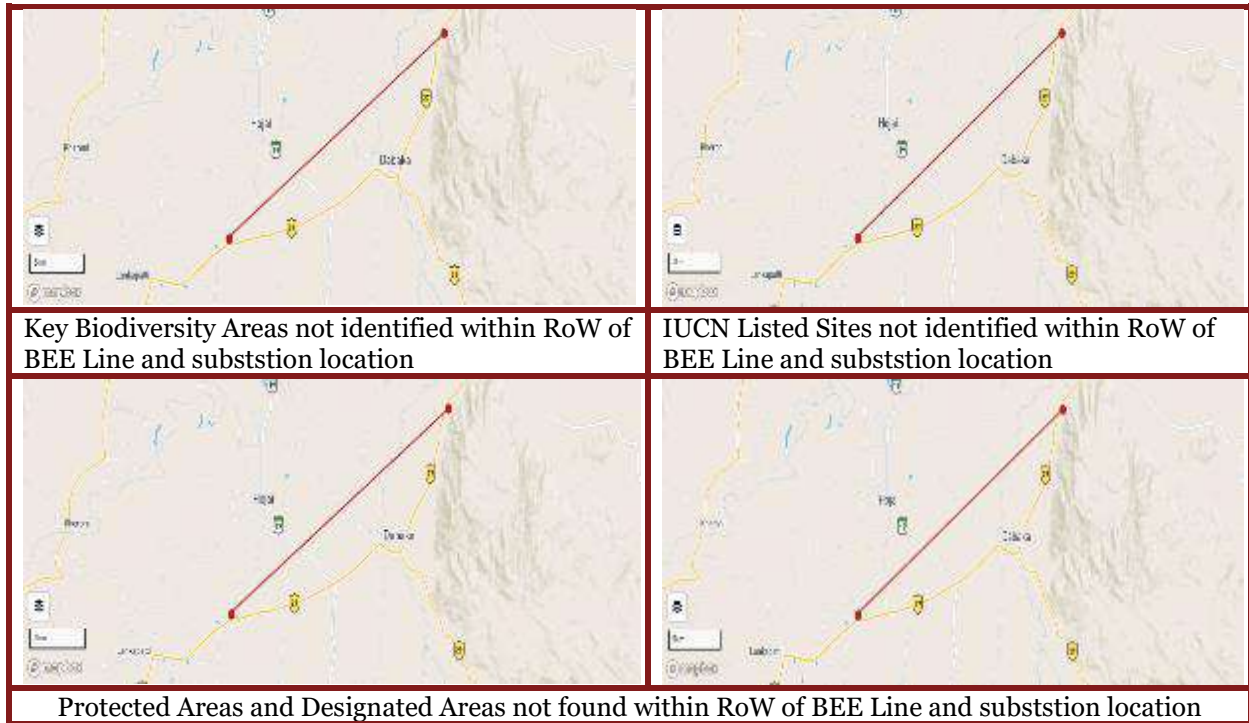
6. Proposed 220/33 kV (2 X 100 MVA) Substation at Chhaygaon and Associated Lines (Bee Line)

	
<p>Key Biodiversity Areas not identified within RoW of BEE Line and subststion location</p>	<p>IUCN Listed Sites not identified within RoW of BEE Line and subststion location</p>
	
<p>Protected Areas and Designated Areas not found within RoW of BEE Line and subststion location</p>	



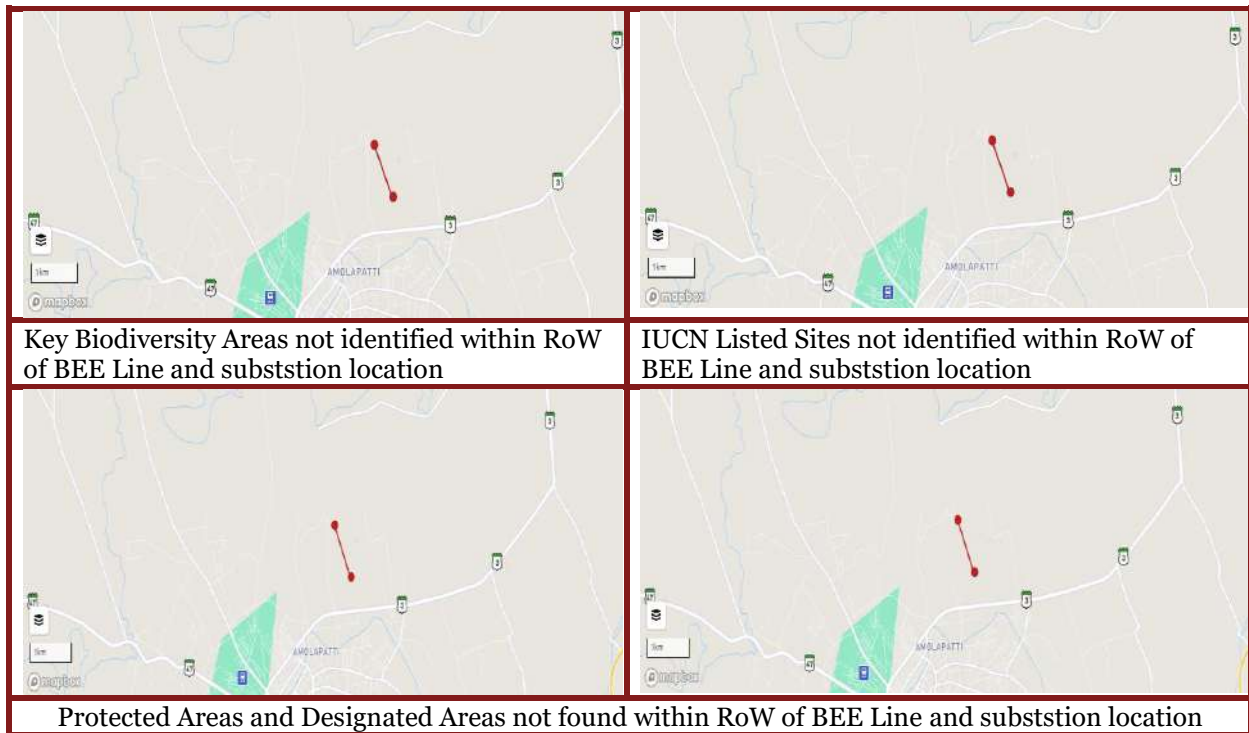
Environmental and Social Management Planning Framework

7. Proposed 220/132 kV (2 X 160 MVA) Substation at Shankardevnagar and Associated Lines (Bee Line)



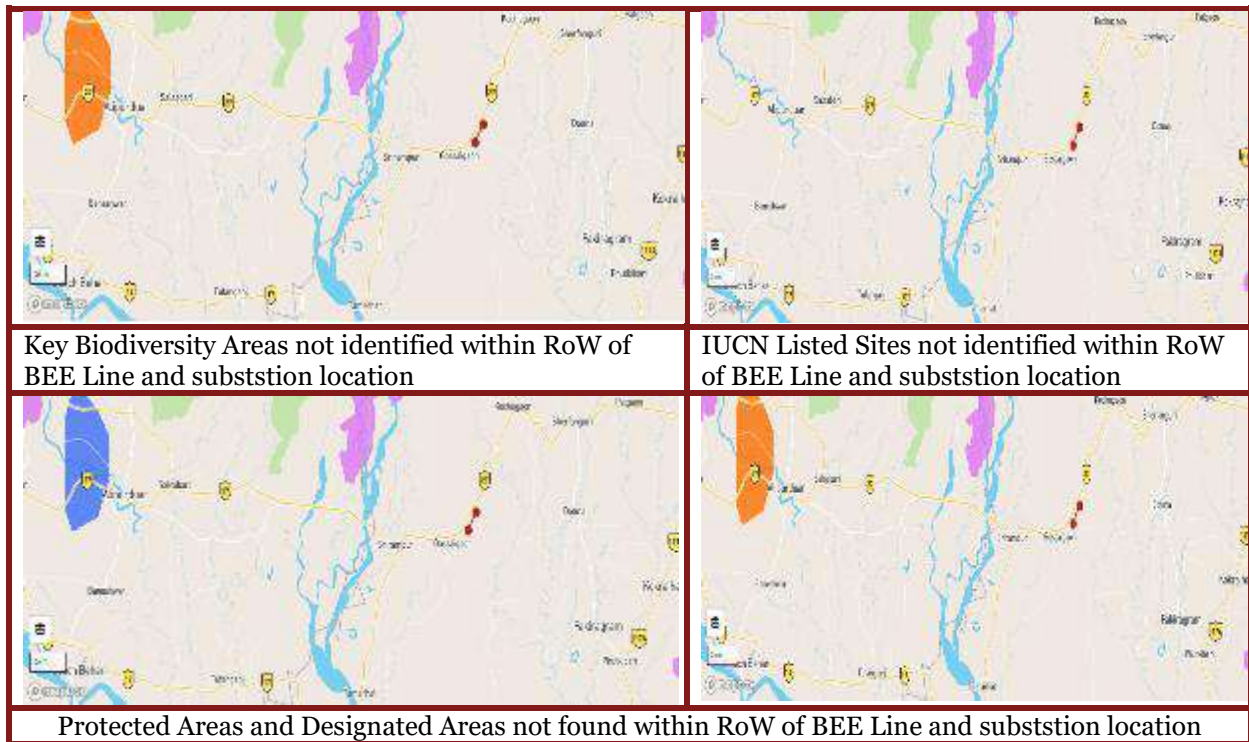
Environmental and Social Management Planning Framework

8. Proposed 220/33 kV (2 X 100 MVA) Substation at Nagaon-2 and Associated Lines (Bee Line)



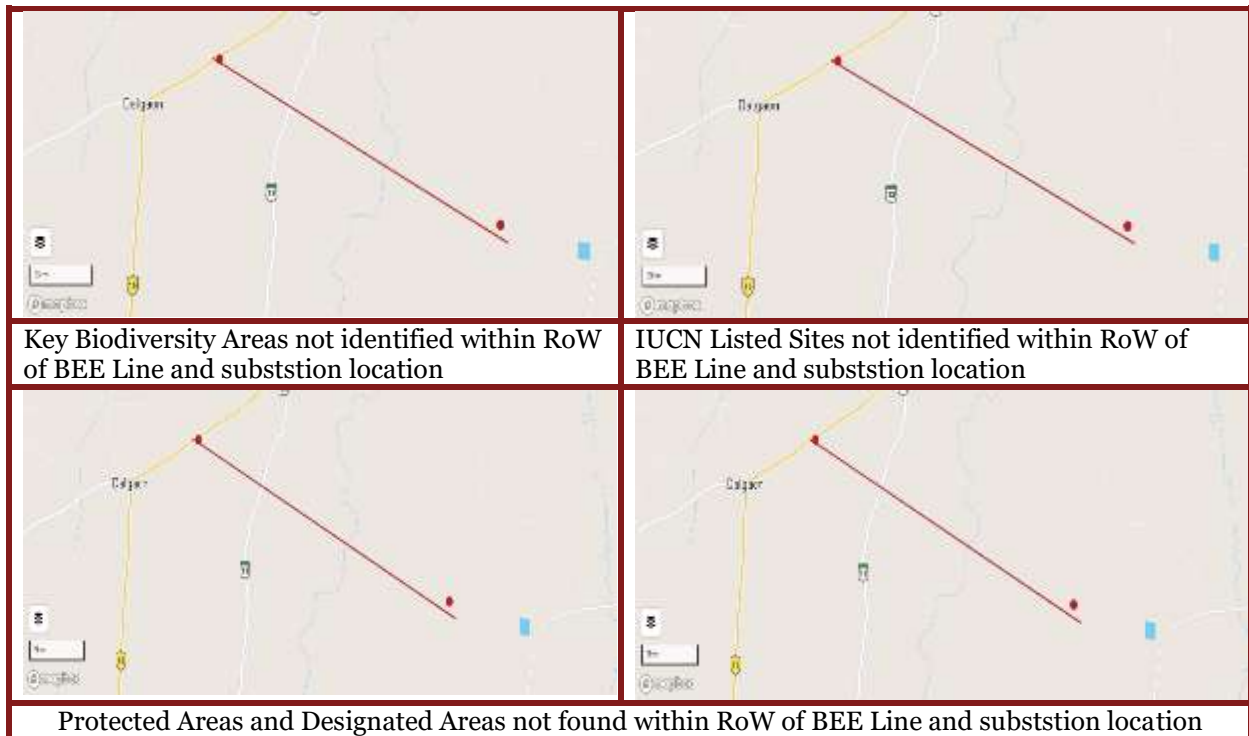
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9. Proposed 220/132 kV (2 X 50 MVA) Substation at Agamoni and Proposed Line (Bee Line)



Environmental and Social Management Planning Framework

10. Proposed 132/33 kV (2 X 50 MVA) Substation at Burhigaon and Associated Lines (Bee Line)



Environmental and Social Management Planning Framework

Legends for Reference

 Alliance for Zero Extinction Sites ✓	 National ✓	 IUCN Management Ia ✓
 Important Bird and Biodiversity Areas ✓	 Natura2000 ✓	 IUCN Management Ib ✓
 Other ✓	 Regional Seas ✓	 IUCN Management II ✓
 Governance by government ✓	 World Heritage ✓	 IUCN Management III ✓
 Shared governance ✓	 Ramsar ✓	 IUCN Management IV ✓
 Private governance ✓	 MAB ✓	 IUCN Management V ✓
 Governance by indigenous peoples and local communities ✓		 IUCN Management VI ✓
		 IUCN Management Not Applicable ✓



Appendix 10 Attendance Sheets for Consultation and Photographs of Site Visits

Attendance Sheet

"Consultancy service for Environmental and Social Management Planning Framework,"
For the Project Enhancement of Intra State Transmission System of ASSAM

Attendance Sheet for Consultation

Project Name	220/132/33 KV Khuntai S/S + LLD
Division	Jorhat
Date	07/11/2019
Venue	Khuntai S/S (proposed site)
Number of Participants	10
Points of Discussion	① Land Ownership & transfer status ② Involvement of bee culturing ③ Elephant corridors in the vicinity (7-8 PM) ④ Ownership - TATA enterprise (currently) ⑤

S.No.	Name	Occupation	Contact Number	Signature
1.	Promit Basu	Deputy Manager Lathapoojam. T. Co A.P.P.L.	8011208275	
2.	Anshu Joshi	Asst. Gen. Manager REGCL	8638651421	
3.	Mansum Rm. Sika	Assistant Manager A.P.P.L.	98545-59659	
4.	Poulomi Ghosh	P.O.C. Guinguan	9822011673	
5.	Naveez Kaur	P.O.C.,	7838048909	
7.	Hemanta Deog	NRE	9435152591	
8.	Hema Chaita	Reliance (Land) NRL	9435151038	
9.	Naveez Kaur	Consultant	7838048909	
10.	Poulomi Ghosh	Sr. Associate	9822011673	

Male Participants: 5; Female Participants: 2



“Consultancy service for Environmental and Social Management Planning Framework.”
For the Project Enhancement of Intra State Transmission System of ASSAM

Attendance Sheet for Consultation

Project Name	1
Division	Nagaon
Date	06/11/2019
Venue	Nagaon - 2 & Jakhikabanda S/S
Number of Participants	5
Points of Discussion	Land Status and Ed S Rts.

[illegible]

Male Participants: 3; Female Participants: 2

Environmental and Social Management Planning Framework

"Consultancy service for Environmental and Social Management Planning Framework."
For the Project Enhancement of Intra State Transmission System of ASSAM

Attendance Sheet for Consultation

Project Name	400/220KV (2x500 MVA) Substation at Sonapur LIL of 110kV of Silchar (PGL) - Biphariat (Meghalaya) line at Sonapur
Division	Kahilipara - Sonapur
Date	05/11/2019
Venue	Identified location
Number of Participants	8
Points of Discussion	Land Status and EIS Risky

S.No.	Name	Occupation	Contact Number	Signature
1	HIMANSHU SAIKIA	Asst. Mnsr. AEECL	9854738617	
2	Sheikh Sabir Mohammad	Junior Manager, AEECL	8638457456	
3	Swarupnanda Das	Junior Manager	8638487058	
4	Anbinda Sankar	Asst. H. Manager	9435014219	
5	Pranab Kumar Das	Asst. Manager	8794393020	
6	Ramesh Deka			
7	Nauroj Latur	Consultant	788048909	
8	Poulomi Ghosh	Asst. Associate	9823011673	

Male Participants: 4; Female Participants: 4



Attendance Sheet for Consultation

Project Name	220KV Bihulpuria SLS
Division	T&T Division, North Lakhimpur
Date	08/11/19
Venue	Jarabari Village
Number of Participants	3
Points of Discussion	(a) Land handover documents & status (b) Associated EIS Risky -

[illegible]

Male Participants: 1; Female Participants: 2

Environmental and Social Management Planning Framework

**"Consultancy service for Environmental and Social Management Planning Framework."
For the Project Enhancement of Intra State Transmission System of ASSAM**

Attendance Sheet for Consultation

Project Name	400 KV Rangia S/S + T/L
Division	Rangia
Date	12/11/2019
Venue	Proposed land for 400KV S/S
Number of Participants	8
Points of Discussion	Land Status; EIS Risk

S.No.	Name	Occupation	Contact Number	Signature
1	Kaushwar Sultana (Land owner)	Farming (2 crops)		Prasanna
2	Utpal Nayak	ARM, Rangia	9864314383	Utpal
3	Ajay Boro	PM, Rangia	9435748962	Ajay
4	Rupanjyoti Thakuria	JM(civil), Rangia	7002415446	Rupanjyoti
5	Navroz Baur	Consultant	7838048909	Navroz
6	Soumitra Ghosh	Consultant	9823011673	Soumitra
7	Naren Sptredhar			Naren
8	Soren Rava	(Land Owner)		

Male Participants: 6; Female Participants: 2



Attendance Sheet for Consultation

Project Name	132 KV Umding & 220KV Shan Pardew Nagar
Division	Samaguri
Date	13/11/19
Venue	220/132 KV Samaguri S/S
Number of Participants	4
Points of Discussion	Land Status and EIS/RISRs.

[illegible]

Male Participants: 2; Female Participants: 2

Photographs of Site Visits

400/220 kV (2 X 500 MVA) Substation at Sonapur (Location – 2)



Consultation with AEGCL Officials



Proposed location (existing AEGCL Land)

220/33 kV (2 X 100 MVA) GIS Substation at Nagaon-2 and associated lines



25 Bigha land parcel for the 220/33 kV S/s



Approach road and informal/illegal cultivation on the land parcel

220/33 kV (2 X 100 MVA) GIS Substation at Jakhalabandha & associated lines



21 Bigha land parcel for the 220/33 kV GIS S/s at Jakhalabandha



Abandoned structures and trees at the site

220/132 kV (2 X 160 MVA) and 132/33 kV (2 X 50 MVA) S/s at Khumtai & associated lines



Consultation with Tea Estate Manager



Selected Land Parcel

New 400 kV S/s at Rangia & associated lines



Consultation with Farmer and Stakeholders



Proposed Land Parcel for 400 kV S/S and crossing PGCIL T/L

220/132 kV (2 X 160 MVA) GIS Substation at Shankardevnagar and associated lines



AEGCL land parcel within existing premise of 132 kV S/S



Proposed land for 220/132 kV Substation at Shankardevnagar

Appendix 11 Features of Proposed Project Components

Geographical Coordinates of Proposed Substations

Sl No	Substation Name	GPS Coordinates (Longitude, Latitude)
1.	220KV BIPHURIA	26.9888000, 93.836000.
2.	400kV RANGIA/KUMARIKATA	26.6442648, 91.5968102
3.	400KV SONAPUR	N26 02.867 E91 52.355
4.	220KV KHUMTAI	26.5695157, 93.7890606, 3971.
5.	220KV JAKHALABANDHA	26.573041, 92.996683
6.	132KV CHHAYGAON	26.0416154, 91.2702751
7.	220KV SHANKARDEVNAGAR	25.9869873, 92.925075.
8.	132KV NAGAON 2	26°22'42.3"N 92°41'40.6"E
9.	132kV/33kV AGAMONI	26.308N, 89.760E
10.	132KV BURHIGAON	26.324321, 92.104010



Land Details of Proposed Substations

Sl. No.	Name of the S/S	Location / District / Village / Town	Area in Hecter	Slope/ Plain	Kind of Land
1.	New 220/33kV (2 X 100 MVA) S/S at Bihpuria and Associated lines	Bihpuria, Jarabari Village	2	Plain	Barren
2.	New 400/220kV (2 X 500 MVA) Rangia S/S and Associated lines/ 132kV/33 Kukurmara	Rangia, Kamrup (R)	7.47	Plain	Barren
3.	New 400/220kV (2 X 500 MVA) S/S at Sonapur and Associated lines	Kamrup	1.2	Plain	Barren
4.	New 220/132kV (2X 160 MVA) and 132/33kV (2 X 50 MVA) S/S at Khumtai and Associated lines	Khumtai, Golaghat	6.8	Plain	Tea Garden land
5.	New 220/33kV (2 X 100 MVA) GIS S/S at Jakhalabandha and Associated lines	Jakhalabandha, Nagaon	2.5	Plain	Barren
6.	New 220/33kV (2 X 100 MVA) GIS Substation at Chhaygaon and Associated	Chhaygaon, Kamrup	1.33	Plain	Barren
7.	New 220/132kV (2 X 160 MVA) GIS S/S at Shankardev Nagar and Associated lines	Shankardevnagar Nagar, Karbi-Anglong	2	Plain	Barren
8.	New 220/33kV (2 X 100 MVA) GIS S/S at Nagaon-2 and Associated lines	Nagaon	2.63	Plain	Barren
9.	New 132/33kV (2 X 50 MVA) at Agomoni and Associated lines	Agomoni, Dhubri	3.6	Plain	Barren
10.	New 132/33kV (2 X 50 MVA) GIS Burhigaon S/S and Associated lines	Mangaldai	0.79	Plain	Barren

Subproject Features

1. New 220/33kV (2 X 100 MVA) S/S at Bihpuria

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/33kV BihpuriaS/S	2 nos.	100MVA two phase ICTs
2. 220kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 220kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	78 KM	220KV Bihpuria (AEGCL-New) - Sonabil (AEGCLExisting) D/C Line

2. New 400/220kV (2 X 500 MVA) Rangia S/S & New 132/33 kV (2 X 50 MVA) AIS Substation at Kumarikata

Sl. No.	Equipment	Nos. / Length	Details
1.400kV Inter-Connecting Transformers (ICTs)			
a.	400/220kV Rangia S/S, 500 MVA	2nos.	500MVA two phase ICTs
2. 400kV Bays			
a.	Transformer Bays	2 nos.	
b.	Feeder Bays	2 nos.	
c.	Tie Breaker	1 no.	
3.400kV Connectivity			
a.	Erection of 400kV DC feeder with Quad Moose Conductor	21 KM	LILO of Balipara (PG) – Bongaigaon (PG) at 400kV Rangia GSS
1. 132kV Inter Connecting Transformers (ICTs)			
a	132/33kV Kumarikata S/S	2 nos.	50MVA two phase ICTs



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2. 132kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 132kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	40 KM	Kumarikata(AEGCL-New)Nalbari (AEGCL Existing) S/C Line on D/C Tower

3. 400/220kV Sonapur GIS S/S, 500 MVA

Sl. No.	Equipment	Nos. /	Details
1.400kV Inter Connecting Transformers (ICTs)			
a.	400/220kV Sonapur S/S	2 nos.	500MVA two phase ICTs
2.400kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3.400kV Connectivity			
a.	Erection of 400kV DC feeder with Quad Moose Conductor	25 KM	LILO of Silchar (PG) – Byrnihaat (PG) at 400kV Sonapur S/S

4. 220/132kV Khumtai GIS S/S, 160 MVA

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/132kV Khumtai S/S	2 nos.	160MVA two phase ICTs
2. 220kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 220kV Connectivity			
a	Erection of 220kV DC feeder with Quad Moose Conductor	6 KM	220kV LILO of Mariani-Samaguri S/C line 1 at Khumtai S/S
		5km	220kV LILO of Mariani-Samaguri S/C line 2 at Khumtai S/S

5. New 220/33kV (2 X 100 MVA) GIS S/S at Jakhalabandha

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/33kV Jakhalabandha S/S	2 nos.	220MVA two phase ICTs
2. 220kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 220kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	10 KM	LILO of 220kv Samaguri-Mariani line 1 (AEGCL-Existing) at Jakhalabandha (AEGCL-New) S/C line

6. New 220/33kV (2 X 100 MVA) GIS Substation at Chaygaon

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/33kV Chaygaon S/S	2 nos.	100 MVA two phase ICTs



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2. 220kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 220kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	3 KM	LILO of 220kV Azara – Boko (AEGCL-Existing) line at Chayygaon

7. 220/132kV Shankardev Nagar GIS S/S, 160 MVA

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/132kV Sankardev Nagar S/S	2 nos.	160MVA two phase ICTs
2. 220kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 220kV Connectivity			
a	Erection of 220kV DC feeder with Quad Moose Conductor	25 KM	220kV Sankardev Nagar-Misa D/C line

8. 220/33kV (2 X 100 MVA) GIS S/S at Panjabari

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/33kV Panjabari S/S	2 nos.	100MVA two phase ICTs
2. 220kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 220kV Connectivity			
a	Erection of 220kV DC feeder with Quad Moose Conductor	3 KM	LILO of Sonapur-Sarusajai (AEGCL-Existing) -S/C Line at Panjabari (AEGCL-

9. 220/33kV (2 X 100 MVA) GIS S/S at Nagaon-2

Sl. No.	Equipment	Nos. / Length	Details
1. 220kV Inter Connecting Transformers (ICTs)			
a	220/33kV Nagaon-2 S/S	2 nos.	100MVA two phase ICTs
2. 200kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 200kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	1 KM	LILO of Samaguri(AEGCL-Existing) – Sarusajai(AEGCL-Existing) 220kVD/CLine at Nagaon-2 (AEGCL-New)

10. New 132/33kV (2 X 50 MVA) AIS at Agomoni

Sl. No.	Equipment	Nos. / Length	Details
1. 132kV Inter Connecting Transformers (ICTs)			
a	132/33kV Agomoni S/S	2 nos.	50MVA two phase ICTs
2. 132kV Bays			



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a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 132kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	10 KM	LILO of Gossaigaon Gauripur S/C (AEGCL-Existing) Line at Agamoni (AEGCL- New)

11. New 132/33kV (2 X 50 MVA) AIS Burhigaon S/S

Sl. No.	Equipment	Nos. / Length	Details
1. 132kV Inter Connecting Transformers (ICTs)			
a	132/33kV BurhigaonS/S	2 nos.	50MVA two phase ICTs
2. 132kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	2 nos.	
c	Tie Breaker	1 nos.	
3. 132kV Connectivity			
a	Erection of 400kV DC feeder with Quad Moose Conductor	15 KM	LILO of Rowta-Sipajhar (AEGCL-Existing) S/C Line at Burhigaon (AEGCL-



Appendix 12 Indigenous Peoples Planning Framework

The preliminary assessments made during the project preparation have established that no indigenous or Indigenous people are impacted as part of selection of locations for proposed substations and transmission lines. However, the chances of presence of Indigenous community/people near to or alongside the proposed route alignments cannot be left unaddressed. It is also ascertained that they may have a collective attachment to the project area particularly in the scheduled area and that they may get affected by the project interventions. Accordingly, to ensure focused and exclusive attention towards such tribal it is advised that the Indigenous People Plan (IPP) should be developed if the detailed assessment (ESIA), reveals impact on tribal community. Since the project involve many subprojects linear in nature running in different geographical areas of state due to which precise information about the tribal people likely to be impacted is not yet firmed up. In order to overcome this limitation, an Indigenous Peoples Planning Framework (IPPF) is developed which sets out approach and methodology for the preparation of a IPP. This approach and methodology are developed in line with AIIB ESP, ESS3 and the AEGCL's existing Environmental & Social Policy & Procedures Framework (ESPPF)² developed under "NER Power System Improvement Project (NERPSIP)".

Legal and Institutional Framework for Indigenous Peoples

It is stated in the Directive Principles of the State Policy, Part IV (46), "The State shall promote with special care the educational and economic interests of the weaker sections of the people, and, in particular, of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation."

There are several policies which provide a legal framework for ensuring dedicate attention to the tribals. Article 366(25) of the Indian constitution refers to Scheduled Tribes (STs) as those communities who are scheduled in accordance with Article 342 of the Constitution. According to Article 342 of the Constitution, STs are the tribes or tribal communities or part of or groups within these tribes and tribal communities which have been declared as such by the President through a public notification. Identification of tribes is a State subject. Thus, classification of a tribe would depend on the status of that tribe in the respective State. Further the Fifth and Sixth Schedule of the constitution provides special provision for Tribal People in selected regions of the country.

In Assam, certain areas have been declared as scheduled area as Specified by the Scheduled Areas under the Sixth Schedule of Indian Constitutions. Six schedule areas in Assam are Bodoland Territorial Council, Karbi Anglong Autonomous Council, Dima Hasao Autonomous District Council³

AIIB's ESS 3: ESS 3 applies if Indigenous Peoples⁴ are present in, or have a collective attachment to, the proposed area of the Project, and are likely to be affected by the Project. The term Indigenous Peoples is used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees: (a) self-identification as members of a distinct indigenous cultural group and recognition of this identity by others; (b) collective attachment to geographically distinct habitats or ancestral territories in the Project area and to the natural resources in these habitats and territories; (c) customary cultural, economic, social or political institutions that are separate from those of the dominant society and culture; and (d) a distinct language, often different from the official language of the country or region. In considering these characteristics,

²

https://www.powergridindia.com/sites/default/files/Our_Business/Domestic_Consultancy/NER_Agreements_and_MoUs/2015/6/ESPPF_ASSAM.pdf

³ Govt. of Assam has recently created 6 more Autonomous Councils viz. Rabha Hasong Autonomous Council (RHAC), Mishing Autonomous Council (MAC), Tiwa Autonomous Council (TAG), Deori Autonomous Council (DAC), Thengal Kachari Autonomous Council (TKAC) and Sonowal Kachari Autonomous Council (SKAC).

⁴ There is no universally accepted definition of Indigenous Peoples. Indigenous Peoples may be referred to in different countries by such terms as "indigenous ethnic minorities," "aboriginals," "hill tribes," "minority nationalities," "scheduled tribes," "first nations," or "tribal groups." As the applicability of such terminology varies widely from country to country, the Client may agree with the Bank on an alternative terminology for the Indigenous Peoples as appropriate to the circumstances of the Client.



national legislation, customary law and any international conventions to which the country is a party may be taken into account. A group that has lost collective attachment to geographically distinct habitats or ancestral territories in the Project area because of forced severance remains eligible for coverage, as an Indigenous People, under ESS 3.

Objective of the IPPF

As not all project details and locations are identified, an IPPF is required as per AIIB ESP ESS3. The IPPF is a principles-based document that sets out the procedural framework for preparing an IPP in the event of any positive or/and adverse impacts on indigenous people and spells out screening and planning procedures. The objectives of the IPPF are to design and implement project activities in a way that fosters full respect for Indigenous Peoples so that they access to:

- (i) a framework for continued consultation during Project implementation;
- (ii) culturally appropriate benefits;
- (iii) measures to avoid, minimize, mitigate, offset or compensate for any adverse Project impacts; and
- (iv) culturally appropriate grievance procedures, monitoring and evaluation arrangements

The Framework seeks to ensure that tribal communities are informed, consulted, and mobilized to participate in the subproject preparation in a culturally appropriate manner. The Framework is intended to guide selection and preparation of additional subprojects under the Project to avoid and if impacts on tribal people are identified to receive culturally appropriate social and economic benefits, do not suffer adverse impacts as a result of Projects and can participate actively in the Project. The framework is prepared in accordance with both the Indian Constitution provisions, RFCTLARRA, 2013 and AIIB's ESS3 and serves the following purposes:

- a) Guide the undertaking of a culturally appropriate and gender-sensitive social assessment or use similar methods to assess Project impacts, both positive and adverse, on Indigenous Peoples.
- b) Guide the preparation of an Indigenous Peoples plan that is based on the social impact assessment prepared with the assistance of suitably qualified and experienced experts and that draws on indigenous knowledge and participation by the affected Indigenous Peoples communities.
- c) Direct avoidance of any restricted access to, and physical displacement from, protected areas and natural resources under the Project. Where avoidance is not possible, ensure that the affected Indigenous Peoples communities participate in the design, implementation and monitoring and evaluation of management arrangements for such areas and natural resources, and that benefits are equitably shared.
- d) Ensure that the level of detail and comprehensiveness of the Indigenous Peoples plans is proportional to the degree of the Project's impacts.
- e) Guide the carrying out of meaningful consultation on the Project with affected Indigenous Peoples communities and concerned Indigenous Peoples organizations, in a culturally appropriate, accessible and inclusive manner, and facilitate their informed participation.
- f) Establish a culturally appropriate and gender inclusive grievance mechanism to receive and facilitate resolution of affected Indigenous Peoples' concerns and grievances regarding the Project's environmental and social performance and inform them of its availability.
- g) If Project activities are identified to have impacts on land and natural resources subject to traditional ownership or under customary occupation or use, cause relocation of Indigenous Peoples from land and limitations on access to natural resources subject to traditional ownership or under customary occupation or use, or have significant impacts on Indigenous Peoples' cultural heritage, engage in Free, Prior and Informed Consultation (FPICon) to obtain the broad support of the affected Indigenous Peoples.
- h) Ensure the timely disclosure the draft Indigenous Peoples plan, including documentation of the consultation process and the results of the social impact assessment.

Approach to Indigenous Peoples Plan (IPP) Preparation

Preparing an IPP is necessary if IPs are reasonably expected to be impacted. This includes, but is not limited to any substations, transmission lines or related works that may have impacts or significantly affects directly or indirectly the (1) customary rights of use and access to land and natural resources; (2) socioeconomic status; (3)



cultural and communal integrity and heritage; (4) health, education, livelihood systems and social security status; and (5) indigenous knowledge of Indigenous. The significance of a project's impact on indigenous people/scheduled tribe is determined by the following assessment.

- (i) Magnitude of impact in terms of:
 - a) customary rights of use and access to land and natural resources;
 - b) socioeconomic status;
 - c) cultural and communal integrity;
 - d) health, education, livelihood, and social security status;
 - e) recognition of social security status; and
 - f) recognition of indigenous knowledge.
- (ii) Level of vulnerability of the affected tribal people

An IPP addresses the aspirations, needs, and preferred options of the affected indigenous people, and places before them development options, keeping their distinctive socio-cultural status in view. The IPP aims to strengthen the capacity of the affected tribal community to encourage them to participate in and derive benefits from the project intervention. The principal elements of an IPP are:

1. development plans for indigenous people should be prepared considering best options and approaches that are in accordance with affected individuals and communities;
2. scope and impact of adverse effects of the project are assessed, and appropriate mitigation measures designed;
3. social and cultural context of affected IPs and their traditional skill and knowledge in natural resource management should be considered;
4. regular consultation will be held with the IPs, including the women, to seek their informed participation in designing mitigation measures and project intervention at all stages of project preparation and implementation. To achieve this information sharing, disclosure meetings, workshops, and distribution of pamphlets in local language will be carried out;
5. in areas where working experience with indigenous people is unknown, a pilot scale operation will be carried out and evaluated prior to full-scale implementation;
6. community organizations, NGOs, and consultants experienced in executing indigenous people development plans or projects will be engaged to prepare IPP;
7. responsible agency will formulate IPP implementation schedule, which will be periodically monitored by PMU/ PIU officials as well as an independent/external monitoring agency; and
8. responsible agency will also prepare a budget for IPP implementation and a financing plan to ensure smooth progress.

Steps for Formulating and IPP

If potential negative impact on IPPs has been identified during the preliminary screening stage, PIU officials will visit all indigenous peoples/ tribal communities and villages at subproject potential impact areas. The PIU will arrange public meetings for selected communities at a pre-announced place and date to provide information on the project and subproject components. During the visits, community leaders and other participants, including representatives of tribal communities, will present their views on the merits, benefits, and envisaged constraints of the project and subproject components.

During this initial visit, a screening exercise will be undertaken by the PIU with the help of indigenous people community leaders. The screening will be done based on the following:

- (i) presence and names of indigenous people community groups in the area;
- (ii) cultural and religious distinction of the indigenous groups vis-à-vis other communities, and mainstreaming of the indigenous people with the dominant population;
- (iii) laws and legislations related to indigenous people groups;
- (iv) total number of indigenous people community groups and percentage of indigenous people population to total population in the area;



- (v) number and percentage of indigenous people households likely to be affected by the subproject component; and
- (vi) initial assessment to also include level of vulnerability of the indigenous people, such as being (primitive) tribal groups (PTG) and existing socioeconomic conditions that may further deteriorate due to project impact. If such especially vulnerable groups among the IP community are identified within the project area, they warrant special measures for protecting their socio-cultural identity and baseline economic standard. While determining vulnerability of these IP groups, assessment will be made if there is any possibility of future impact due to the project.

If the indigenous people assessment confirms likely impacts on IP, PIU will engage qualified and experienced experts to carry out a full social impact assessment (SIA) of the affected indigenous people/ scheduled tribes families and community. The SIA will screen impacts, based on a field level survey, either as part of a detailed project study report or as a stand-alone activity. The SIA will be conducted in consultation with the indigenous people communities, with emphasis on a gender-sensitive approach, and will identify project-affected IPs, potential impact, and severity of impact with special reference to gender impact. The SIA will prepare a baseline socioeconomic profile of the indigenous people groups in the project area and project impact zone. It will assess their access to social infrastructures and economic opportunities. The study will also indicate and focus on short- and long-term benefits and potential positive and adverse impacts on the indigenous people groups' social, cultural and economic status due to the project, assess which indigenous people group will require indigenous people principles, and recommend the subsequent approaches, resource requirements, and planning mechanism to address the issues and concerns of the affected indigenous people groups. The level of detailed and comprehensive information required for the SIA will be commensurate with the complexity of the impact on the indigenous people groups. Particular attention will be paid to the following aspects:

(i) Ancestral domains and related natural resources

(a) As indigenous people communities are closely tied to ancestral domains and natural resources, including land, forest, water, and others, special attention will be given to protect such ties in terms of their customary rights to these ancestral domains which they traditionally own, use, or occupy, and where access to natural resources is vital for their survival and livelihood system. The need to protect such ties, respecting cultural and spiritual values that indigenous people attach to these resources, and natural resource management for long-term sustainability should be considered while undertaking SIA. Rehabilitation of livelihood systems of indigenous people who are displaced should take priority.

(b) If the project requires acquisition of lands that are customarily owned, used, or occupied by indigenous people, legal recognition of their customary rights to such lands and ancestral domains should be integrated into the project. This will need full recognition of the existing customary land tenure system of the indigenous people and conversion of customary usage of rights to communal and/or individual ownership rights. If this option is not possible under national law, the IPP will include an action plan for legal recognition of perpetual or long-term renewable custodial or user rights.

Presently no negative impact on or land acquisition and resettlement of IPs is anticipated. In the unlikely case when after initial screening it is found that land belonging to tribal community /communities is needed to be involuntary acquired for setting up of a substation demonstrating/substantiating no acquisition will be undertaken without the explicit consent of the Bank. Should that be the case, it will be done as a last resort by completing a technical investigation including assessment of alternatives and detailed surveys with the assistance of suitably qualified and experienced experts who draws on indigenous knowledge and participation by the affected Indigenous Peoples communities. This will be included in the SIA along with land requirement is submitted to the Government of Assam (GoA) for further processing as per provisions of RFCTLARRA, 2013.

The preliminary SIA will cover at the least:

- Consultations with the concerned Panchayat, Municipality, District/Village Council at village level;
- Assessment of the general impacts or purpose of potential land acquisition and evaluation of all possible alternatives to avoid or mitigate the impact.
- Evaluation in a culturally appropriate way of the impacts on households, community, community properties, assets and infrastructure particularly roads, public transport, drainage, sanitation, sources of



drinking water, sources of water for cattle, community ponds grazing land, plantations, public utilities electricity supply and health care facilities.

This will inform the development of a Social Impact Management Plan (SIMP) listing ameliorative measures required for addressing the likely impact vis-à-vis intended benefit of the project. The SIA and SIMP will form the IPP. The draft IPP shall be disclosed in a culturally appropriate way and subject to public hearing in the affected area after giving adequate publicity for the venue, time etc. to ascertain the views of affected indigenous families/communities which shall be included in the IPP. If FPIC is required, as outlined above, such provisions will be made prior to finalization of the IPP.

The final IPP report shall be published including its translation in local language and shall also be made available to Panchyats, District/Village Councils & Deputy Collector/District Magistrate office for wider circulation. Detailing of the same is provided below:

(i) the prior consent of the concerned Gram Sabha or the Panchayats or the autonomous District Councils at the appropriate level in Scheduled Areas under the Fifth Schedule to the Constitution, as the case may be, shall be obtained in all cases of land acquisition in such areas, before issue of a notification under this Act, or any other Central Act or a State Act for the time being in force.

(ii) Provided that the consent of the Panchayats or the Autonomous Districts Councils shall be obtained in cases where the Gram Sabha does not exist or has not been constituted.

(iii) In the case of a project involving land acquisition on behalf of a Requiring Body which involves involuntary displacement of the Scheduled Castes or the Scheduled Tribes families, a Development Plan shall be prepared in such a form as may be prescribed by the Bank laying down the details of procedure for settling land rights due, but not settled and restoring titles of the Scheduled Tribes as well as the Scheduled Castes on the alienated land by undertaking a special drive together with land acquisition. This plan is targeted at both SCs and STs, but, for the current purpose, it is referred to as IPP and contents of such a Development Plan are provided at the end.

(iv) the IPP also contain a program for development of alternate fuel, fodder and non-timber forest produce resources on non-forest lands within a period of five years sufficient to meet the requirements of tribal communities as well as the Scheduled Castes.

(v) In the case of land being acquired from the members of the Scheduled Castes or the Scheduled Tribes, the entire compensation amount due shall be paid to the affected families prior taking over of the possession of the land.

(vi) The affected families of the Scheduled Tribes shall be resettled preferably in the same Scheduled Area in a compact block so that they can retain their ethnic, linguistic and cultural identity. (vii) The resettlement areas predominantly inhabited by the Scheduled Castes and the Scheduled Tribes shall get land, to such extent as may be decided by the appropriate Government free of cost for community and social gatherings.

(viii) Any alienation of tribal lands or lands belonging to members of the Scheduled Castes in disregard of the laws and regulations for the time being in force shall be treated as Null and void. and in the case of acquisition of such lands, the rehabilitation and resettlement benefits shall be made available to the original tribal land owners or land owners belonging to the Scheduled Castes.

(x) Where the affected families belonging to the Scheduled Castes and the Scheduled Tribes are relocated outside of the district. then they shall be paid an additional 25% rehabilitation and resettlement benefits to which they are entitled in monetary terms along with a onetime entitlement of Rs. 50,000/-.

(xi) All benefits, including the reservation benefits available to the Scheduled Tribes and the Scheduled Castes in the affected areas shall continue in the resettlement area.

(xii) Whenever the affected families belonging to the Scheduled Tribes who are residing in the Scheduled Areas referred to in the Fifth Schedule or the tribal areas referred to in the Sixth Schedule to the Constitution are relocated outside those areas, then, all the statutory safeguards, entitlements and benefits being enjoyed by them under this Act shall be extended to the area to which they are resettled regardless of whether the resettlement



area is a scheduled Area referred to in the said Fifth Schedule or a tribal area referred to in the said Sixth Schedule. or not.

(xiii) Where the community rights have been settled under the provisions of the Scheduled 'tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. The same shall be quantified in monetary amount and be paid to the individual conceded who has been displaced.

Tribal Land Acquisition Process:

Land acquisition processes that need to be completed in a sequence has already been discussed in main ESMPF report. However, special provisions as applicable to the lands acquisition in Tribal /scheduled areas are enumerated below:

S. No.	Aspects	Actions	Special provisions for tribal/Scheduled Areas
1.	Preliminary Investigation for determination of Social Impact and public purpose.	Notification for the commencement of Social Impact assessment study to be made available in local language to concerned Panchayat/Municipality and to offices of district collector/sub-divisional magistrate/tehsil (hereinafter referred to as local bodies)	As far as possible, no acquisition of land shall be made in the Scheduled Areas Where such acquisition does take place it shall be done only as a demonstrable last resort
		Consultation with the concerned Panchayat, Municipality or Municipal Corporation, as the case may be and carry out a social impact assessment (SIA) study	Land for traditional tribal institutions and burial and cremation grounds taken into consideration while conducting the SIA
		SIA study to be made public in manner specified in the Act	
		Preparation of Social Impact Management Plan (SIMP)	In case of a project involving land acquisition /involuntary displacement of the Scheduled Castes or the Scheduled Tribes families, a Development Plan shall be prepared laying down the details of procedure for settling land rights due but not settled and restoring titles of the scheduled Tribes as well as the Scheduled Castes on the alienated land by undertaking a special drive together with land acquisition b) The Development Plan shall also contain a programme for development of alternate fuel, fodder and non-timber forest produce resources on non-forest lands within a period of five years sufficient to meet the requirements of tribal communities as well as the Scheduled Castes.



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S. No.	Aspects	Actions	Special provisions for tribal/Scheduled Areas
		Public hearing for Social Impact Assessment (when prepared under section-4 of the act)	
2.	Appraisal of SIA by expert group	SIA report is evaluated by an independent multi-disciplinary Expert Group, as may be constituted by appropriate Govt.	
		Recommendations of the expert group made available to the local bodies and in the affected areas in local language	
		The appropriate govt. would recommend the such area for acquisition after examining the expert group report (and report from the collector if any)	
3.	Publication of preliminary notification	Notification (hereinafter referred to as preliminary notification) to that effect along with details of the land to be acquired in rural and urban areas shall be published (Notification to be issued within 12 months from DoA of SIA)	In case of acquisition or alienation of any land in the Scheduled Areas, the prior consent of the concerned Gram Sabha or the Panchayats or the autonomous District Councils, at the appropriate level in Scheduled Areas under the Fifth Schedule to the Constitution, as the case may be, shall be obtained. in all cases of land acquisition in such areas, including acquisition in case of urgency, before issue of a notification under this Act, or any other Central Act or a State Act for the time being in force.
		Immediately after issuance of the notification, the concerned Gram Sabhas at the village level, municipalities in case of municipal areas and the Autonomous Councils in case of the areas referred to in the Sixth Schedule to the Constitution, shall be informed of the contents of the notification issued under the said sub-section in all cases of land acquisition at a meeting called especially for this purpose	
		After issuance of notice, the Collector shall, before the issue of a declaration under section 19, undertake and complete the exercise of updating of land records as prescribed within a period of two months.	



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S. No.	Aspects	Actions	Special provisions for tribal/Scheduled Areas
		Preliminary survey of land	
		Payment for damage (if any) during survey	
4.	Preparation of Rehabilitation and Resettlement Scheme by the Administrator	Upon the publication of the preliminary notification by the Collector, the Administrator for Rehabilitation and Resettlement shall conduct a survey and undertake a census of the affected families	
		The Administrator shall, based on the survey and census prepare a draft Rehabilitation and Resettlement Scheme (including time limit)	The affected families of the Scheduled Tribes shall be resettled preferably in the same Scheduled Area in a compact block so that they can retain their ethnic, linguistic and cultural identity. The resettlement areas predominantly inhabited by the Scheduled Castes and the Scheduled Tribes shall get land, to such extent as may be decided by the appropriate Government free of cost for community and social gatherings. The affected Scheduled Tribes, other traditional forest dwellers and the Scheduled Castes having fishing rights in a river or pond or dam in the affected area shall be given fishing rights in the reservoir area of the irrigation or hydel projects.
		The draft Rehabilitation and Resettlement scheme referred to in sub-section (2) shall be made known locally by wide publicity in the affected area and discussed in the concerned Gram Sabhas or Municipalities	
		A public hearing shall be conducted in such manner as may be prescribed, after giving adequate publicity about the date, time and venue for the public hearing at the affected area:	Provided further that the consultation with the Gram Sabha in Scheduled Areas shall be in accordance with the provisions of the Provisions of the Panchayats (Extension to the Scheduled Areas) Act, 1996.
		The Administrator shall, on completion of public hearing submit the draft Scheme for Rehabilitation and Resettlement along with a specific report on the claims and objections	



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S. No.	Aspects	Actions	Special provisions for tribal/Scheduled Areas
		<p>raised in the public hearing to the Collector.</p> <p>The Collector shall review the draft Scheme submitted by the Administrator with the Rehabilitation and Resettlement Committee at the Rehabilitation project level constituted under section 45:</p> <p>The Collector shall submit the draft Rehabilitation and Resettlement Scheme with his suggestions to the Commissioner Rehabilitation and Resettlement for approval of the Scheme.</p> <p>Approved Rehabilitation and Resettlement Scheme to be made public</p> <p>Publication of declaration and summary of Rehabilitation and Resettlement.</p>	
5.	Land to be marked out, measured and planned including marking of specific areas	The Collector shall thereupon cause the land to be marked out and measured, and a plan to be made of the same.	
6.	Notice to persons interested and making of statements	The Collector to publish the public notice on his website and cause public notice to be given at convenient places, to stating that the Government intends to take possession of the land, and that claims to compensations and rehabilitation and resettlement for all interests in such land may be made to him	
		The collector may require a statement containing the name of every person possessing any interest in the land and nature of interest for three years preceding the date of statement	
7.	Enquiry and land acquisition award by Collector	the Collector shall proceed to enquire into the objections (if any) which any person interested has stated The Collector shall make an award within a	



Environmental and Social Management Planning Framework

S. No.	Aspects	Actions	Special provisions for tribal/Scheduled Areas
		period of twelve months from the date of publication of	
8.	Determination of amount of compensation	Determination of market value of the land by the collector	In case of land being acquired from members of the Scheduled Castes or the Scheduled Tribes, at least one-third of the compensation amount due shall be paid to the affected families initially as first instalment and the rest shall be paid after taking over of the possession of the land.
		<p>The market value is multiplied by a factor as described in the first schedule of the Act</p> <p>Determination of value of things attached to land or building</p> <p>Determination of value of things attached to land or building</p>	
9.	Rehabilitation and Resettlement Award for affected families	The Collector shall pass Rehabilitation and Resettlement Awards for each affected family in terms of the entitlements provided in the Second Schedule	Where the affected families belonging to the Scheduled Castes and the Scheduled Tribes are relocated outside of the district, then, they shall be paid an additional twenty-five per cent R&R benefits to which they are entitled in monetary terms along with a one-time entitlement of fifty thousand rupees. b) Where the community rights have been settled under the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, the same shall be quantified in monetary amount and be paid to the individual concerned who has been displaced due to the acquisition of land in proportion with his share in such community rights.
		Provision of infrastructural amenities in resettlement area	All benefits, including the reservation benefits available to the Scheduled Tribes and the Scheduled Castes in the affected areas shall continue in the resettlement area b) Whenever the affected families belonging to the Scheduled Tribes who are residing in the Scheduled Areas referred to in the Fifth Schedule or the tribal areas referred to in the Sixth Schedule to the



S. No.	Aspects	Actions	Special provisions for tribal/Scheduled Areas
			Constitution are relocated outside those areas, than, all the statutory safeguards. Entitlements and benefits being enjoyed by them under this Act shall be extended to the area to which they are resettled regardless of whether the resettlement area is a Scheduled Area referred to in the said Fifth Schedule or a tribal area referred to in the said Sixth Schedule or not.

The main source of information for the IPP (inclusive of SIA and SIMP) will be direct interviews with potentially affected indigenous people households, besides separate group meetings with the indigenous people communities, including their leaders, youth, and men and women, especially those living within the project impact zone of the proposed subproject components. Group discussion will center on positive and negative impacts of the subproject components and indigenous people groups' recommendations on design of the project components. The PMC consultants will be responsible for analyzing the SIA data and information and developing an action plan in consultation with the indigenous people community leaders. If the SIA indicates significantly adverse impacts, or that the indigenous people community rejects the project proposal outright, other design options will be looked into to minimize adverse impacts. An IPP will be prepared only when the indigenous people community accepts the design of the subproject component, and broad community support has been ascertained.

Outline of the IPP

The substantive aspects of this outline will guide the preparation of IPPs. The IPP will contain the following chapters:

- (i) Executive Summary of the Indigenous People Plan-describes the critical facts, significant findings, and recommended actions.
- (ii) Description of the Project-provides a general description of the project; discusses project components and activities that may cause impacts on indigenous people; and identifies project area.
- (iii) Social Impact Assessment-this section:
 - a. reviews the legal and institutional framework applicable to indigenous people in project context;
 - b. provides baseline information on the demographic, social, cultural, and political characteristics of the affected indigenous people communities; the land and territories that they have traditionally owned or customarily used or occupied; and the natural resources on which they depend;
 - c. identifies key project stakeholders and elaborates a culturally appropriate and gender-sensitive consultation process with indigenous people at each stage of project preparation and implementation;
 - d. based on meaningful consultation with the affected indigenous people communities, assesses the potential adverse and positive effects of the project. Assessment will include a gender-sensitive analysis of the relative vulnerability of, and risks to, the affected indigenous people communities with respect to their close ties to land and natural resources, as well as their lack of access to opportunities;
 - e. includes a gender-sensitive assessment of the affected IPs' perceptions about the project and its impact on their social, economic, and cultural status; and
 - f. based on meaningful consultation with the affected indigenous people communities, identifies and recommends the measures necessary to avoid adverse effects or, if such measures are not



possible, identifies measures to minimize, mitigate, and/or compensate for such effects, and to ensure that the indigenous people receive culturally appropriate benefits under the project.

(iv) Information Disclosure, Consultation, and Participation-this section:

- a. describes the information disclosure, consultation, and participation process with the affected indigenous people communities that was carried out during project preparation;
- b. summarizes their comments on the results of the social impact assessment, and identifies concerns raised during consultation, and how these have been addressed in project design;
- c. in the case of project activities requiring broad community support, documents the process and outcome of consultations with affected indigenous people communities and any agreement resulting from such consultations for the project activities and safeguard measures addressing the impacts of such activities;
- d. describes consultation and participation mechanisms to be used during implementation to ensure indigenous people participation during implementation; and
- e. confirms disclosure of the draft and final IPP to the affected indigenous people communities.

(v) Beneficial Measures - This section specifies the measures to ensure that the indigenous people receive social and economic benefits that are culturally appropriate and gender responsive.

(vi) Mitigation Measures - This section specifies the measures to avoid adverse impacts on indigenous people, and where avoidance is impossible, specifies the measures to minimize, mitigate, and compensate for the unavoidable adverse impacts for each affected indigenous people group.

(vii) Capacity Building - This section provides measures to strengthen the social, legal, and technical capabilities of (a) government institutions, to address indigenous people issues in the project area; and (b) indigenous people organizations in the project area, to enable them to represent the affected IP more effectively.

(viii) Grievance Redress Mechanism - This section describes the procedures to redress grievances of affected indigenous people communities. It also explains how the procedures are accessible to indigenous people, culturally appropriate, and gender sensitive.

(ix) Monitoring, Reporting, and Evaluation - This section describes the mechanisms and benchmarks appropriate to the project for monitoring and evaluating the implementation of the IPP. It also specifies arrangements for participation of affected indigenous people in the preparation and validation of monitoring and evaluation reports.

(x) Institutional Arrangement - This section describes institutional arrangement responsibilities and mechanisms for carrying out the various measures of the IPP. It also describes the process of including relevant local organizations and NGOs in carrying out the measures of the IPP.

(xi) Budget and Financing - This section provides an itemized budget for all activities described in the IPP.

Meaningful Consultations, Information Disclosure and GRM

AIIB's ESP requires the undertaking of meaningful consultations with affected Indigenous Peoples communities and concerned Indigenous Peoples organizations, in a culturally appropriate, accessible and inclusive manner, to facilitate their informed participation: (a) in designing, implementing and monitoring measures to avoid adverse impacts or, when avoidance is not possible, to minimize, mitigate, offset or compensate for such impacts; and (b) in tailoring Project benefits to affected Indigenous Peoples communities in a culturally appropriate manner. To enhance affected Indigenous Peoples' active participation, provide for culturally appropriate, and gender inclusive capacity development in the Project. This process (a) involves Indigenous Peoples' representative bodies and organizations (e.g., councils of elders, village councils or chieftains) and, where appropriate, other community members; (b) provides sufficient time for Indigenous Peoples' decision-making processes; and (c) allows for Indigenous Peoples' effective involvement in the design of Project activities or mitigation measures that may affect them either positively or adversely.

Thus, consultations and information disclosure are an integral part of the IPP preparation in order to ensure that the priorities, preferences, and needs of the tribal groups have been taken into consideration adequately. With that objective in view, a strategy for consultation with tribal communities and their leaders will be developed so



that these are conducted in a participatory manner. The PIU will be fully involved in evolving the strategy and consultation process.

The affected IPs will be actively engaged in all stages of the project cycle, including project preparation, and feedback of consultations with the IPs will be reflected in the project design, followed by disclosure. Their participation in project planning will inform project design, and the IPs should be convinced of their benefits from the project. The IPP prepared will be translated into the local language of the IPs and made available to them before implementation by the PIU, with assistance from NGO.

Local CBOs/tribal community representatives will be involved in IPP implementation and resolving all issues related to the IPP through consultation and facilitation by the implementing CBO/NGO. The PIU will ensure the preparation of an adequate budget, subject to Bank's approval is made available for consultation and facilitation of planned activities within IPP.

The consultation and disclosure approaches identified in the ESMPF will be adjusted in a culturally sensitive way to reflect the needs of IPs. This is to ensure that IP representative bodies are included in the process, IPs are provided with sufficient time for any decision-making and IPs are involved effectively in the design of Project activities. These provisions do not negate the requirement for conducting FPIC when IPs may experience impacts on land and natural resources subject to traditional ownership or under customary occupation or use or relocation from land and limitations on access to natural resources.

The GRM as detailed out in main document shall also be applicable without any discrimination for TPDF. Its coverage in IP areas will be organized in a culturally inclusive and respectful way, should this be necessary.

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		Description of various types of tribes of Assam, geographical spread, specific characteristics, culture, dialects, occupation, etc
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		Occupation, BPL/APL, etc
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		The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006



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		The Scheduled Castes & Tribes (Prevention of Atrocities) Rules, 1989
		Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013
		The Assam Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Rules, 2015
		The National Forest Policy, 1988
		The Right to Information Act, 2005
		The Assam Panchayat Act, 1994
		other relevant State Specific Act, policy, Rules, Govt. Orders etc
		AIIB E&S Framework
		World Bank OP 4.10 – Indigenous Peoples
		State Policy on Tribal Development
		Tribal Development Institutions (Department, Tribal Development Corporation, Forest Department Programs, identify and add others, if any)
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5	Indigenous People's Development Plan (TPDF)	
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		Objective of IPP
		Status of Tribal Population vis-à-vis general Population Analysis (General & Project area, Specific to Subproject)
		Issues and problems faced by Tribals in Assam & Project area/Subproject (based on surveys & consultations)
		Strategy for Tribal People's Participation
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