

**ENVIRONMENT AND SOCIAL IMPACT ASSESSMENT - ENVIRONMENT
AND SOCIAL MANAGEMENT PLAN REPORT FOR TRANSMISSION LINES
OF PACKAGE -A**

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**ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT
PROJECT**

SUBMITTED TO
ASIAN INFRASTRUCTURE INVESTMENT BANK



SUBMITTED BY
ASSAM ELECTRICITY GRID CORPORATION LIMITED
PREPARED BY: PT FEEDBACK INFRA CONSORTIUM



This Environment and Social Impact Assessment (ESIA) - Environment and Social Management Plan (ESMP) 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.

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List of Abbreviations

AEGCL	Assam Electricity Grid Corporation Limited
AGM	Assistant General Manager
AIB	Asian Infrastructure Investment Bank
AISTSEP	Assam Intra-State Transmission System Enhancement Project
ARAP	Abbreviated Resettlement Action Plan
BOQ	Bill of Quantity
CEA	Central Electricity Authority
CESMP	Contractor's Environmental and Social Management Plan
DC or D/C	Double Circuit
DisCom	Distribution Company
E&S officer	Environment and Social Officer
E&S Policy	Environmental and Social Policy
E&S	Environment and Social
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMPF	Environmental and Social Management and Planning Framework
ESS	Environmental and Social Standard
GIS	Gas Insulated Substation
GoA	Government of Assam
GoI	Government of India
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
HIV	Human Immunodeficiency Virus
HTLS	High Temperature Low Sag
IA	Implementing Agency
INR	Indian Rupee
IP	Indigenous Peoples
IPP	Indigenous People Plan
IUCN	International Union for Conservation of Nature
Km	Kilometre
LC	Least Concern
LILO	Loop In Loop out
MoEF&CC	Ministry of Environment, Forest and Climate Change
MVA	Mega Volt Ampere
NGO	Non-Government Organization
OPGW	Optical Power Ground Wire
PAPs	Project Affected Persons
PFA	Power for All
PIU	Project Implementation Unit
PMC	Project Management Consultancy
PMU	Project Management Unit
RoW	Right of Way
S/S	Substation (s)
SC or S/C	Single Circuit

STU	State Transmission Utility
T&T	Tower and Transmission
TL	Transmission Line
VU	Vulnerable

WEIGHTS AND MEASURES

Ha. (hectare)	10,000 sq. m = 2.47105 Acre
km (kilometer)	1,000 meters
kV	kilovolt (1,000 volts)

EXECUTIVE SUMMARY

Background: The Asian Infrastructure Investment Bank (AIIB), through Government of India (GOI), has been approached by Government of Assam (GoA) for financial and technical assistance to upgrade and strengthen Assam's power transmission network under the Power for All (PFA) initiative. To enhance power supply reliability, AIIB has extended their support for the "Assam Intra-State Transmission System Enhancement Project" (AISTSEP) implemented by Assam Electricity Grid Corporation Limited (AEGCL).

The Project under Phase I includes the construction of 10 new substations in 400kV, 220kV and 132kV voltage level along with the associated (332.945 km) transmission lines (TL), Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS; Augmentation of 18 existing substations (replacement of old transformers with new transformers); Augmentation of 186 km of transmission line (restringing of One Single Circuit (S/C) line and two Double Circuit (D/C) line) by High Temperature Low Sag (HTLS) conductors; Replacement of ground wire to Optical Power Ground Wire (OPGW) for 636 km of existing transmission lines and substation equipment's at substations.

As part of AIIB's E&S policy and its compliance requirements as stipulated in the agreed environmental and social management planning framework (ESMPF) for the project, an Environmental and Social Impact Assessment including an Environmental and Social Management Plan (ESIA - ESMP) is to be in place for transmission lines before commencement of the work.

PT Feedback Infra Limited (PTFIL), Indonesia in Association with Jade Consult Nepal and NIPSA, Spain has been engaged by AEGCL as Project Management Consultant (PMC) including scope of preparation of ESIA-ESMP report for the transmission lines.

Description of the Project: The present Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP) is pertaining to the Transmission Lines namely:

- A. LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S – 2.592 km

Further, a separate ESIA/ESMP will be prepared for other Transmission Line under Package-A, as the tower design and engineering documents are currently under review and yet to be approved. Subsequently after approval, check survey will be initiated. After completion of check survey, the EPC Contractor will submit the report to AEGCL for approval. Accordingly, based on the final approved check survey report an ESIA-ESMP report will also be prepared for the following line:

- 220 kV Bihpuria (New) - Sonabil (Existing) D/C Line – 88.324 km

For the LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S transmission line, temporary access roads for 11 tower foundation locations will be require out of 13 tower foundation sites, while the remaining 2 locations can be accessed via existing rural roads and barren land. Most of these tower foundation sites are located in paddy fields. In total, approximately 0.33 hectares of land will be temporarily affected by the construction of access roads, primarily impacting paddy crops.

Key pre-construction & construction phase activities are reconnaissance, walkover, detailed route survey to finalize route alignment & tower spotting, soil investigation to ascertain tower foundation design. Other activities included RoW marking, site clearing, foundation works, tower erection, stringing, tower footing

protection (if required) final checking & testing & commissioning. The estimated timeframe for the overall construction of the transmission line is nine working months, i.e. from October 2025 to April 2026.

A brief of activities undertaken during Operation phase are ground inspection by lineman/team, inspection of towers, thermo-vision scanning, punctured insulator detection & attending all defects.

Approx. 40 (2 gangs with 20 persons in each gang) numbers of labour will be engaged by the contractor during construction period.

The above-mentioned Transmission Line corridor is located in the Nagaon district in the State of Assam.

The Right of Way required for the transmission line is 35 m (17.5 m on each side of the transmission line route) which is approx. 9.072 hectare in total. The tower base area required varies from 31 to 45 sq. m (DA type towers), 37 to 53 sq. m (DB type towers) 41 to 61 sq. m (DC type towers) and 47 to 70 sq. m (DD type towers).

The RoW permission for the transmission line has been obtained in keeping with the requirements of the Electricity Act 2003, the Indian Telegraph Act 1885, MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015 and Assam Government Power (Electricity) Department, Dispur, Guwahati-6 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) MoP new guideline March 2025 & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.

Cost of the project is as under:

A. LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S – 2.592 km

Supply Portion – Rs. 20,569,600.70 with GST.

Erection Portion – Rs. 14,825,435.63 with GST.

Policy, Legal and Administrative Framework: As per the EIA Notification, 2006 (and its amendments), power transmission projects including substations and lines do not require environmental clearance from MoEF&CC, Govt. of India. However, project linked activities like quarrying (if any) may need clearance. Forest clearance is applicable if the project involves forest land. Wildlife clearance from State/National Board of Wildlife is required; if it falls within notified wildlife or eco-sensitive zones and wetland clearance is required for projects in notified wetlands. However, based on the environmental screening such clearances are not applicable to this transmission line. The detail of the various regulatory frameworks pertaining to the project has been discussed in the main ESIA-ESMP report.

As the Project is funded through the AIIB, the Bank's Environmental and Social Policy (ESP) applies. The Project has been assigned to "Category B" as per the ESP, as the Transmission lines are not located in ecological sensitive areas.

Environmental and Social Standards (ESS 1) Environmental and Social Assessment and Management is applicable to the project as civil works may cause a limited number of potentially adverse environmental and social impacts. These impacts are not unprecedented and are limited to the project area.

Environmental and Social Standards (ESS 2) Involuntary Resettlement is applicable and accordingly Abbreviated Resettlement Action Plan/Resettlement Action Plan (ARAP/RAP) has been prepared.

Once finalized it will be disclosed prior to the commencement of works.

Environmental and Social Standards (ESS 3) Indigenous Peoples 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. ESS 3 is not applicable for the LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S at Jakhalabandha transmission line project. The assessment is based on a mixed-method socio-economic survey for the tower footing locations, combined with a sampling approach for households within the Right of Way (RoW) corridor, found that four individuals from the ST Plains community affected in Jakhalabandha Transmission line, however, they do not possess distinct cultural, linguistic, or institutional characteristics of Indigenous Peoples. Moreover, the area is not covered under the Sixth Schedule of the Indian Constitution. Hence, **ESS 3** is not triggered.

Description of the Environment: The project site i.e LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S Transmission Line is located in the Tehsil Kaliabor under Nagaon district of Assam. The project footprint (RoW) is spread across 2 villages for the Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S Transmission Line.

The direct impacts of the project are confined to the Right of Way (RoW) of the transmission line and indirect or induced impacts extends to the Area of Influence (AoI) defined by a buffer zone of 2 Km on either side of the transmission line. A 10 Km radius is also considered for evaluating the impact on flora & fauna of the project area.

The environmental and social attributes were assessed through both primary and secondary studies. Primary attributes including air environment, water, soil, noise, flora and fauna, and public consultation were evaluated through field studies, on-site monitoring and review of the past studies.

Secondary attributes such as land use patterns, geology, physiological characteristics, and socio-economic profile were analysed through literature review of previous studies conducted by various government Agencies & research publications. An interdisciplinary team through discussions and professional judgment formulated the scoping and the extent of data generation.

In the project area the land is primarily used for agriculture i.e Paddy (rice) which is a seasonal crop/ crops (vegetables). The other land uses in the area are built up residential areas and water bodies.

No protected areas (National Park, Wildlife Sanctuaries, Biosphere Reserves), Reserved Forests, notified historical and cultural sites etc. are falling in the Right of Way (RoW) of the proposed transmission line.

Based on the observation at site it has been perceived that the ambient air quality of the project area is good. The ambient air quality monitoring conducted at Jakhalabandha S/S shows that the value of PM₁₀ and PM_{2.5} are 58 & 29 µg/m³ respectively.

Based on the observation at site it has been perceived that the project area has very minimal surface & ground water and soil contamination. Therefore, requirement of conducting test for water and soil quality monitoring is not critical.

As per the detailed survey report, the Right of Way of " LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S" involves approximately 30 trees comprising both fruit-bearing and non-fruit-bearing species. Additionally, around 115 bamboo plants are present within the corridor.

No negative impact from the project is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs) or archaeological/historical sites as assessed during the detailed and check survey.

There are no Protected Cultural Resources (PCRs), Common Property Resources (CPRs), or archaeological/historical sites located within the Right of Way (RoW) corridor of the proposed LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S transmission line. However, beyond the Right of Way of the proposed line, the following CPRs have been identified: 4 places of worship, 2 Schools and 1 market place.

During the construction phase, no impact is anticipated on these above mentioned CPRs, as most of them are located at a considerable distance from the center line of the transmission lines.

Impact Assessment: Environmental sensitive sites including the Key Biodiversity Areas (KBA), Important Bird and Biodiversity (IBA) sites are not involved in the corridor (RoW) of both the transmission lines. Permanent restricted use of land is required for the tower footing area. However, no land is acquired permanently for the tower foundations or Right-of-Way (RoW), and ownership of the land will remain with the respective landowners. Agricultural activities will be allowed to continue within the RoW after construction; however, for the tower base area, it is recommended that agricultural activities not be carried out due to electrical safety considerations. Moreover, compensation of land utilised for tower footing and RoW will be paid as per Ministry of Power, Government of India (MoP, GoI) guidelines and Zirat Value (tree and crop damages) will be paid to the individual landowners as per compensation guidelines/procedures. As assessed from the site visit and observation no major environmental and social issues have been recorded and the impacts are manageable with proper mitigation measures. Details of impact assessment and mitigation measures are discussed in the main report.

Climate Risk and Adaptation at the Design Stage: Remedial measures for climate risks have been adapted for Transmission Line at the design stage.

Stakeholder & Public Consultation and Information Disclosure:

The community consultations are carried out in all the villages along the transmission line corridor with local habitants where Sixty one (61) participants were participated in the of 220kV D/C line from Samaguri to Mariani Transmission line at Jakhlabandha S/s like economically weak communities, women, vulnerable groups and other local community leaders nearby the proposed transmission line on 10th April 2025, 11th April 2025, 14th May 2025, 15th May 2025, 18th July 2025, 19th July 2025 and 22nd July 2025.

Summary of Key consultation findings:

- The local community was informed in detail about the project scope, including the construction of the proposed transmission lines to the Khumtai substation.
- The procedures for payment of compensation for land, trees, and crops were explained to the landowners.
- Potential impacts associated with the transmission lines were discussed, along with measures to minimize these impacts.
- Landowners were briefed on the specific documents required for disbursement of compensation related to tower footing, RoW, and zirat (assets) compensation.

- It was clarified that common property resources will be fully avoided during construction of tower footing. If any utilities are identified, alignment will be adjusted to prevent impacts.
- The community was informed about the establishment of a Grievance Redressal Committee, and that they can approach this committee directly in case of any grievances arising during project implementation.

This draft ESIA - ESMP will be disclosed online on the website of AIIB and AEGCL. The hardcopies of the same (English version) and Assamese version of the Executive Summary will be available at the following locations:

1. PMU: Project Director,
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.coc.in
2. PIU: Project Manager
Address: AGM, 220/132 kV Samaguri GSS, AEGCL
Email: agm.samaguri@aegcl.co.in

Grievance Redress Mechanism (GRM): To ensure environmentally and socially responsible implementation a free, multi-tiered Grievance Redress Mechanism (GRM) will be established to promptly address concerns or complaints from project-affected people or workers, helping to resolve issues efficiently and avoid litigation.

The GRM will consist of two levels of committees:

- Tier I – Operates at the field level.
- Tier II – Functions at the Project Management Unit (PMU) / Headquarters level. Tier II: The composition of the Tier II and Tier II GRCs is available in Chapter 9.

The Project-affected People’s Mechanism (PPM) has been established by AIIB to provide an opportunity for the independent and impartial review of submissions from Project-affected people who believe they have been or are likely to be adversely affected by the AIIB’s failure to implement its ESP in situations when their concerns cannot be addressed satisfactorily through the Project-level GRM or the AIIB’s management processes. Information about the PPM is available at: <https://www.aiib.org/en/policies-strategies/operational-policies/policy-on-the-project-affected-mechanism.html>

Environmental and Social Management Plan: ESMP for identified impacts and the administrative aspects to ensure that mitigative measures are implemented at Site and their effectiveness monitored regularly through Environmental and Social Monitoring program has been detailed in the main report.

The ESMP cost to implement the key environmental & social measures and environmental & social monitoring plan which a part of Engineering Procurement Construction (EPC) Contractor’s good Engineering practice an amount of **INR 8.10 Lakhs** is estimated for implementation of ESMP.

Arrangement for Monitoring and Reporting of Assam Intra-State Transmission System Enhancement Project (AISTSEP) including Reporting Line (from contractor to AIIB) is in place and detailed in the main report.

Capacity building programmes are being conducted by PMC as per the requirement and PMC contract provision. Apart from these, training and capacity building programme are being conducted by E&S team of AIB to ensure implementation of E&S requirement.

Summary, Recommendations and Conclusion: The ESMP provides a structured approach to ensure that the temporary impacts during construction are minimized, while also maximizing the positive benefits such as local employment opportunities, through effective management and monitoring.

It is recommended to implement all the mitigation measures outlined in Environmental and Social Management Plan, monitor Environmental and Social Monitoring Plan, continuous public consultation and maintaining GRM.

In conclusion, it can be stated that the proposed project will yield positive result in terms of reliable & enhanced power supply and generating local employment opportunities. The environment & social impacts identified in the ESIA study are manageable and can be mitigated effectively through compensation, adoption of preventive measures and careful planning during the construction & operational phase.

1 Introduction

1.1 Background

Asian Infrastructure Investment Bank (AIIB) extends financial assistance for “Assam Intra-State Transmission System Enhancement Project” (AISTSEP) to Assam Electricity Grid Corporation Limited (AEGCL), the Implementing Agency (IA), to support the implementation of Power for All (PFA) plan. The Project under Phase I includes the construction of 10 new substation in 400kV, 220kV and 132kV voltage level along with the associated (332.945 km) transmission lines (TL), Conversion of one no. of existing AEGCL S/S (132/33kV Gohpur) from AIS to GIS; Augmentation of 18 existing substations (replacement of old transformers with new transformers); Augmentation of 186 km of transmission line (restringing of One Single Circuit (S/C) line and two Double Circuit (D/C) line) by High Temperature Low Sag (HTLS) conductors; Replacement of ground wire to Optical Power Ground Wire (OPGW) for 636 km of transmission lines and substation equipment’s at substations.

As part of AIIB’s Environmental and Social Policy (ESP) and its compliance requirements, an Environmental and Social Impact Assessment - Environmental and Social Management Plan (ESIA - ESMP) is to be in place for transmission lines.

PT Feedback Infra Limited (PTFIL), Indonesia in Association with Jade Consult Nepal and NIPSA, Spain has been engaged by AEGCL as Project Management Consultant (PMC) including scope of preparation of ESIA – ESMP report for the transmission lines. The present Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA - ESMP) report focuses on the constructions of one transmission line namely

- A. LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S– 2.592 km

1.2 Purpose of the report

Power transmission projects are not listed in the list of environmentally sensitive projects as per the Environmental Impact Assessment (EIA) notification of 2006 and its subsequent amendments issued by the Ministry of Environment, Forest and Climate Change (MoEF&CC), Govt of India and hence no Environmental Clearance (EC) is required to be obtained as per National law. However, project associated activities like quarry operation/borrowed earth etc. (if any) may require prior Environmental Clearance.

As per AIIB’s ESP, an ESIA – ESMP shall be prepared to assess E&S risks and impacts and design appropriate mitigation measures associated with the subproject’s activities.

The present ESIA – ESMP report discusses the project description, policy, legal and institutional framework, current (baseline) environmental and social status, analysis of alternatives, assessment for potential environmental and social impacts and mitigation measures, climate risk and adaptation at the design stage, environmental and social management plan, stakeholder consultations and public disclosure, recommendations, and conclusion.

1.3 Objective and scope of ESIA

The objective of this report is to carry out Environment and Social Impact Assessment (ESIA) for the proposed activities in line with approved Environment and Social Management Planning Framework (ESMPF) of the project.

The scope includes the following:

- Review and update (if any) policy, legal and institutional framework as detailed in approved ESMPF,
- Current (baseline) environmental and social status (Description of the environment baseline of the project in terms of the key sensitivities and potential constraints on the construction and operation and maintenance of the transmission line),
- Analysis of alternatives (assessment of alternatives available for the project),
- Assessment for potential environmental and social impacts and mitigation measures,
- Climate risk and adaptation at the design stage,
- Stakeholder consultations and public disclosure,
- Grievance Redress Mechanism (GRM),
- Environmental and Social Management Plan (ESMP),
- Recommendations

1.4 Approach and key tasks for this ESIA study

The following approach has been considered for preparation of present ESIA – ESMP report.

Screening: Assessment of the requirements of relevant International, National, State Act/Policies and also AIIB's E&S policy. Environmental Clearance is not required as per the EIA Notification of MoEF&CC. Screening determines whether the project requires a full EIA based on its scale, location, and potential impacts. The project has been categorised as “Category B” as per AIIB's E&S policy with limited, site-specific, and reversible impacts and thus requires an ESIA – ESMP for transmission lines to be covered under its investment.

Scoping: Scoping identifies the key environmental issues to be studied in detail, such as impacts on forests, wildlife, communities, and electromagnetic fields. Reconnaissance survey within the project footprint (i.e., RoW), 2 km and 10 km (for biodiversity assessment) buffer from either side of transmission line to assess environmental and social sensitivity has been done for the project. Together, they help streamline the assessment process, ensuring focus on significant environmental concerns and facilitating informed decision-making.

Baseline data collection: It includes details about physical environmental resources and social & economic aspects along the project footprint, 2 km; and 10 km (for biodiversity assessment) from either side of transmission lines.

Baseline data collection has been initiated in the month of June 2025 from secondary sources. Site reconnaissance survey has been conducted in April, May, June and July 2025 by comprising team of Environmental & Social Experts of PMU & PMC along with Environmental & Social Investigation officers of PMC.

Public and stakeholder consultations: The public consultation has been conducted with the local community nearby the proposed transmission lines in the month of April, May and July 2025. Also in April, May, June and July 2025 for collecting the base line data.

Impact Assessment: Impact Assessment has been done (identification, prediction and evaluation) based on the available data from primary & secondary sources, site assessment and public consultation.

ESMP: Development of practical mitigation measures and management, monitoring plan, budget and institutional framework has been done in line with the approved ESMPF.

1.5 Limitations

The basis of this ESIA-ESMP report is scientific principles and professional judgement of experts based on available secondary data and data gathered during primary survey for impact assessment, mitigation measures as per the requirement and provide management plan. There are some limitations in preparation of this ESIA-ESMP report assessed as follows:

- ESIA-ESMP is prepared with available information as per approved check survey observations made during site survey and consultation at site.
- The consultations undertaken as part of the ESIA to the stakeholders, who were available for consultation during the site visit; which included local community;
- ESS 2 is applicable as there is involuntary permanent and temporary restrictions on land use for the tower footing as well as RoW of the Transmission line and accordingly Resettlement Action Plan/ Abbreviated Resettlement Action Plan (RAP/ARAP) has been prepared.
-
- ESS 3 is applicable if Indigenous Peoples are present in, or have a collective attachment to, the proposed project area and are likely to be affected by the project.

In the case of the LILO of 220 kV S/C Samaguri–Mariani Line–1 at the proposed Jakhalabandha Substation, screening was conducted to determine the presence of Indigenous Peoples in accordance with the four defining characteristics outlined under ESS 3.

The screening findings, verified through field observations and meaningful public consultations with the tribal households (Refer **Appendix 15** - Photographs and attendance sheet of public consultation with Tribal households) indicate that although these individuals belong to the Scheduled Tribe (ST) Plains community and are affected by the proposed transmission line, they do not exhibit the substantive socio-cultural characteristics typically associated with Indigenous Peoples as per ESS 3. Specifically:

1. **Self-identification and recognition by others:**
The affected individuals identify as members of the ST Plains community but are socially and culturally integrated with the mainstream population. They are not recognized by others as a distinct indigenous group.
2. **Collective attachment to ancestral territories or natural resources:**
The affected individuals do not demonstrate collective attachment to any geographically distinct habitat, ancestral territory, or specific natural resources within the project area.
3. **Distinct customary institutions:**
The affected households follow the same administrative, social, and political systems as the dominant local society, with no separate customary institutions governing their affairs.
4. **Distinct language:**
The affected individuals communicate primarily in Assamese and do not possess a distinct indigenous language different from the official or regional language.

Moreover, the project area is not located within a Sixth Schedule area under the Indian Constitution.

Based on the above assessment and field verification, it is concluded that the affected individuals and groups do not demonstrate the four defining characteristics of Indigenous Peoples. Therefore, ESS 3 is not applicable and is not triggered for this project.

1.6 Report structure

Chapter No.	Chapter Name	Contents
	Executive summary	This chapter includes a brief summary of the ESIA- ESMP report.
Chapter 1	Introduction	This chapter includes background of the project, purpose of the report, objective and scope of ESIA, approach and key tasks for this ESIA study, limitations and structure of ESIA-ESMP report.
Chapter 2	Project Description	This chapter covers profile of the project route, overview of project site, overview of activities during different phases of the project, land requirement and allotment process.
Chapter 3	Policy, legal and institutional framework	This chapter describes the applicable national, state level and AIB's environmental and social laws and regulations and institutional framework and International treaties and conventions on environment and labours.
Chapter 4	Description of the Environment	This chapter describes the Baseline Environmental features in detail. It includes details about location characteristics, study area, physical environment, biological environment (flora and fauna) and social environment baseline of the study area.
Chapter 5	Analysis of Alternatives	This chapter elucidates detailed analysis about different options of alignment with considering design, environmental, social and economic aspects. The selection of final alignment with their justification is reflected in this chapter.
Chapter 6	Assessment for Potential Environmental and Social Impacts and Mitigation Measures	This chapter details the impact assessment methodology, anticipated project impacts on physical, biological environment (biodiversity assessment, critical habitat assessment using tools like KBA, IBA, AVISTEP etc.) and social environment, based on baseline environmental features of the project during design, construction and operation phases and mitigation measures for all identified adverse impacts.
Chapter 7	Climate risk and adaptation at the design stage	This chapter describes climate risk and adaptation taken at the design stage.
Chapter 8	Stakeholder consultations and public disclosure	This chapter elaborates stakeholder identification, stakeholder mapping and analysis, stakeholder consultations undertaken as part of the ESIA process in order to assess the impact on project and them and their participation in the project as a continuous process.
Chapter 9	Grievance redress mechanism	This chapter shall highlight the mechanism to redress grievances arises during implementation of the project.
Chapter 10	Environmental and Social Management Plan (EMP) with	This chapter outlined the ESMP for identified impacts and the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored. This chapter also outlined:

Chapter No.	Chapter Name	Contents
	specific potential E&S impacts	<ul style="list-style-type: none">● Environmental and Social Monitoring program for the project.● Budgetary allocation for implementation of different activities of the ESIA.● Institutional arrangements for the project, monitoring and reporting indicators for performance of ESMP.
Chapter 11	Summary, recommendations and conclusion	This chapter summarizes the project with impact, mitigation and management plan of the project activities with recommendations and conclusion.
Appendices		Appendices of the project related documents shall be detailed at the end of the report.

2 PROJECT DESCRIPTION

2.1 Overview of Project Site

AEGCL, the State Transmission Utility (STU) of Assam, proposes to implement the “Assam Intra-State Transmission System Enhancement Project” in alignment with the Government of India’s “Power for All” (PFA) initiative. The project aims to facilitate the evacuation of power from both state based generating stations and central sector utilities, as well as other sources. Additionally, it seeks to reinforce the state’s grid infrastructure and minimize transmission losses. AEGCL is responsible for transmission of electricity to the Distribution Company (DisCom) i.e., APDCL of Assam.

The project scope involves construction of substations and associated transmission lines, augmentation, upgradation and installation of equipment of substations. The sub-projects are located in different areas of Assam.

The present Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP) is pertaining to the Transmission Line namely:

A. LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S– 2.592 km

The Right of Way (RoW) required for the transmission line is 35 m (17.5 m on each side of the transmission line route) which is approx. 9.072 hectare in total. The tower base area required varies from 31 to 45 sq. m (DA type towers), 37 to 53 sq. m (DB type towers), 41 to 61 sq. m (DC type towers), and 47 to 70 sq. m (DD type towers).

For the LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S transmission line, temporary access roads for 11 tower foundation locations will be require out of 13 tower foundation sites, while the remaining 2 locations can be accessed via existing rural roads and barren land. Most of these tower foundation sites are located in paddy fields. In total, approximately 0.33 hectares of land will be temporarily affected by the construction of access roads, primarily impacting paddy crops.

The above-mentioned Transmission Line corridor i.e LILO of 220 kV S/C Samaguri – Mariani Line -1 is located in the Tehsil Kaliabor in Nagaon district in the State of Assam. Map showing the transmission line and a brief description of the Transmission Line corridor is given in Figure and table below:

Table 2.1: Brief Description of Different District/Towns/Village crossing the Transmission Line

Sl. No.	Particulars	Different District/ towns/Village crossing the TL
		LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S– 2.592 km
1	District Name / State	Nagaon / Assam
2	Tehsil (Administrative subdivision)	Kaliabor
3	Project affected Village	Seconee Pathar and Barholagaon



Figure 2.1: Map showing LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S transmission line

Table 2.2: Brief Description of Transmission Line corridor

Sl. No.	Particulars	Description
		LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S – 2.592 km
1	Location Coordinates (start and end)	Starting point of T/L:- 93° 1'0.50"E 26°33'51.22"N Ending point of T/L:- 92°59'46.43"E 26°34'19.09"N
2	Project affected Village	Seconee Pathar and Barholagaon
3	Tehsil	Kaliabor
4	District Name / State	Nagaon / Assam
5	Capacity of Transmission line	220 kV
6	Power Evacuation	The transmission line will evacuate power from existing 220 kV S/C Samaguri – Mariani Line -1.
7	Climatic zone	Subtropical Humid
8	Elevation	Nagaon district – 40 to 61 meters
9	Site Conditions	Mostly flat agricultural land, crop plantation and water bodies are prominent in the RoW of transmission line.
10	Road Accessibility	Site could be accessed through NH-27 which connects to village roads of the project area.
11	Road crossing	<ul style="list-style-type: none"> ● National Highway: Nil ● State Highway: Nil ● Village Roads/ cart track: 6 locations
12	Nearest Airport	Nearest Airport is Tezpur Airport Approx. distance is 43 Km.
13	Nearest Railway Station	Nearest Railway station is Silghat.
14	Railway crossing	Nil
15	River/canal/small stream/pond crossing	<ul style="list-style-type: none"> ● River: Nil ● Canal: Nil ● Small stream: Nil ● Pond/ Water body: Nil

Sl. No.	Particulars	Description
		LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S – 2.592 km
16	Number of Powerline (66 kV and above) crossing	Nil
17	Reserved Forest / Protected areas (WLS/NP/TR etc.)	Nil
18	Land Requirement	<ul style="list-style-type: none"> • Transmission Corridor (9.072 ha considering 35 m RoW width and 2592 m length of Transmission Corridor) • Tower Base Area: DA type towers 35 to 51 sqm, DB type towers 47 to 66 sqm, DC type towers 50 to 70 sqm and DD type towers 57 to 79 sqm. • The tower base area for 13 numbers of towers will require an area of 0.144 ha of land.
19	Land Availability	Obtained RoW permission from District Administration.
20	Access Road	The project shall primarily use the existing roads in the area. In addition to this, temporary access routes shall be built during the transmission line construction phase.
21	Water Requirement: Construction Phase	The transmission line generally requires about 50 m ³ of water for casting of foundations for each tower, which shall be sourced from local sources through tankers.
22	DG sets	DG Set (5 kVA)
23	Soil Characteristics	Nagaon district- Alluvial soil is mostly loamy and consists of a mixture of clay and sand in varying proportions, ranging from pure sand on the banks of the Brahmaputra to sticky clay content depending on location.
24	Seismic Zone	Seismic Zone V – Earthquake Hazard Zone.
25	Highest Flood Level	Nagaon district- 62.17m
26	Wind zone	The Project area falls in a Very high damage risk zone B ($V_b = 50$ m/s).

Source: Check Survey report and site visit

Survey of India Toposheet showing transmission line, Environmental and Social Features within 2 KM buffer are given figure below.

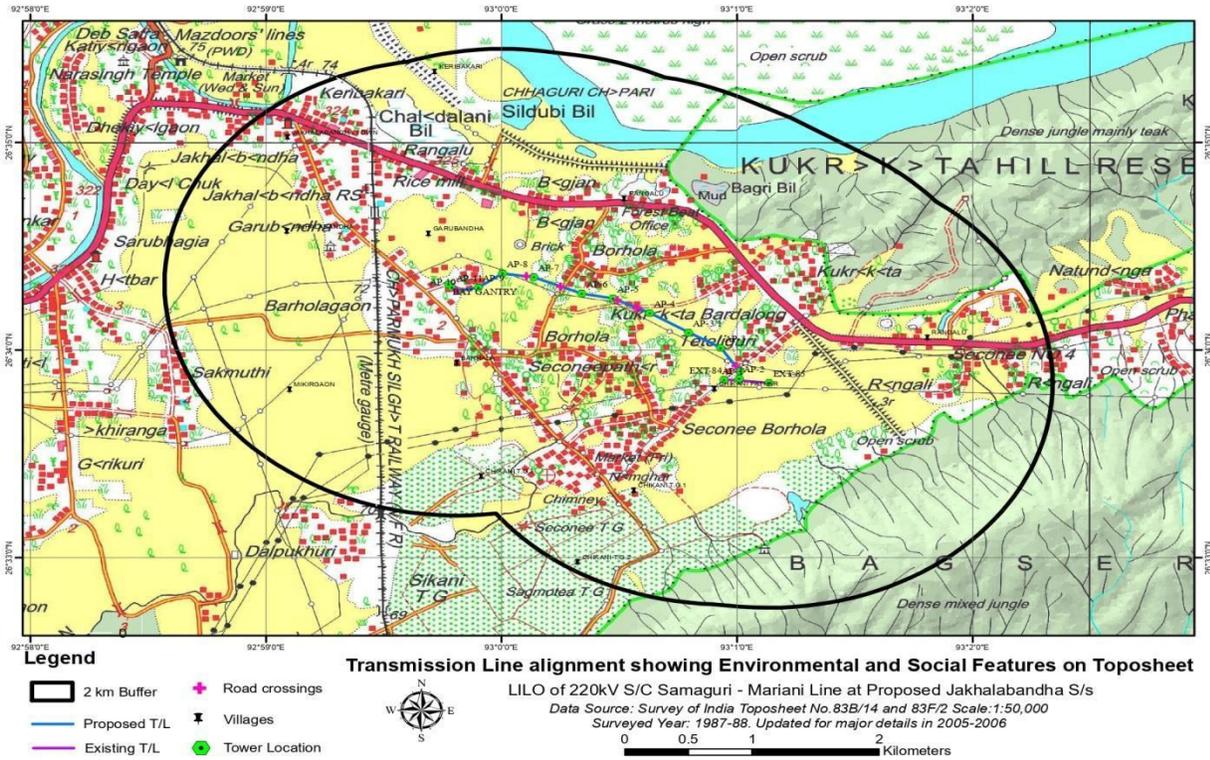


Figure 2.2: Survey of India Topo-sheet showing Jakhlabandha S/s transmission line, Environmental and Social Features within 2 km buffer area.

Table 2.3: IS: 5613 & MOEF&CC guidelines on Right of Way and Spacing between the lines/cables as per Electrical standard

Sl. No.	Transmissin line voltage (In KV)	Maximum RoW (in meter) as per MoEF&CC	Maximum RoW (in meter) as per Electrical standard (in meter)	Minimum clearance between conductor and trees (in meter)	Minimum ground clearance as per Electrical standard (in meter)	Spacing between the lines/cables (in meter)
1.	132	27.00	27.00	4.0	6.10	3.05
2.	220	35.00	35.00	4.6	7.00	4.58
3.	400 SC/DC	46.00/52.00	46.00 52 – SC Horizontal configuration	5.5	8.84	5.49

Source: IS: 5613 & MOEF&CC guidelines on Right of Way and Spacing between the lines/cables as per Electrical standard

Technical details along with layout, design, and other parameters of the towers (different type) and conductors etc. are given in **Appendix -1, Appendix 2A and 2B.**

Detailed methodology for installation of towers and stringing of conductors given in **Appendix 3A & 3B.**

Details of other project resources requirements including construction/workers camps, material supply and storage, access roads etc. are as follows:

Resources

- No of Foundation and Stringing Gangs engaged: 2 nos.
- No of workers per gang: 20 nos.

Worker camps - Worker camps are set in high ground finding a suitable spot which has suitable access road and near to the line. Two labour camps will be established within the substation premises to accommodate workers. Additional camps will be set up at required locations along the transmission line alignment. Approximately 40 workers are expected to be deployed along the 2.592 km stretch of the Jakhalabandha transmission line. Proper illumination will be provided with emergency communication system, Fire Extinguishers & Fire Buckets and First-aid box. Adequate hygiene condition will be maintained.

Material supply and Storage – The materials are supplied from approved vendors only, Centralized storage facility will be made for storing all the items, cement will be stored indoor to avoid damage, from the centralized store the required items will be shifted through tractors or small trucks to the temporary stores at the sites. Usually, the temporary stores are made near to the tower locations. The following will be maintained for choosing storage areas.

- There will be no overhead line in Material storage area/Work Area.
- Proper approach road at site/Store for material handling.
- There will be no waterlogging
- Ground conditions levelled for material movement and storage

Access roads

Access roads will be typically 12–20 feet wide, but can be wider to accommodate turns. Contractor representatives can work with landowners to find the most practical location for the access road and maximum efforts will be made to use/widening of existing village tracts. They need to be built through environmentally and socially non-sensitive areas.

2.2 Profile of the project route

The details of the proposed components of the transmission lines are provided in table below.

Table 2.4: Components of the transmission line

Sl. No.	Particulars	Description
		LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S
1	Length of TL route	2.592 km
2	No. of Transmission Towers	13
3	Circuit type	Double Circuit
4	Type of conductor	ACSR Zebra 85 ⁰
5	Type of tower	220 kV DA, DB, DC, DD - series Tower
6	Insulator used	Porcelain Insulators
7	No. of Angle Points (AP)	12

Sl. No.	Particulars	Description
		LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S
8	Span	20 to 374 m
9	Ground coverage area	Average- 238 sqm.
10	Height of tower	A-34.4m, B, C-33.85m, D-34.3m
11	Design of tower	A, B, C, D series towers (Refers to Appendix – 2A & B).
12	RoW of transmission line	35m
13	Tower Accessories	Danger plates, number plates, phase plates, circuit plates, anti-climbing plates etc.
14	Minimum ground clearance	7.015m
15	Access Road	During the construction phase, the project has primarily been dependent upon the existing roads in the study area. In addition to this, access through agricultural lands for equipment and personnel movement will be developed with consultation with stakeholders and local people as per requirement.

Source: Checked Survey report

The profiling of transmission line towers is provided in the following table.

Table 2.5: Profiling of Transmission Line Towers as per check survey

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S – 2.592 km						
1.	Ex. TN - 84	93°0'56.60"E 26°33'51.50"N	Agricultural land	Agriculture land	---	Cart Track
2.	Ex. TN - 85	93°1'8.10"E 26°33'50.50"N	Agricultural land	Agriculture land	---	Cart Track
3.	AP-1	93° 1'0.50"E 26°33'51.22"N	Agricultural land	Agriculture land	---	Cart Track
4.	AP-2	93°1'0.53"E 26°33'51.82"N	Agricultural land	Agriculture land	---	Cart Track
5.	AP-2A	93°1'0.70"E 26°33'53.90"N	Agricultural land	Agriculture land and Non-Agriculture land	11 kV Line, 33 kV Line, Metal Road	Village Road
6.	AP-3	93°0'55.80"E 26°34'0.70"N	Agricultural land	Agriculture land	---	Cart Track
7.	3/1	93°0'47.68"E 26°34'5.15"N	Agricultural land	Agriculture land	---	Cart Track
8.	AP-4	93°0'37.70"E 26°34'10.80"N	Agricultural land	Agriculture land and Non-Agriculture land	11 kV Line, 33 kV Line, Metal Road, Village Road	Village Road
9.	AP-5	93°0'28.40"E 26°34'15.00"N	Agricultural land	Agriculture land	---	Cart Track

Sl. No.	Tower No.	Geographical Coordinates	Current Land use and Land Ownership of Tower Base	Current Land use of Transmission Corridor	Environmental Sensitivity within RoW (water body/ streams/ forest)	Access Road within RoW
10.	AP-6	93°0'20.50"E 26°34'16.30"N	Agricultural land	Agriculture land and Non-Agriculture land	2 Nos 11 kV Line, Metal Road, Garden	Village Road
11.	AP-7	93°0'8.20"E 26°34'21.10"N	Agricultural land	Agriculture land		
12.	AP-8	93°0'0.25"E 26°34'22.16"N	Agricultural land	Agriculture land	11 kV Line	Cart Track
13.	AP-9	92°59'54.09"E 26°34'18.11"N	Agricultural land	Agriculture land	11 kV Line	Cart Track
14.	AP-10	92°59'48.79"E 26°34'17.15"N	Agricultural land	Agriculture land and Non-Agriculture land	---	Cart Track
15.	AP-11	92°59'47.39"E 26°34'18.07"N	Agricultural land	Agriculture land and Non-Agriculture land	Kacha Road	Village Road
16.	Gantry	92°59'46.43"E 26°34'19.09"N	Sub-Station	Sub-Station	Kacha Road	Village Road

Source: Checked Survey report

It is evident from the above table and table 4.5 that,

- The transmission line passes through the agriculture i.e. Paddy (rice) which is a seasonal crops/crops plantation and water bodies.
- No major settlements and cultural heritage within 100 m distance from the center line of RoW of transmission line; However, there are 4 places of worship, 2 Schools and 1 market place coming within a radius of 500 m from the proposed LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S. Details are provided in table 4.5.
- Most of the transmission towers can be accessed through village roads, and cart tracks etc.

Box 2.1 Ground Clearance for different features

<ul style="list-style-type: none"> • Crossing another power line: 66kV -3.05, 132 kV and 220 kV- 4.58 m; 400 kV- 5.49 m; • Telecommunication line: 3.050 m; • Minimum ground clearance above rail level of the lowest portion of any conductor under condition of maximum sag: 17.9 m; • Major roads: 12.2 m; • Minimum ground clearance from power conductor: 7.05 m; • Minimum vertical midspan clearance between power conductor and earth wire in still air: 8.5 m;

Source: APTRANSCO- Technical Reference book- 2011-vol. ii.

Map showing road network in area is given below.

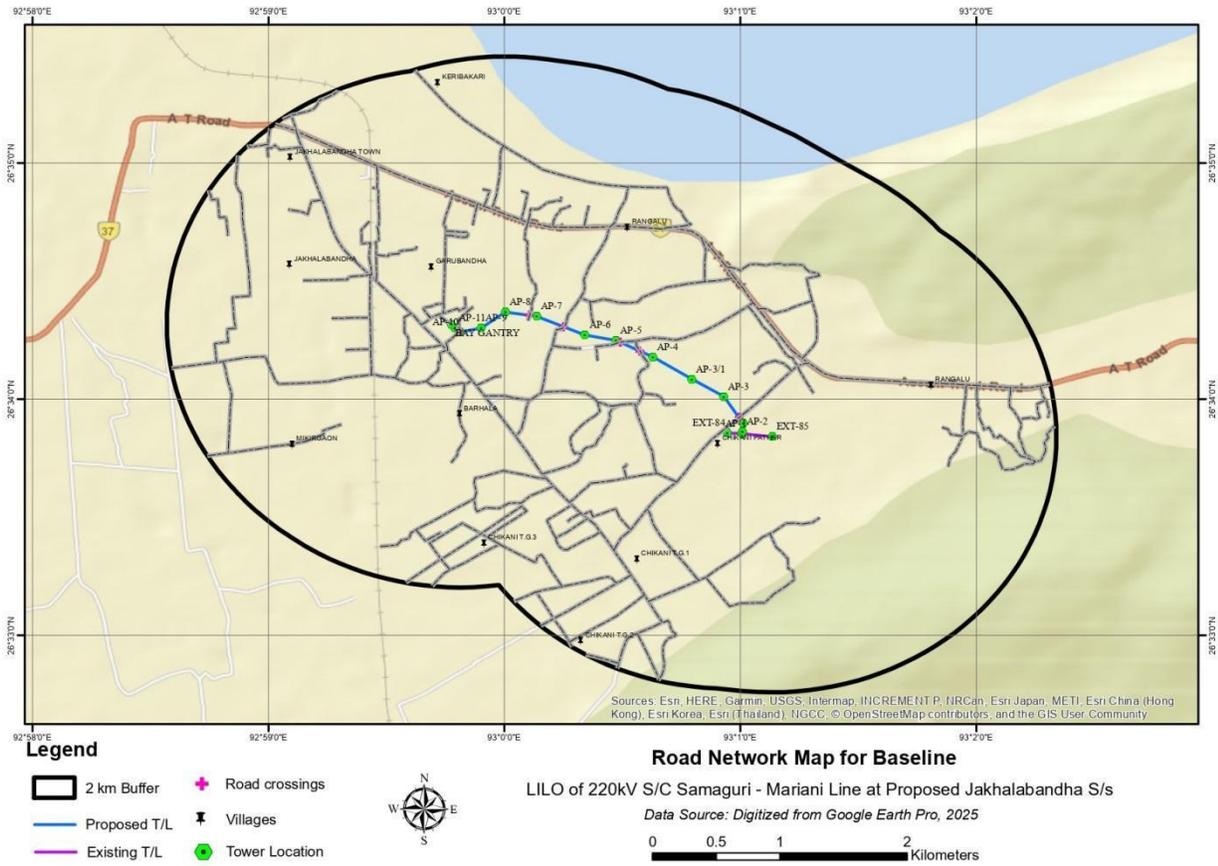


Figure 2.3: Map showing road network in area of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S

2.3 Overview of activities during different phases of the project

Construction Phase

A brief on activities under taken during construction phase are given in table below.

Table 2.6: Brief on Construction Activities

Activity	Details
Transmission Lines	
Pre-construction Activity	<ul style="list-style-type: none"> A reconnaissance, walkover and detailed route survey was carried out to identify the corridor and fixing the alignment; Preliminary & Detail Survey was conducted for finalizing the tower spotting and alignment of route. Soil investigation at tower locations was carried out to ascertain the type of foundation to be adopted.
Marking of the Route and Right of Way (RoW)	<ul style="list-style-type: none"> The right of way is taken as 35 m for 220kV including both sides from the centre line of the transmission line. The Tower location will be identified on the ground in accordance with the line route during Check Survey. Tree enumeration will be finalized as per the Corridor ROW.

Activity	Details
Clearing of Tower Sites	At the tower sites, all vegetation within the footprint of the tower base and for a distance of approximately 2 m beyond the base in all directions will be cleared to ground level.
Foundations for Towers	<ul style="list-style-type: none"> ● Pit marking will be done for the legs of the tower and excavation will be done accordingly. The excavated soil will be stored at the site of each foundation and used for backfilling purposes. Excavated soil ranges from 22.726 m³ to 619.120 m³ at tower locations depending on the type of tower and soil strata; ● Foundation for towers will be laid depending upon the type of soils encountered. The formwork, reinforcing bars, the embedded parts of the towers and any earthing elements will be placed in the pits. A concrete cement pad will be laid at the base of the foundation. The depth of foundation below ground will be generally 3.0 - 3.5 m. ● Lag time of 28 days, as specified by the Indian Standards, will be maintained for curing of concrete before erection of the towers. About 50 KL of water will be required at each site for foundation and curing activities. ● The foundation pits will be backfilled following the removal of the formwork with soil excavated from the site itself. The top part of the stub of the tower leg will remain above the ground level after the backfilling. ● The excess soil will be disposed in the surrounding agricultural fields. On an average, 80 m³ of excess earth will be generated at each tower location. ● Earthing will be done as per specification.
Erection of Towers	The time duration for tower erection ranges between 2 - 3 days for all series of tower. Erection of towers will be done by assembling prefabricated components of the lattice structure followed by straightening and then concreting through hydra cranes. The manpower involved in one tower erection will be minimum 20 workers.
Stringing	<ul style="list-style-type: none"> ● The Tower will be checked for any missing parts and tightness of nuts and bolts before stringing. ● The stringing operations between two sections normally take 2-4 days. The operation involves 'paying off' the conductors and earth wires on the ground and then hoisting them with the help of winch machine/Tensioner Puller for fixing with the towers at both ends along with insulators and hardware. Stringing of the section between two angle towers will be done at a time. ● The tensioning and sagging will be done in accordance with the approved initial stringing charts before the conductors and ground wire will be finally attached to the towers through the ground wire clamps for the ground wire and insulator strings for the conductor as well as earthwires; ● The stringing process requires min 20-25 workers.
Protection of Tower Footing (if required)	Based on site conditions, special measures for protection of foundations are to be taken in respect of locations close to / in nallah, river beds, etc.
Final checking	The final checks are to be done by the concerned Field Officer jointly with the Contractor for foundation and tower footing / protection work, towers and tower accessories, earthing, Conductor, Insulators, Earthwires, RoW & Clearances.

Activity	Details
Testing and Commissioning	<ul style="list-style-type: none"> On completion of the construction work, a series of thorough inspections and commissioning tests will be carried out before the Transmission Line will be put into service as Safety Measures for Operation. After carrying out final checking there will not be any defects / short comings in the work of the transmission line, the line will be considered as having been completed and clear for energizing.

Source: Detailed & Check Survey report

Operation and Maintenance Phase

EPC contractor is obligated to address any issues arises during defect liability period as per the contract terms. The defect liability period is considered as one year from the date of completion and operational acceptance of the facilities or part thereof. AEGCL will perform required Operation and Maintenance after final handover by EPC contractor. Following are activities to be performed during operation period.

Table 2.7: Brief on Operation Activities

Activity	Details
Transmission Line	
Ground inspection by lineman / team	For 220 kV T/L
Inspection of Towers	Repeated tripping of line-on-line faults and fault is untraceable during ground patrolling.
Thermo-vision scanning	After first charging of T/L
Punctured insulator detection	Lines having insulator de-capping incidents.
Attending all Defects	Foundation- backfilling / soil removal, crack of chimney, tree trimming, cleaning of insulators etc.

Source: Checked Survey report

2.4 Manpower requirements and organization structure

EPC contractor is responsible for the overall engineering, procurement, supply, construction, erection, installation, commissioning of the project. The sub-contractors shall be recruited for the fulfilment of the specific scope of works. Approx. 40 numbers of labour will be engaged by the contractor during construction period. For tower base construction local skilled and unskilled labours are engaged. However, for erection and stringing of towers skilled migrant labours will be engaged.

2.5 Land requirement and allotment process

Land requirement

The land requirement for the transmission lines is summarized as below:

Table 2.8: Summary of Land Requirement for the Project

Project Sub Component	Affected Village	Total Land (ha)	Approx. Number of Project Affected Families
LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S			
Transmission line RoW (Corridor Width of 35m)	Seconee Pathar and Barholagaon	9.072	Landowner identification for RoW is under process
Base are for Tower footing		0.144	Landowner identification for Tower base area is under process

Source: Check survey report

The joint verification for identification of landowners for proposed transmission line LILLO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S for tower footing area has been completed, and approval is awaited from the concerned Revenue Circle Offices. Meanwhile, joint verification for the Right of Way (RoW) for the transmission line is currently in progress.

Land allotment process

The RoW permission for the transmission line has been obtained in keeping with the requirements of the Electricity Act 2003, the Indian Telegraph Act 1885, MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015 and Assam Government Power (Electricity) Department, Dispur, Guwahati-6 and and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.

Section 67 (3&4)

- (1) 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 anyone employed by him.
- (2) 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.

Section 68 (5&6)

- (1) 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 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.
- (2) When disposing of an application under sub-section
- (3) 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 purposes of this section, the expression tree shall be deemed to include any shrub, hedge, jungle growth or other plant.

● **The Indian Telegraph Act, 1885, Part-III, Section 10 ("e"):**

"Section 110 - The telegraph authority may, from time to time, place and maintain a telegraph line under, over, along, or across, and posts in or upon any immovable property, Provided that

- a) The telegraph authority shall not exercise the powers conferred by this section except for the purposes of a telegraph established or maintained by the [Central Government], or to be so established or maintained;

- b) The [Central Government] shall not acquire any right other than that of user only in the property under, over, along, across in or upon which the telegraph authority places any telegraph line or post; and
- c) Except as hereinafter provided, the telegraph authority shall not exercise those powers in respect of any property vested in or under the control or management of any local authority, without the permission of that authority, and
- d) In the exercise of the powers conferred by this section, the telegraph authority shall do as little damage is possible, and, when it has exercised those powers in respect of any property other than that referred to in clause (c), shall pay full compensation to all persons interested for any damage sustained by them by reason of the exercise of those powers."
- **MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015**
Ministry of Power (MoP), Government of India (GoI) vide notification no. 3/7/2015-Trans dated 15.10.2015 has issued 'Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines. It is to be noted that the guidelines have proposed compensation to be paid for the base area in between the transmission tower (between four legs) and towards diminution of land value in the width of the RoW corridor due to laying of transmission line @ 85 % and 15 % respectively of the land value as determined by the District Magistrate or any authority based on circle rate/ guideline value/ stamp value/stamp act.
 - **Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024)**, has notified guidelines for compensation related to Right of Way (RoW) for transmission lines, including urban areas, ensuring uniformity in payments to affected landowners.
Compensation Structure:
Tower Base Compensation: 200% of land value for the area enclosed by the four legs of the tower at ground level, plus a one-meter extension on each side.
RoW Corridor Compensation: 30% of land value for land within the RoW corridor, as per Schedule VII of the Central Electricity Authority.
 - **Assam Government Power (Electricity) Department, Dispur, Guwahati-6**
No.PEI.219/2015/91: The Governor of Assam is pleased to notify the following rates for payment of compensation towards damages in regards to Right of Way for transmission lines. In accordance with the Guidelines of Ministry of Power, Govt of India, vide Ref No. 03/07/2015 Trans, dated 15.10.2015 for maintaining uniformity in compensation payment to the affected land owners during construction of transmission lines, it has been decided that a similar payment methodology towards compensation shall also be adopted in the state of Assam. The guidelines of payment methodology of compensation towards "damages" as stipulated in Section 67 & 68 of the Electricity Act, 2003 read with Section 10 and 16 of Indian Telegraph Act 1885 shall be in addition to the compensation towards normal crop and tree damages. This amount will be payable only for transmission lines supported by tower base of 66kV and above and not for sub-transmission and distribution lie below 66kV.

The following steps would be taken for payment of compensation for RoW of the transmission line.

Table 2.9: Steps wise Procedure for payment of compensation of RoW

Sl. No.	Procedure for payment of compensation
1.	Apply NOC for ROW as per standard format.
2.	Grant of NOC
3.	Issue notice in State Gazette/local newspaper as per standard format.
4.	Detail survey
5.	Check Survey
6.	Assessment, jointly with concerned district administration, of properties likely to be affected and preparation of estimates as per standard formats and verify the same.
7.	Finalization of tower design/ tower structure/ tower foundation/ tower testing.
8.	Assisting district administration in preparation of valuation report based on Govt. approved rates.
9.	Working out compensation amount to be paid to the individual beneficiaries
10.	Completion of the Assessment report/estimate and countersignature by Circle Officer and verify the same by concerned officials of AEGCL.
11.	Preparation of Provisional Notice as per format, countersigned by Circle Officer and acknowledgement from beneficiaries.
12.	Preparation of Compensation Receipt as per format and countersignature by Circle Officer
13.	Serving the provisional notice to individual beneficiaries and obtaining their acknowledgement.
14.	Documents collection from affected person.
15.	Submission of proposal to HQ for requisition of fund along with all approved documents
16.	Re-Checking of all documents and Payment to individual beneficiaries and acknowledgment to be obtained on each receipt.
17.	Disbursement of compensation directly from AEGCL.

Source: AEGCL T/L Manual

The following process will be complied:

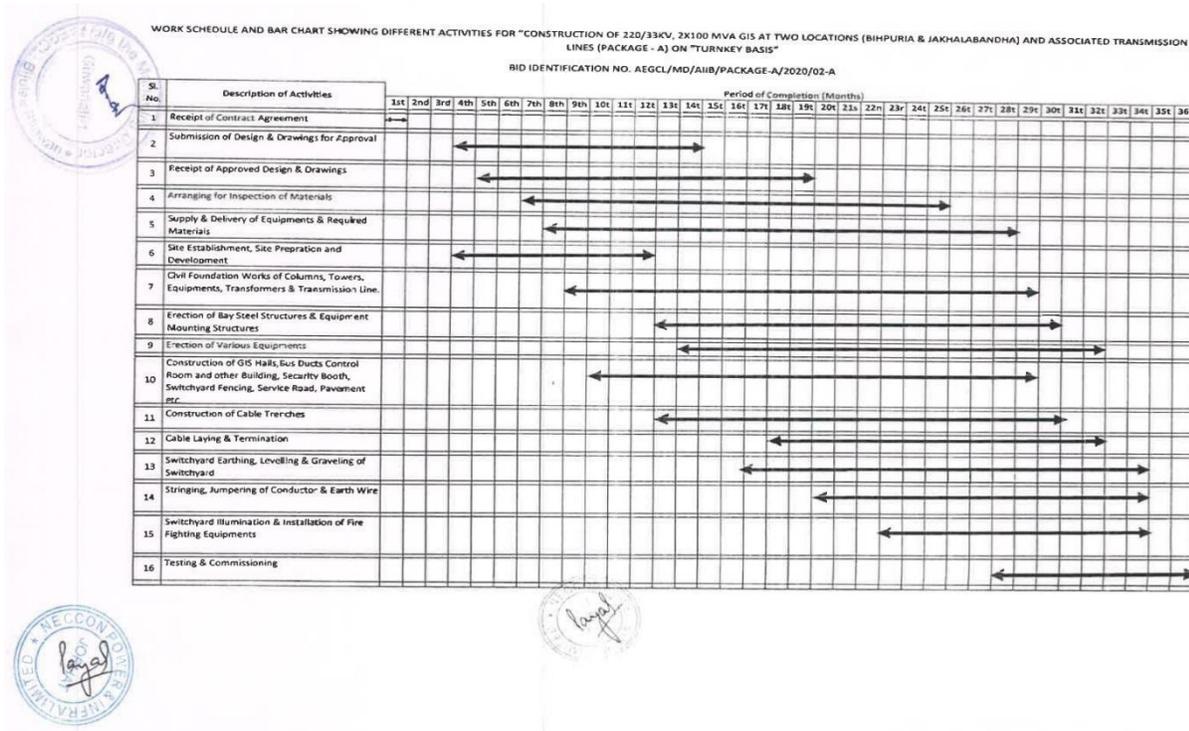
- RoW of transmission Line passing through private lands, the clearance shall be obtained by EPC contractor in liaising with concern revenue department and other line departments for determining the Land compensation and zirat value.
- The Land compensation amount will be paid directly by AEGCL to project affected person as per the assessment of the district administration.
- Moreover, the zirat compensation will be paid by EPC contractor for which the reimbursement of the same shall be made by the AEGCL.
- The documents required to be obtained from the landowners for disbursement of Compensation for tower footing, RoW and zirat compensation, etc. shall be Aadhar card/Voter ID/or other valid identity card, Bank details as per UID, Jamabandi copy/ Khajana receipt, next to kin certificate (where required), NOC for land use, etc.
- Further, PIU need to communicate to all stockholders/departments for providing various government rates for compensation of crop damage, plantation damage, tree cutting, trimming, utilities, etc. that will be damage8d during construction works.
- EPC to obtain all statutory clearance if any required, such as Railway crossing, NHA etc. & any clearance require from Power Grid etc.

2.6 Costs and implementation schedule

Cost of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S
 Supply Portion – Rs. 20,569,600.70 with GST.
 Erection Portion – Rs. Rs. 14,825,435.63 with GST.

Implementation schedule

The detailed implementation schedule has been approved by AEGCL. The details of work progress as per L2 schedule is presented below.



2.7 Existing and associated facilities of the project

The 220 kV S/C Samaguri – Mariani Line -1 transmission line is existing operational assets of (AEGCL) which were constructed and commissioned prior to the proposed LILO lines and without AIIB financing. The line exists independently of the LILO line and was developed to serve prior or ongoing transmission needs. While the LILO at Jakhlabandha S/s will connect to the line respectively, the existing line does not require modification, expansion, or redevelopment under the current project scope. In view of the above, the existing transmission line is not classified as an associated facility under the AIIB ESF.

3 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This chapter describes provisions of Constitution of India, various applicable laws, regulations and policies of Government of India (GoI) and Government of Assam (GoA), International conventions and the Asian Infrastructure Investment Bank (AIIB).

3.1 Provisions of Constitution of India

As a sequel to the UN Conference on the Human Environment (1972), Indian Parliament in 1976 amended the Constitution of India by introducing articles 48A and 51A. These articles incorporated environmental concerns into the Directive Principles of state policy and postulated as a fundamental duty of all citizens to preserve and protect the environment.

3.2 GOI and GOA Laws/Regulations/Policies

Table 3.1: Environmental and Social Policies and Regulatory Requirements (National and Assam State Regulation)

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
Environmental Regulations					
1.	The Electricity Act, 2003	An Act to consolidate the laws relating to generation, transmission, distribution, trading and use of electricity and generally for taking measures conducive to development of electricity industry, promoting competition therein, protecting interest of consumers and supply of electricity to all areas.	Central Electricity Authority, Regulatory Commissions and establishments	Applicable, transmission line projects are constructed under the ambit of Electricity Act, 2003 following the provisions of Section 67 & 68 of act which mandates licensing for the entities involved in the construction, operation and maintenance of the project. Contractor to follow all the requirements as per the Act.	EPC Contractor / PMC / AEGCL
2.	EIA Notification, 2006 and subsequent amendments	Projects indicated in the schedule of this notification require EIA study and environmental clearance.	Ministry of Environment, Forest and Climate Change (MoEF & CC) or State Environmental Impact Assessment Authority (SEIAA)	Not Applicable, transmission line project does not come under purview EIA Notification 2006 and its subsequent amendments. Thus, Environmental	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
				Clearance is not required. However, project associated activities like creation of borrow area (if any) extraction of boulders, River Sand etc. for the project will require prior Environmental Clearance.	
3.	National Environment Policy (NEP), 2006	NEP is a comprehensive guiding document in India for all environmental conservation programs and legislations by Central, State and Local Government. The dominant theme of this policy is to promote betterment of livelihoods without compromising or degrading the environmental resources. The policy also advocates collaboration method of different stakeholders to harness potential resources and strengthen environmental management.	MoEF & CC/CPCB MoEF&CC, GoI, CPCB/SPCB, Department of Environment and Forest, GoA MoEF& CC, IRO Guwahati,	Applicable, should adhere to NEP conservation of environmental resources and abatement of pollution.	EPC Contractor / PMC / AEGCL
4.	The National Green Tribunal Act, 2010	An act established for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to	National Green Tribunal (NGT)	Applicable, respected to area where development activities may cause any damage to environment and property. Should adhere to NGT mandate.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.			
5.	Environment Protection Act, 1986 and subsequent amendments and rules Eco-Sensitive Zone Notifications	An umbrella act for environmental protection in India. Various rules, notifications and standards established under the Act. Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards notified.	MoEF & CC/CPCB MoEF&CC, GoI, CPCB/SPCB, Department of Environment and Forest, GoA MoEF& CC, IRO Guwahati,	Applicable, comply with applicable standards for ambient air, air emission, effluents, receiving water bodies, and drinking water at the consumer end.	EPC Contractor / PMC / AEGCL
6.	Biological Diversity Act, 2002 Assam Biodiversity Rules, 2010	The Act provides a comprehensive legal framework for conservation and sustainable use of bio-resources reflects a strict regime for access, control and benefit sharing. It restricts access and use of biological resources by outsiders and creates decentralized institutional structures for conservation of biological diversity.	National Biodiversity Authority (NBA), Assam State Biodiversity Board (ASBB) and Biodiversity Management Committees (BMCs)	Applicable, should adhere measures as per the Act.	EPC Contractor / PMC / AEGCL
7.	The Forest (Conservation) Act,1980 and subsequent amendments and rules	As per Rule 6, every user agency, who wants to use any forest land for non-forest purposes shall seek approval of the Central Government	MoEF&CC, GoI, Department of Environment and Forest, GoA MoEF& CC, IRO Guwahati	Not Applicable, no notified forest land within the subproject area.	-
8.	National Forest Policy 1988	It articulates the twin objectives of ecological stability and social	Department of Environment and Forest, Assam,	Not Applicable, no notified forest land within the	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		justice; recognizes people's dependence and their symbiotic relation with forest, emphasizes protection of people's rights over forest resource and offers space for participation of forest dependent communities in the conservation, protection and management of state-owned forests.	MoEF&CC, New Delhi	sub-project area.	
9.	Assam Forest Policy, 2004	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 people.	Department of Environment and Forest, Assam	Not Applicable	-
10.	The Compensatory Afforestation Fund Act, 2016 State Compensatory Afforestation Fund Management and Planning Authority Forest (Conservation) Amendment Rules, 2014	This act provides for the establishment of funds under the public accounts of India and the public accounts of each State and crediting thereto the monies received from the user agencies towards compensatory afforestation, additional compensatory afforestation, penal compensatory afforestation, net present value and all other amounts recovered from such agencies under the Forest (Conservation) Act, 1980. The collected funds will	Department of Environment and Forest, Assam and MoEF&CC, New Delhi	Not Applicable, no notified forest land within the sub-project area.	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		be utilized for afforestation, regeneration of forest system, wildlife protection and infrastructure development			
11.	The Assam Compensatory Afforestation Fund Rules, 1994	Provision to constitute a Fund for the purpose of Compensatory Afforestation to be raised against the Forest Area diverted for non-forest use under the provisions of Section 4(1) of the Forest (Conservation) Act, 1980	Department of Environment and Forest, Assam	Not Applicable, no notified forest land within the sub-project area.	-
12.	Assam (Control of Felling & Removal of trees from Non-Forest Land) Rules 2002 and subsequent amendment	These rules prescribe how tree plantations raised in non-recorded forest areas by individuals or institutions are to be governed. They specify which plantations need to be registered, which tree species do not require felling permission, what process is to be followed in order to fell trees outside non recorded forest areas, how is the transit of timber originating from non-recorded forest areas regulated and how and why timber can be confiscated to the Government.	Department of Environment and Forest, Assam	Applicable	EPC Contractor / PMC / AEGCL
13.	The Assam Trees Outside Forest (Sustainable Management Rules), 2022	Provides regulation for Tree Cutting Permission outside forest in a sustainable manner.	Department of Environment and Forest, Assam (PCCF, DFO)	Applicable if tree felling requires during the construction of the sub-projects	EPC Contractor / PMC / AEGCL
14.	Wildlife Protection Act,	The Act provides for the protection of wildlife	Department of Environment and	Not applicable as per MOEF&CC	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	1972 and Subsequent Amendments	and for all matters that are connected to wildlife and their habitat. This Act prohibits destruction, exploitation or removal of any wildlife, and provides for protection to listed species of flora and fauna.	Forest, Assam, NBWL, SBWL	Notification dated 17 May 2022. Transmission Lines are not located within the boundaries of protected areas.	
15.	Air (Prevention and Control of Pollution) Act, 1981 and subsequent amendments The Air (Prevention & Control of Pollution) Assam Rule, 1991	This Act was enacted to achieve prevention, control and abatement of air pollution activities by assigning regulatory powers to Central and State boards for all such functions. The Act also establishes ambient air quality standards.	State Pollution Control Board, Assam.	Applicable, implement measures to mitigate air pollution from project activities; construction facilities.	EPC Contractor / PMC / AEGCL
16.	Noise Pollution (Regulation and Control Act) 2000 and subsequent amendments	Rule 3 of the Act specifies ambient air quality standards in respect of noise for different areas/zones.	Central Pollution Control Board & State Pollution Control Board, Assam	Applicable, contractors to ensure all noise-producing activities during civil works conform to standards	EPC Contractor / PMC / AEGCL
17.	Water (Prevention and Control of Pollution) Act, 1974 and subsequent amendments The Water (Prevention & Control of Pollution) Assam Rule, 1977	Act was enacted to provide for the prevention and control of water pollution and the maintaining or restoring of wholesomeness of water, by Central and State Pollution Control Boards and for conferring on and assigning to CPCB/SPCBs powers and functions relating to water pollution control. Control of water pollution is achieved	State Pollution Control Board, Assam. Prevention of water pollution due to project activities	Applicable, implement measures to mitigate water pollution from project activities; construction facilities.	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		through administering conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act of 1974.			
18.	Wetland (Conservation and Management) Rules, 2010, 2017	The Rules specify activities which are harmful and prohibited in the wetlands such as industrialization, construction, dumping of untreated waste and effluents, and reclamation. The Central Government may permit any of the prohibited activities on the recommendation of Central Wetlands Regulatory Authority.	Central Wetlands Regulatory Authority (CWRA)	Not Applicable, none of the T/L falls within notified wetland areas.	
19.	Hazardous & Other Waste (Management and Transboundary Movement) Rules, 2016	Protection to general public against improper handling, storage and disposal of hazardous waste. The rules prescribe the management requirement of hazardous wastes from its generation to final disposal.	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plan for reuse or safe disposal.	Applicable, Hazardous & Other Waste generated will be managed and disposed off as per requirement.	EPC Contractor / PMC / AEGCL
20.	Construction and Demolition Management Rule 2016 of MOEF & CC (26 March 2016)	Applies to everyone who generates construction and demolition waste. Every waste generator shall segregate construction and demolition waste and deposit at collection center or handover it to the authorized processing facilities. Shall ensure that there is no littering or deposition so as to	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plan for reuse or safe disposal.	Applicable, follow all the rules in managing construction debris and waste (soil, road debris etc.) during construction works	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		prevent obstruction to the traffic or the public or drains.			
21.	Solid Waste Management Rules 2016	Rules for management of municipal solid waste. Responsibility of solid waste generator include waste segregation, and no throwing, burning or bury the solid waste generated on streets, open public spaces outside the premises or in the drain or water bodies, storage and disposal as per the rules.	State Pollution Control Board, Assam and Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plans for its safe disposal/burial.	Applicable, follow all the rules in managing solid waste during construction works activities	EPC Contractor / PMC / AEGCL
22.	E-waste Management Rules, 2016	The rules are applicable to the consumers of electrical and electronic equipment. Large consumers of electrical and electronic equipment are required to ensure that e-waste generated by them is channelized through authorized collection centres or service providers to authorized dismantler or recycler. Additionally, records for e-waste are to be maintained for the State Pollution Control Board.	Central Pollution Control Board & State Pollution Control Board, Assam	Applicable	EPC Contractor / PMC / AEGCL
23.	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 under this rule.	State Pollution Control Board, Assam	Not Applicable	-

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
24.	Central Motor Vehicle Rules, 1989	To minimize the road accidents, penalizing the guilty, provision of compensation to victim and family and check vehicular air and noise pollution.	Commissionerate of Transport (District Transport Offices, Assam)	Applicable during transportation of manpower and construction material. Also applicable during the use of construction equipment and vehicles.	EPC Contractor / PMC / AEGCL
25.	The Mines and Minerals (Development and Regulation) Act, 1957	For development and regulation of mines and minerals in a sustainable manner. The rules regulate the mining of mineral and dealerships for mining and trading.	Directorate of Geology and Mining, Assam and Department of Environment and Forest, Assam	Applicable, as the construction works shall require stones, aggregates, sand, earth, etc.	EPC Contractor / PMC / AEGCL
26.	Assam Minor Mineral Concession Rules, 2013 and subsequent amendment, 2021	Provide regulations established by state governments or relevant authorities to govern the extraction and management of minor minerals. The amendment prescribes the rates (as per the 3rd schedule) at which Royalties shall be paid when minor minerals are used or consumed by Government Agencies.	Directorate of Geology and Mining, Assam and Department of Environment and Forest, Assam	Applicable, as the construction works shall require stones, aggregates, sand, earth, etc.	EPC Contractor / PMC / AEGCL
27.	Disaster Management Act, 2005	This act provides an effective management of disasters and for matters connected therewith or incidental thereto.	Assam State Disaster Management Authority (ASDMA)	The subproject areas fall under the seismic zone V and hence any construction activities/ interventions will be under purview of this act.	EPC Contractor / PMC / AEGCL
28.	Assam State Disaster Management Policy 2010	The policy provides measures' to be adopted for prevention and mitigation of disaster; mitigation measure to be integrated with	Assam State Disaster Management Authority (ASDMA)	The subproject areas fall under the seismic zone V and hence any construction activities/ interventions will	EPC Contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		development plans and projects; build capacity and preparedness measure; and specify roles and responsibilities to each dept. in relation to adopted measure.		be under purview of this act.	
29.	Energy Conservation Act, 2001	This act provides for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.	Inspectorate of Electricity (IEC), Assam	Applicable all project activities involve use of energy efficient equipment etc.	EPC Contractor / PMC / AEGCL
30.	National Building Code, 2016	The National Building Code of India (NBC), a comprehensive building Code, is a national instrument providing guidelines. For regulating the building construction activities across the country. The code provides the 'accepted standards' in relation to material specification, testing or other related information. The code provides development control rules and general building requirements (e.g. floor area ratio, specifications on building design, etc.).	Approval building plan from appropriate agency.	Not Applicable	-
31.	Guidelines to Regulate and Control Ground Water Extraction in India, 2019	This act regulates and control ground water extraction for various construction purpose.	Central Ground Water Board (CGWB)	Not Applicable	-
Social Regulations					
32.	The Right to Fair Compensation and Transparency in Land Acquisition,	The act aims to provide fair compensation to landowners and ensure transparency in land acquisition processes. Additionally, it focuses	State Revenue Department/ District Administration Ministry of Social Justice &	Not Applicable as involuntary land acquisition is not triggered Yes. For all the	AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	Rehabilitation and Resettlement Act, 2013 Rights of Persons with Disabilities Act, 2016	on the rehabilitation and resettlement of affected persons. It gives effect to the proclamation on the full participation and equality of the persons with disabilities and provides the right to equality, life with dignity, and respect for his or her own integrity equally with others.	Empowerment/Commissionerate of Labour, Government of Assam	sub-project where Persons with Disabilities are present and affected persons. Would comply with relevant provision of the Act.	
33.	The Indian Telegraph Act, 1885, Part-III, Section 10 ("e"):	Section 110 - The telegraph authority may, from time to time, place and maintain a telegraph line under, over, along, or across, and posts in or upon any immovable property	Central Telegraph Authority	Applicable for T/L project.	EPC contractor / PMC / AEGCL
34.	MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, October 2015 And new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.	Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines	Ministry of Power, Govt. of India	Applicable for T/L project.	EPC contractor / PMC / AEGCL
35.	Ministry of Power, Govt. of India (Ref No.	Guidelines for compensation related to Right of Way (Row)	Ministry of Power, Govt. of India	Applicable for T/L project.	EPC contractor / PMC / AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
	3/4/2016-Trans-Part (4) dated 14.06.2024)	for transmission lines			
36.	Assam Government Power (Electricity) Department, Dispur, Guwahati-6	Payment of compensation towards damages in regards to Right of Way for transmission lines	Assam Government Power (Electricity) Department	Applicable for T/L project.	EPC contractor / PMC / AEGCL
37.	Right to information Act, 2005	The Act provides for setting out the practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, contain corruption.	Directorate of Economics and Statistics, Government of Assam	The project activities come under the preview of Right to Information Act and any citizen can obtained any information about any aspect of the project. All documents pertaining to the project would be disclosed to public.	EPC Contractor/PMC /AEGCL
38.	Forest Right Act, 2006 /Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006	This is an act to recognize and vest the forest rights and occupation in forest land in forest dwelling scheduled tribes and other traditional forest dwellers who have been residing in such forests for generations but whose rights could not be recorded; to provide for a framework for recording the forest rights so vested and the nature of evidence required for such recognition and vesting in respect of forest land. The Act provides for use, access and ownership to forest	Department of Environment and Forest, Assam and District Administration	Not Applicable, no notified forest land within the subproject area	

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		resources, biodiversity and provision for benefit sharing for ST and other forest dwelling communities.			
39.	Direct Purchase Policy, 2023	In the States policy of Direct Purchase of land, the affected land, immovable assets and other assets attached with the land will be evaluated by the District Level Direct Purchase Committee (DLLPC) according to sections 26 to 30 & Schedule I of RFCTLARR Act 2013 along with Multiplication factor of Assam. The land owners will get an incentive of 25%, inclusive of R&R Benefits, on the compensation calculated as per provisions of Section 26 to 30, Valuation of immovable assets & Schedule I of RFCTLARR Act 2013, as he has readily agreed to be a part of the project assets & Schedule I of RFCTLARR Act 2013, as he has readily agreed to be a part of the project.	Revenue & Disaster Management (LR) Department, Govt. of Assam	Will not be triggered for the TL.	
40.	The Ancient Monuments and Archaeological Sites and Remains (Amendment and Validation) Act, 2010	The Act aims to stop the rampant encroachment and construction around the monuments and other sites of archaeological importance. As per the Act, construction is prohibited in a radius of 100 meters from a protected monument and is regulated in a	Archaeological Survey of India (ASI), Go	No notified Archaeological site is located within 300m of the sub project. However, if any chance findings finds during the construction of TL mitigation measures will be taken.	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		radius of >100-300 meters from a protected monument. Permission of the National Monuments Authority needs to be taken in case of repair/renovation in the prohibited area or regulated area.			
41.	Government of India Act, 1935 (6 th Schedule)	The Sixth Schedule under Article 244(2) and 275(1) provides for the formation of autonomous administrative divisions – Autonomous District Councils (ADCs) – that have some legislative, judicial, and administrative autonomy within a state	District Autonomous council	Not Applicable	
Labour Laws Applicable to Establishments Engaged in Building and Other Construction Work					
42.	Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996	It regulates the employment and conditions of service of building and other construction workers and provides for their safety, health and welfare.	Commissioner at Labour, Government of Assam	Applicable to ensure safety and welfare measures for workers employed at construction sites. License, Safety and welfare measures for work force employed at construction sites are to be regulated in conformity with this act. Should adhere and follow the act.	EPC Contractor/PMC /AEGCL
43.	Workmen Compensation Act, 1923	It provides for payment of compensation by employers to their employees for injury/fatalities / disablement by accident including occupational disease.	Commissioner at Labour, Government of Assam	Applicable because contractor shall be applying large number of labours during construction which will include both Men and	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
				Women. Should follow as per the requirement of the Act,	
44.	Employees State Insurance Act, 1948	Employees State Insurance Act provides sickness benefit, maternity benefit (Female employees), disablement benefit, dependent's benefit and medical benefits as specify in the act to the employees.	Commissioner at of Labour, Government of Assam	Applicable Should follow as per the requirement of the Act,	EPC Contractor/PMC /AEGCL
45.	The Child Labour (Prohibition & Regulation) Act, 1986 and subsequent Amendments	The Child Labour (Prohibition & Regulation) Act is aimed at regulating the employment of children and prohibiting the engagement of children in certain occupations and processes. It seeks to protect the rights of children and ensure their well-being.	Commissioner at of Labour, Government of Assam	There should not be any child labour (less than 14 years) engaged in any project activity and adolescents (above 14 and less than 18 years) in any hazardous activity. Should follow as per the requirement of the Act.	EPC Contractor/PMC /AEGCL
46.	Sexual Harassment of Women at the Workplace (Prevention, Prohibition and Redressal) Act, 2013 (POSH Act)	The Act is meant to serve as guidelines for the employees subject to the provisions of the Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013. It aims to set out effective measures to avoid & to eliminate & if necessary to impose punishment for any sexual harassment in the workplace.	District Administration	Applicable. If women workers at project workplaces are engaged. It will safeguard and protect women involved in the project from Sexual Harassment. Should adhere as per the requirement of the Act.	EPC Contractor/PMC /AEGCL
47.	Contract Labour (Regulation & Abolition) Act 1970 along with the rules, 1971	The objective of the Contract Labour Regulation and Abolition) Act, 1970 is to prevent exploitation	Commissioner at of Labour, Government of Assam	Contractors shall employ work-force during Construction. The Act applies to the	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		of contract labour and also to introduce better conditions of work.		Principal Employer of an Establishment and the Contractor where in 20 or more workmen are employed or were employed even for one day during preceding 12 months as Contract Labour. Should comply as per the requirement of the Act.	
48.	Minimum Wages Act, 1948 along with Central Rules, 1950 The minimum wages rules Assam 1952	To ensure that workman gets at least minimum wages as fixed by Govt. Minimum wages sets the lowest limit below which wages cannot be allowed to sink.	Commissioner at of Labour, Government of Assam	Applicable, Contractor should comply minimum wages act.	EPC Contractor/PMC /AEGCL
49.	Payment of Gratuity Act, 1972 The payment of gratuity rules Assam 1972	This act provides for a scheme for the payment of gratuity to employees engaged and completed 5 or more years of service with employer.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should adhere the both Gratuity Act and Rules.	EPC Contractor/PMC /AEGCL
50.	Employees Provident Fund and Miscellaneous Provision Act, 1952 along with EPF Scheme Rules and Forms	It is a beneficent piece of social welfare legislation aimed at promoting and securing the well-being of the employees.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should adhere the Act.	EPC Contractor/PMC /AEGCL
51.	Maternity Benefit Act, 1961 and subsequent amendment, 2017; Assam Maternity benefit Rules 1965	This act provides provision for maternity leave for women, during pregnancy and after giving birth and some other benefits to women employees, in case of medical recommendation of	Commissionerate of Labour, Government of Assam	Applicable, Contractor should follow as per the requirement of the Act.	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		bed rest or miscarriage etc.			
52.	The Bonded Labour (Abolition) Act 1976 Bonded Labour System (Abolition) Rules 1976	An Act to provide for the abolition of bonded labour system with a view to preventing the economic and physical exploitation of the weaker sections of the people and for matters connected therewith or incidental thereto	Commissionerate of Labour, Government of Assam	Applicable, Contractor will ensure that there is no Bonded Labour in the project.	EPC Contractor/PMC /AEGCL
53.	Code on Occupational Safety, Health and Working Conditions, 2020	This is a comprehensive code regulating the occupational safety, health and working conditions of the persons employed in an establishment and for matters connected therewith.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should follow as per the requirement.	EPC Contractor/PMC /AEGCL
54.	National Institute of Occupational Safety and Health (NIOSH) Publication No. 98-126	NIOSH has laid down criteria for a recommended standard: occupational noise exposure. The standard is a combination of noise exposure levels and duration that no worker exposure shall equal or exceed.	Commissionerate of Labour, Government of Assam	Applicable, contractors are required to provide hearing-protection equipment and ensure exposures of workers to noise-generating activities are within allowed NIOSH standards.	EPC Contractor/PMC /AEGCL
55.	National Policy on Safety, Health and Environment at Workplace, 2009	The policy provides an action program for enforcement of national standards on occupational health and safety at construction works, testing and laboratories.	Commissionerate of Labour, Government of Assam	Applicable for ensuring safety of the workforce during the transmission line construction under the project. Contractor should follow as per the requirement in the construction sites.	EPC Contractor/PMC /AEGCL
56.	Equal Remuneration Act, 1976 along with allied Rules	An Act to provide for the payment of equal remuneration to men and women workers and for the prevention	Commissionerate of Labour, Government of Assam	Applicable, Needed compliance of regulations as per the requirement.	EPC Contractor/PMC /AEGCL

Sl. No.	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Competent Authority	Applicability / Requirement	Responsibility / Supervision / Monitoring
		of discrimination, on the ground of sex, against women in the matter of employment and for matters, connected therewith or incidental thereto.			
57.	Inter-state Migrant Workers Act, 1979	The purpose of this act is to protect workers whose services are requisitioned outside their native states in India. Whenever an employer faces shortage of skills among the locally available workers, the act creates provision to employ better skilled workers available outside the state.	Commissionerate of Labour, Government of Assam	Applicable, Contractor should comply if migration labours are engaged in construction work.	EPC Contractor/PMC /AEGCL

Table 3.2: International Conventions

Sl. No.	Conventions/Treaties/Declarations	Applicability to the project
A. Nature conservation (Forestry and Wildlife)		
1.	Ramsar Convention on Wetlands, 1971	No
2.	CITES, 1973 (Convention on International Trade in Endangered Species of Fauna and Flora)	No
3.	TRAFFIC, 1976 (The Wildlife Trade Monitoring Network)	No
4.	Bonn Convention, 1979 (Convention on the Conservation of Migratory Species)	Yes, flyway involved
5.	CAWT, 2005 (Coalition Against Wildlife Trafficking)	No
6.	CBD, 1992 (Convention on Biological Diversity)	No
7.	Commission on Sustainable Development, 1992	No
8.	ITTA, 1983 (International Tropical Timber Agreement)	No
9.	UNFF, 2000 (United Nations Forum on Forests)	No
10.	IUCN-World Conservation Union, 1948 (International Union for Conservation of Nature and Natural Resources)	No
11.	GTF, 1994 (Global Tiger Forum)	No
B. Hazardous material		
1.	Cartagena Protocol on Biosafety, 2003	No
2.	Nagoya Protocol, 2010	No
3.	SAICM, 2006 (Strategic Approach to International Chemicals Management)	No
4.	Stockholm Convention on Persistent Organic Pollutants (POPs), 2001	No

Sl. No.	Conventions/Treaties/Declarations	Applicability to the project
5.	Basel Convention on the Control of Trans-boundary Movement of Hazardous Waste and Their Disposal, 1989	No
6.	Rotterdam Convention on Prior Informed Consent (PIC) for certain Hazardous Chemicals and Pesticides in International Trade, 1998	No
C. Atmospheric emissions		
1.	UNFCCC (United Nations Framework Convention on Climate Change), 1992	No
2.	Kyoto Protocol, 1997	No
3.	UNCCD (United Nations Convention to Combat Desertification), 1994	No
4.	Montreal Protocol (on Ozone Depleting Substances), 1987	No
D. Marine environment		
1.	IWC (International Whaling Commission), 1946	No

Table 3.3: International Labour Law Conventions

Sl. No.	International Labour Law Convention	Stipulation/ Terms and Conditions
1.	Forced Labour Convention, 1930 (No. 29)	Prohibits all forms of forced or compulsory labour, which is defined as “all work or service which is exacted from any person under the menace of any penalty and for which the said person has not offered himself voluntarily.” The convention also requires that the illegal extraction of forced or compulsory labour is punishable as a penal offence and that ratifying states ensure that the relevant penalties imposed by law are adequate and strictly enforced.
2.	Abolition of Forced Labour Convention, 1957 (No. 105)	Prohibits forced or compulsory labour as a means of political coercion or education or as a punishment for holding or expressing political views or views ideologically opposed to the established political, social, or economic system; as a method of mobilizing and using labour for economic development; as a means of labour discipline; as a punishment for having participated in strikes; and as a means of racial, social, national, or religious discrimination
3.	Equal Remuneration Convention, 1951 (No. 100)	Lays out the principles for equal remuneration for work of equal value and addresses gender discrimination
4.	Discrimination (Employment and Occupation) Convention, 1958 (No. 111)	Prohibits all discrimination and exclusion on any basis including of race or colour, sex, religion, political opinion, national or social origin in employment and repeal legislation that is not based on equal opportunities
5.	Minimum Age Convention, 1973 (No. 138)	To ensure the effective abolition of child labour and to raise progressively the minimum age for admission to employment or work. India has ratified this convention with a minimum age of 14 years
6.	Convention concerning the Prohibition and Immediate Action for the Elimination of the Worst Forms of Child Labour, 1999 (No. 182)	Prohibition and elimination of the worst forms of child labour, including slavery, forced labour and trafficking in human beings. It prohibits the use of children in armed conflicts, prostitution and pornography, illegal activities such as drug trafficking and dangerous work.

3.3 Applicability of AIB Environmental and Social Policy

AIB is an international financial organization that provides a multilateral financing and investment platform for infrastructure development and enhanced interconnectivity in Asia. AIB 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 AIB's Environmental and Social Policy (ESP) is to facilitate achievement of these development outcomes, through a system that integrates sound Environment and Social (E&S) management into projects. ESP sets forth mandatory E&S requirements for AIB's investments accomplished with the following:

A. Environmental and Social Standards (ESSs)

ESS 1: Environmental and Social Assessment and Management

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).

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 AIB.

ESS 1 is applicable to the project as civil works may cause a limited number of potentially adverse environmental and social impacts. These impacts are not unprecedented and are limited to the project area.

ESS 2: Land Acquisition and Involuntary Resettlement

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.

Permanent restricted use of land is required for the tower footing area. However, ownership of the land will remain with the respective landowners. There will be temporary restrictions of land use within the RoW. Agricultural activities will be allowed to continue within the RoW after construction; however, for the tower base area, it is recommended that agricultural activities not be carried out due to electrical safety considerations. The ESS 2 is applicable as there is involuntary permanent and temporary restrictions on land use for the tower footing as well as RoW of the Transmission line and compensation for restricted/temporary use of land, tree / crop/structure (if any) damages will be paid to the individual landowners as per compensation procedures laid in Ministry of Power, Government of India (MoP, GoI)

guidelines for payment of compensation towards damages with regard to RoW, October 2015 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024.

ESS 3: Indigenous Peoples

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 are used in a generic sense to refer to a distinct, vulnerable, social and cultural group possessing the following characteristics in varying degrees:

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

ESS 3 is not applicable to the LILO of the 220 kV S/C Samaguri–Mariani Line-1 at the proposed Jakhlabandha S/S. The survey identified four affected individuals from the ST Plains community; however, they do not exhibit distinct Indigenous characteristics, and the area is outside the Sixth Schedule. Therefore, ESS 3 is not triggered.

B. Environmental and Social Exclusion List

Projects that do not comply with the AIIB's ESP and ESSs will not be financed. The Bank will not knowingly finance a Project that: (a) either involves or results in forced evictions¹; 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.

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

Table 3.4: Project Categorization as per AIIB

¹ 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).

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 conducting 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.

The Project has been assigned to Category B, as AEGCL is not siting the transmission line in sensitive areas.

3.4 Gap Analysis between National and AIIB Policies and Standards

Following gaps has been identified:

- Power transmission projects are not listed as environmental sensitive projects under EIA notification 2006 and fall in B2 category does not require EIA. However, the ESS of AIIB lists power transmission projects as projects which may have adverse environmental and social impacts as category B project and requires ESIA -ESMP report.
- As per National Laws analysis of alternatives is not mandatory for power transmission line projects. However, as per AIIB guidelines, it is mandatory to analyse alternatives.
- As per the GoI and GoA guidelines ESMP development and budget allocation is not required. The same is required as per AIIB's guidelines.
- As per national regulations, power transmission line projects do not need public consultation. EIA notification does not cover the grievance redress mechanism but AIIB guidelines require public consultation and a mechanism to receive and facilitate resolution of grievances or complaints.
- As per Indian standards information disclosure is not mandatory for Power Transmission projects whereas the AIIB guideline requires information disclosure.
- There are no specific national guidelines on applicability of minimum environmental standards on power transmission line projects. However, IFC Environmental, Health, and Safety Guidelines for Electric Power Transmission clearly sets minimum environmental limits on air, water, noise and soil quality, which should be followed.

- National Regulations do not cover all displaced persons, such as non-titled on government land. While AIB mandates compensation for all affected people regardless of property title status.
- As per Indian Standards the power transmission projects do not require any monitoring and reporting whereas as per AIB guidelines the project requires monitoring and reporting.

3.5 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)² based on the principle of "Avoidance, minimization & Mitigation". As part of ADB funded projects, AEGCL had experience in development and management of E&S instruments per MDBs' requirements.

AEGCL's working operation safety manual³ also serves as its commitment towards fulfilling the E&S responsibilities including occupational health and safety.

²https://www.powergridindia.com/sites/default/files/Our_Business/Domestic_Consultancy/NER_Agreements_and_MoUs/2015/6/ESPPF_ASSAM.pdf

³ https://www.aegcl.co.in/Safety_Manual_AEGCL.pdf

4 Description of the Environment

This chapter describes the Baseline Environmental features in detail. It includes details about location characteristics, study area, physical environment, biological environment (flora and fauna) and socio-economic environment baseline of the study area.

4.1 Location Characteristics

The project site is located at Kaliabor Tehsil in Nagaon district of Assam. The project footprint (RoW) is spread across following villages in the transmission line namely:

- A. LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S: Villages namely Seconee Pathar and Barholagaon.

In the project area of transmission line, no villages fall under Scheduled Areas as defined by the Indian Constitution.

No national park, wildlife sanctuaries, biosphere reserves, notified reserved forests, notified historical and cultural sites etc. are falling in the entire Right of Way (RoW) of the transmission line. The location of transmission line on Survey of India toposheet with surrounding environmental and social features are already given in **Figure 2.1 and Figure 2.2.**

4.2 Study Area

The direct impacts of the project are confined to the Right of Way (RoW) which is designated as 35 m for the 220 kV Transmission Line. Indirect or induced impacts extends to the Area of Influence (AoI) defined by a buffer zone of 2 Km on either side of the transmission line considered for environmental & social baseline assessment and a 10 Km radius for evaluating the impact on flora & fauna of the area. **Figure 4.1** shows the study area map for baseline study.

4.2.1 Project foot print Area

All permanent / temporary land required for following activities comes under the Project Footprint:

- The erection of 13 numbers of transmission towers for the LILO line;
- Stringing of conductors across the transmission line of 2.592 km length from temporary tapping point to substation (RoW of 35 m);
- Temporary access through government and private land for construction and maintenance works in operation phase;
- Temporary use of vacant government land for storage of materials and equipment nearby the location of construction;
- Temporary set up (for 25-35 days) of Labour accommodation arrangement nearby the location of construction.

4.2.2 Project Area of Influence (AOI)

Project's Area of Influence (AoI) is considered the area where potential indirect and induced impacts of the Project and Project activities are anticipated.

The AOI of project is considered within a corridor of 2 Kms either side of the transmission line with respect to the environmental and social features based on the following impacts:

- In normal conditions dust emissions—typically up to 100 m from major construction areas and up to 500 m during windy summer conditions;
- Noise impact area –typically 100-200 m from construction site;
- The impacts on soil and land- typically up to 50 -70 m from project foot print area;
- Apart from the direct impacts of acquiring rights of use / RoW for tower bases and land-use restrictions in transmission corridor for the habitats - within a corridor of 2 km either side.

4.2.3 Project Area of Influence (AOI) – Biodiversity

- Terrestrial and Aquatic Flora & Fauna: (a) the direct footprint of the project; (b) The areas immediately adjacent to the project footprint within which a zone of ecological disturbance is created through increased dust, human presence and project related activities: - Within 2 km of the project footprint;
- Migration of fauna (especially avifauna) – Considered 10 km buffer on either side from centre line of transmission line.

Study area map (RoW, 2 km and 10 km buffer is given below.

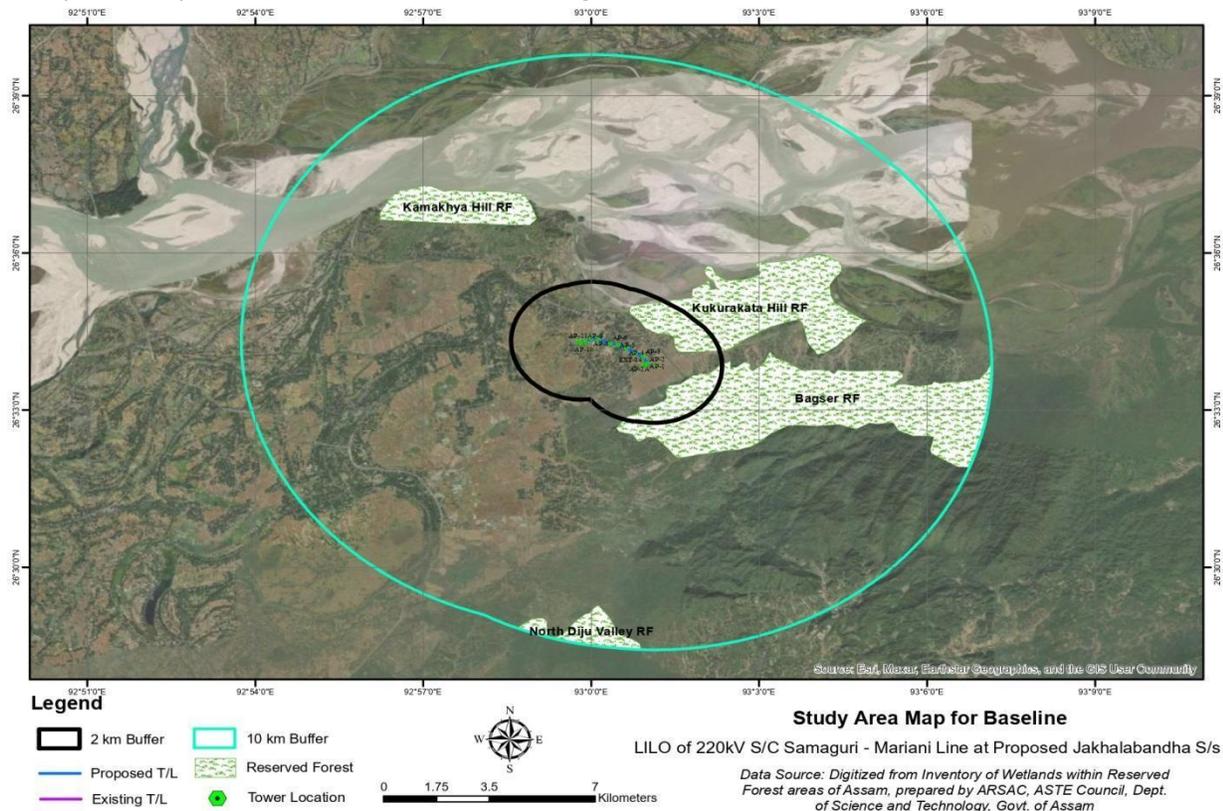


Figure 4.1: Study area map (RoW, 2 km and 10 km buffer) of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S

4.2.4. Methodology of baseline data collection/surveys carried out

The studies were conducted by considering the following:

The various environmental and social attributes were divided into primary and secondary studies. Primary attributes such as air environment, water, soil, noise, flora and fauna, and consultation were assessed and conducted by field studies, on-site monitoring and review of the past studies conducted.

Secondary attributes such as land use studies, geology, physiological characteristics, and socio-economic profile have been assessed by literature review of previous studies conducted by various government publications.

An interdisciplinary team through discussions and professional judgment formulated the scoping and the extent of data generation. The baseline studies started with site visits and reconnaissance survey in the study area. As a secondary data review, various Government agencies information and relevant data of the study area were collected.

Overall, environmental information is based on primary data generated through field survey and also on secondary information from published sources. The primary data have been obtained from environmental monitoring of ambient air quality, ground water quality, soil quality and noise level conducted at Jakhalabandha S/s. Secondary data / information has been collected from reliable sources like District Disaster Management Report, Central Ground Water Board, District Survey Report and Census Data of Assam (2011) for geology, hydrology, landuse, meteorology, ecology and socio-economics.

Brief ecological surveys were carried out. Data of flora and fauna has been gathered from secondary sources, including IBA/KBA sites, AVISTEP etc. whereas tree enumeration data were gathered from detail route survey report of Transmission line.

As part of the Critical Habitat Assessment, Key Biodiversity Areas (KBA) & Important Bird & biodiversity areas (IBA) were identified by obtaining data from The World Database of Key Biodiversity Areas. This data was then overlaid with the route of the proposed transmission line to determine whether any KBA sites fall within or near the vicinity of the transmission line route.

4.3 Biological Environment- Flora and Fauna

4.4.1 Floral Assessment

The project area primarily comprises of agricultural land, crop plantation, water bodies etc. The vegetation associated with these habitats is described below.

Agricultural Field

The staple food of the people in the study region is rice and wheat. Agro-climatic conditions of the area provide a range of potentialities for growing cash crop like off seasonal vegetable i.e. onion, chilly, brinjal, bhindi, fruits and flowers. Kitchen gardening is also common because of sufficient available space in and around house. The commercial cultivation of tea (*Camellia sinensis*) is also found in some pockets of the study area.

Main agricultural crop production in project area is paddy (*Oriza sativa*). The common rabbi crops grown in the study area are wheat, maize, gram, mustard, turmeric, potato, carrot, pea etc. whereas rice, jowar, arhar, tur, moong, til, groundnut, soyabean, chilly, ginger, etc. are kharif crops. Other than cereals, fruits like mango, pineapple, orange, jackfruit, banana, litchi, lemon, papaya, guava etc. are also grown in the study area.

Homestead Plantation

Homestead plantations mostly comprise of *Dipterocarpus macrocarpus*, *Azadiracta indica*, *Aegle marmelos*, *Albizia procera*, *Butea monosperma*, *Cassia fistula*, *Tectona grandis*, *Ficus religiosa*, *Carica papaya*, *Mangifera indica*, *Tamarindus indica*, *Eucalyptus tereticornis*, *Areca catechu* etc.

Trees within the transmission line corridor

As per the detailed survey report, the Right of Way of " LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S " involves approximately 30 trees comprising both fruit-bearing and non-fruit-bearing species. Additionally, around 115 bamboo plants are present within the corridor.

The actual number of project-affected trees will be updated during the execution phase, based on a joint tree enumeration and compensation assessment carried out by AEGCL, PMC, and the Local Revenue Authority.

Detailed tree enumeration is provided in **Appendix-13**.

4.4.2 Faunal Assessment

Since the proposed LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S transmission line do not involve any Protected area or reserved forest or critical wildlife habitats of the project district, therefore, the faunal assessment of the project area reveals presence of common domesticated fauna only like Cow, buffalo, goat, pig, dog etc. Also, common species of birds and other mammals are found.

Avifauna assessment (As per AVISTEP/IBA)

AVISTEP as the *Avian Sensitivity Tool for Energy Planning* has been used for the project area to 1. Identify areas of high avian sensitivity across landscapes where power infrastructure like transmission lines is proposed. 2. Minimize impacts on bird habitats and migratory paths during planning and route alignment. 3. Support environmentally responsible decision-making in the energy sector. 4. Promote biodiversity conservation while allowing energy infrastructure development.

Detail list of Avifauna species with regard to collision sensitivity & occurrence certainty in the project area as per AVISTEP report is provided in **Appendix – 9**.

As per the AVISTEP analysis, four (4) distinct color codes are designated to represent varying levels of avian sensitivity in relation to transmission line projects. The AVISTEP sensitivity map of Assam is depicted in **Figure 4.6.A**.

In the context of the proposed LILO transmission line, the AVISTEP analysis results are presented in **Figures 4.6.B**, which indicate a **High** level of avian sensitivity for the respective areas. Consequently, appropriate mitigation measures, such as the installation of bird guards and bird diverters will be implemented as part of the project design to minimize potential impacts on avian species.

As the Important Bird Area (IBA) sites lies beyond the 10 km buffer zone of all the LILO transmission line and as per site assessment, it reveals presence of common bird species like crow, dove, crane, water dwelling birds, etc. are prevalent in the project area. Although the occurrence of CR/EN/VU avifauna species

in the project area is assessed to be minimal but the possibility of their occasional presence cannot be entirely ruled out in the project area.

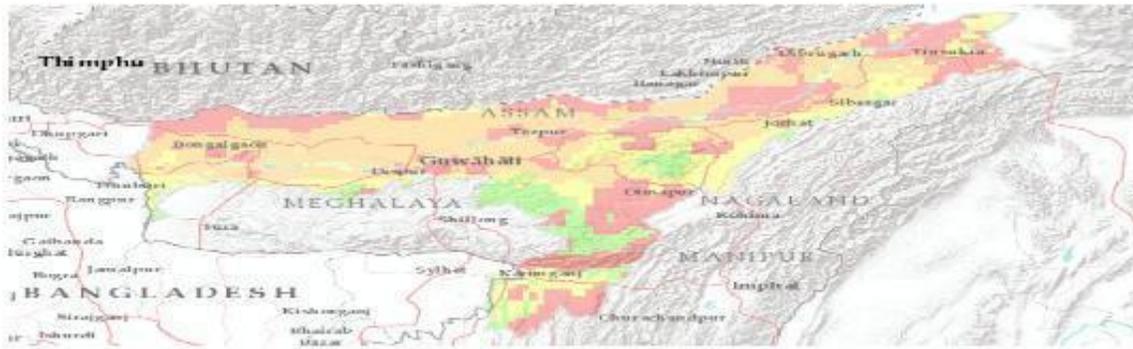
Source: Environmental and Social team

Figure 4.6 A: AVISTEP map of Assam



Avian Sensitivity

Sensitivity Level	Km ² of Country Per Sensitivity Level	% of Country
Low	7,972 km ²	10%
Moderate	18,000 km ²	21%
High	29,315 km ²	37%
Very High	25,025 km ²	32%



Source: AVISTEP

Figure 4.6.B: AVISTEP map project area of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S

4.4.3 Critical habitats in the Project areas

The RoW corridor of all the LILO line does not involve any critical habitats of Endangered/Vulnerable species as per the assessment of Key Biodiversity Areas (KBA) in and around the project area. For Jakhalabandha transmission line from the analysis of World Database of Key Biodiversity Areas, it is revealed that the nearest KBA Site (Kaziranga National Park) is at an offset of appx. 15 KM from the transmission line. Further, a site visit & consultation with the Forest Department (Forest Range Officer, Burapahar) has also been carried out on 15th July, 2025 to reaffirm any interference with the protected area boundary. During the consultation with Forest Range Officer, it is confirmed that, the proposed transmission line falls under Revenue Area and does not form part of any critically designated wildlife habitats of Kaziranga National Park. The photographs and attendance sheet of consultation is **enclosed in Appendix-14**. A map showing the project area vis-a-vis location of Critical Wildlife Habitats (KBA sites) is shown in **Figure 4.7**.

Figure 4.7: Critical habitat (KBA site) vis-a-vis transmission line route of LILO of 220 kV S/C Samaguri –



4.4.4 Migratory Routes

Migratory birds use loosely fixed routes for their migration. Globally, certain routes have been identified that connect both the northern and southern hemispheres. Every year, millions of water birds follow these routes to reach their destinations and return journeys.

Usually, migratory birds follow a north-south axis to spend the duration of their non-breeding winter season.

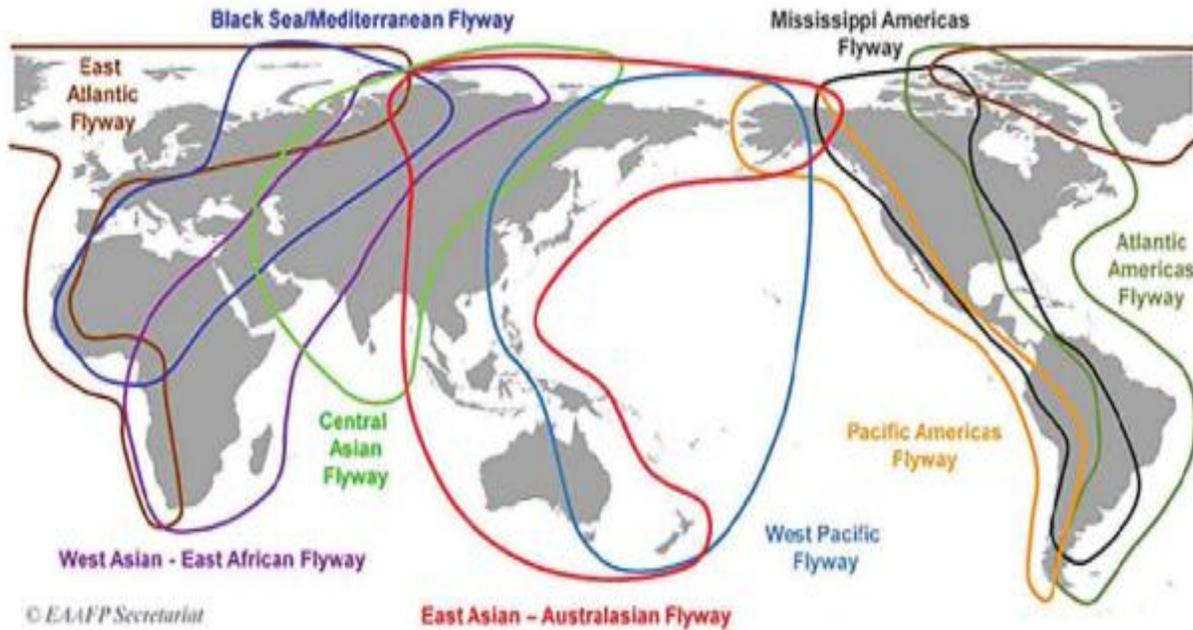


Figure 4.8: The map of the world is showing the migratory birds flyways.

(Image Source: East Asian-Australasian Flyway Partnership (EAAFP); <https://www.eaaflyway.net/the-flyway/>)

4.4 Physical Environment Baseline of the Study Area

4.3.1 Land use and Land cover

In the study area, the land is primarily used for agriculture / crops. The other land uses in the area are built up residential areas and water bodies. The land use map of the study area is presented in **Figure 4.2**. The details of the land use of transmission tower base and RoW of transmission line is provided in **Table 2.4**.

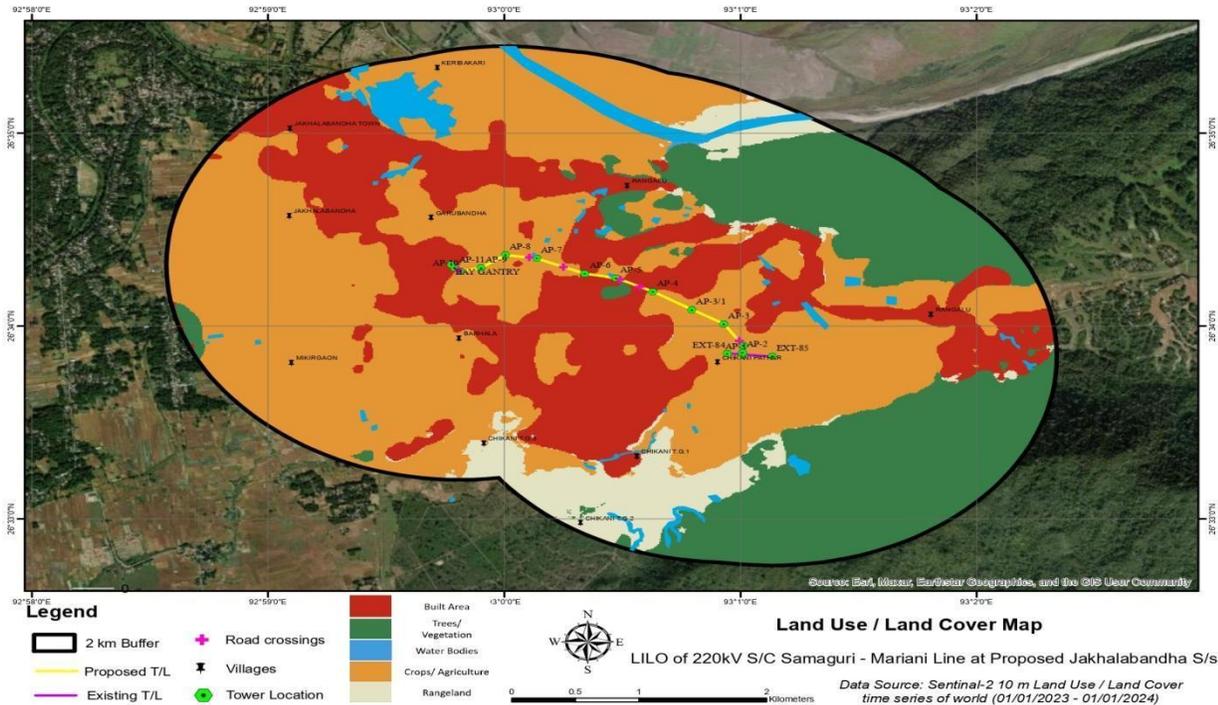


Figure 4.2: Land use and Land cover of study area of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S

4.3.2 Topography

Assam is situated in the North-East of India and is the largest north-eastern state in terms of population while second in terms of area. Assam covers an area of 78,438 km² (30,285 sq miles). The state is bordered by Bhutan and the state of Arunachal Pradesh to the north; Nagaland, Arunachal Pradesh and Manipur to the east; Meghalaya, Tripura, Mizoram, and Bangladesh to the south; and West Bengal to the west. A significant geographical aspect of Assam is that it contains three of six physiographic divisions of India – The Northern Himalayas (Eastern Hills), The Northern Plains (Brahmaputra plain), and the Deccan Plateau (Karbi Anglong).

The major topographic units in the Nagaon district are - **i.** Denudational hills, **ii.** Piedmont zone, **iii.** Flood plain deposits with Charland and Swampy areas. **i.** Denudational Hills: It occupies eastern and southern part of the district comprising parts of Karbi angling hills and N.C.hills. They are NE-SW trending rugged topographic highs standing out due to differentiated erosion. The hilly terrain is covered by thick mantle of lateritic deposit and is densely forested. **ii.** Piedmont Zones: These zones occur at the contact of the denudational hills and plains. They are high land forms deposited adjacent to hill slopes by fluvial action. They consist of assorted admixture of cobbles, pebbles, sand and a matrix of clay. **iii.** Flood Pain deposits: Flood Plain deposit occupy a major part of the district with huge thickness of unconsolidated alluvial sediment deposited by the mighty Brahmaputra and its tributaries. The Kopili River on the south and the Kalong River on the north-east have deposited the sediment during floods. **iv.** Charland: Charland is relatively low lying area along the river Brahmaputra within the recent flood plain. The area is characterized by fertile land with sandy and silty loam. The Charland is formed due to oscillation of the river water which is either washed away by subsequent floods or strengthened by further deposition. **v.** Swampy areas: Swampy areas are low lying areas or the natural depressions created due to change of river courses as abandoned channels or meander lakes. They are locally known as beels and are found abundantly in the district.

A mix of plain and undulating topography has been found in the study area of transmission line. Elevation of project corridor of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S is 40 to 61 meters in Nagaon district above the sea level. The DEM map of the study area is presented in **Figure 4.3**.

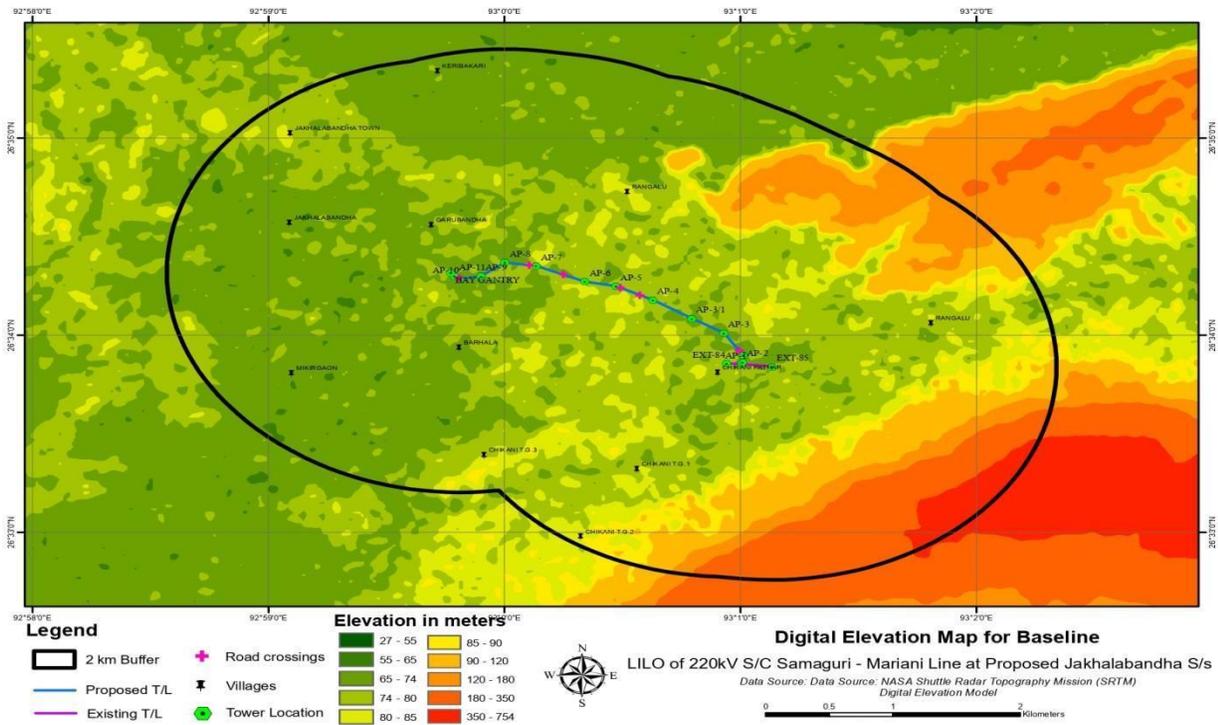


Figure 4.3: DEM map of the study area of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S

4.3.3 Drainage

The main river of Nagaon district is the Brahmaputra flowing on the northern part of the district from east to west with its tributaries Kopili, Kalong and Sonai rivers. Among these, Kopili is the major river originating in the hills of Karbi Anglong to the south and flows on north-westerly direction and meet with Diyang River near Dhing. It follows north-westerly direction from Dhing to the same north-westerly trend up to Kampur and deflects towards west. Kalong, the tributary of Kopili joins the later near Jagiroad. Apart from the above main rivers small streams and nalas attribute to the main rivers.

Drainage map of the study area is given **Figure 4.4**.

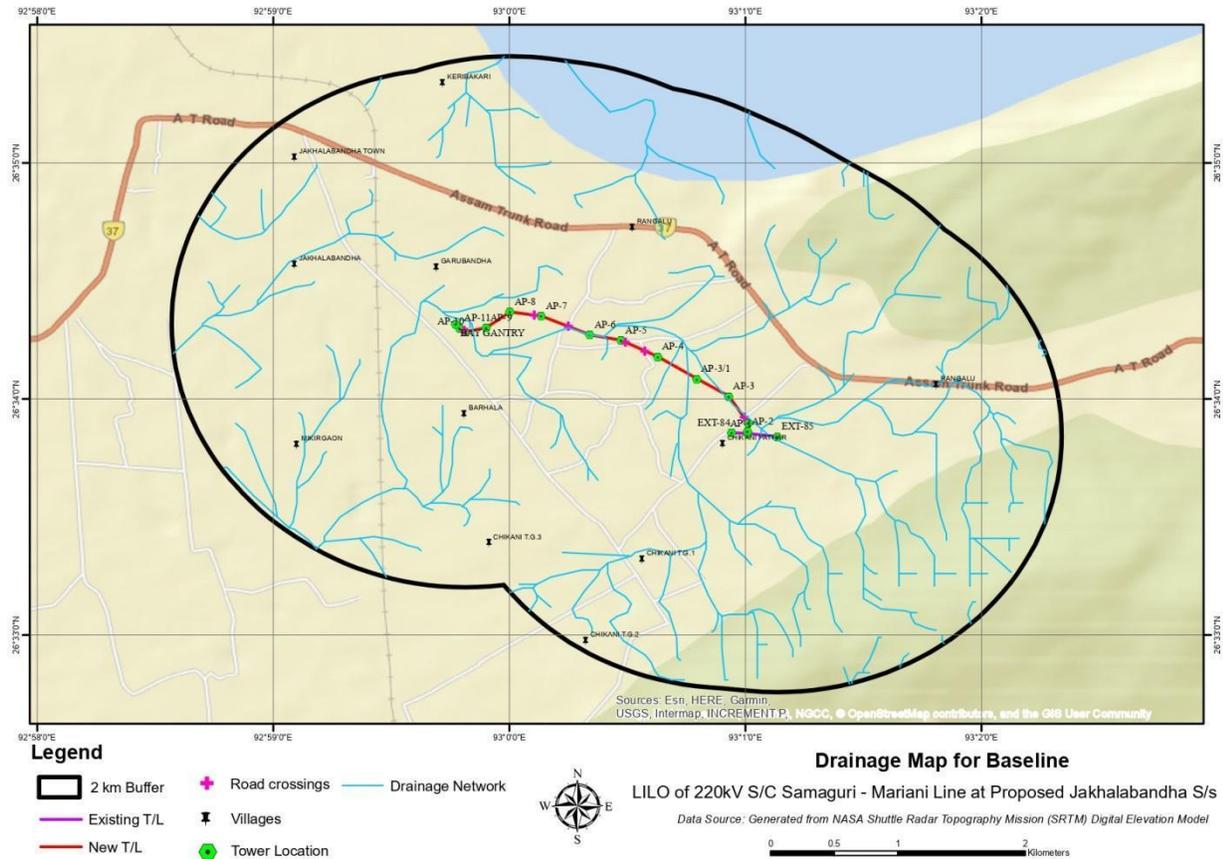


Figure 4.4: Drainage map of the study area of LILO of 220 kv S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S

4.3.4 Geology & Soil Characteristics

The Nagaon district represents various soil types depending upon the composition of the parent materials, palaeogeographical and climatic conditions prevailing at the time of its formation. The variation of soil type is described as follows:

- The flood plain of the district has mostly soils of loamy nature which varies from silty loam or clayey loam or loamy clay. The soil as a whole is moderately permeable (highly permeable in recent sediments along river coarses). It is less acidic and suitable for paddy cultivation.
- High level alluvial soils are found in relatively high land in comparison to the recent flood plain and around the inselbergs. The high level alluvial soil is sandy in nature with percentage of clayey materials while that in the inselberg zone, the soil is reddish with high acid content.

The land suited best for growth of rice is a clayey loam variety, the most fertile variety of which is locally called “Berbherial” and is particularly deep and soft. This type of soil is found in the lowest part of the rice basin which constitutes the area from Silghat in the Northeast to further south. The soils are highly fertile. The alluvial soil is mostly loamy and consists of a mixture of clay and sand in varying proportions, ranging from pure sand on the banks of the Brahmaputra to sticky clay which is considered unfit for cultivation. Marshy soil is chiefly found in the low lying areas. These are black in colour. The red soil generally occupies

the hill slopes and foot hills. Occasionally lateritic soil is also found near Lumding. The plain areas bordering Brahmaputra River are occupied by alluvial sediments belonging to Quaternary age.

4.3.5 Climate Characteristics

Normal climate profile for the whole state of Assam is humid sub-tropical climate zone. The seasons experienced by the area is described below:

- Pre-monsoon: March-May
- Monsoon: June – September
- Post-monsoon: October- November
- Winter: December- February

As per the report of CGWB (2022-23), Nagaon district experiences hot sub tropical humid climate. A hot and humid pre-monsoon from March to mid May, a prolonged southwest monsoon or rainy season from mid May to September, a pleasant post-monsoon or retreating monsoon from October to November and a cold pleasant winter from December to February are the characteristics of the general climate. Summer runs concurrently with the later part of the pre-monsoon season and continues throughout the monsoon season.

Sometimes, the monsoon commences in mid-May and ends in mid-September. Therefore, the boundaries between the seasons are not very rigid. The mean daily maximum temperature during winter is about 25°C and minimum is 11°C. The mean daily maximum temperature during summer is 34°C and the minimum is 24° C. The relative humidity varies from month to month and increases from 76% to 84% during the South west monsoon and is about 77% during the rest of the year. The humidity varies throughout the year but seldom drops down below 67%. The average annual rainfall is 1541 mm. Rainfall is confined mainly during the monsoon season with occasional winter showers.

4.3.6 Ground Water Characteristics

Ground water in Nagaon district occurs in the semi consolidated and unconsolidated formations of Tertiary and Quaternary age respectively and in secondary porosity like fractures, fissures of Precambrian rocks. While the greater part of the district falls in Kalang sub-basin, in the Kalang sub-basin the alluvial formations show two characteristic features. In the northern part of the district particularly north of Sonai river, the alluvium comprising medium to coarse sand with gravel and pebbles form a single aquifer system of massive thickness, but in the south central and southern parts, which is broadly underlain by older alluvium, the clay proportion increases markedly. The clay beds act as confining layers. Thus ground water occurs both under confined, semi-confined and unconfined conditions.

In the Jammu Command area (Kopili sub-basin) three to four good aquifer horizons are encountered within the depth of 300 m with a cumulative thickness of aquifers actually occur within 200 m depth. The dispositions of aquifers are such that both shallow and deep tube wells can be constructed to develop ground water resource.

Water table generally rests within 4 to 6 m of land surface in the greater part of the district. The depth to piezometric surface more or less coincides with the water table in the Kalang sub-basin and is thus generally within 6m from ground surface. However, in the Kopili sub-basin i.e, in the southern part of the district it is variable from 0.5 to 14.0 m below ground surface and in certain localized areas around Hojai- Doboka and Nilbagan artesian conditions prevail indicating thereby that the piezometric surface lies above land surface. Large numbers of shallow and deep tube wells have been constructed in the district which provides us with valuable information regarding aquifer characteristics. Tube wells 20 to 40 m deep and fitted with hand

pump normally yield 3 to 6 m³/hr which is considered sufficient for domestic supplies. Low-duty irrigation tube wells of 10 to 15 cm diameters and 30 to 40 m deep generally tapping 10 to 20 m of saturated sand may yield 15 to 35 m³/hr.

In kalang sub-basin deep tube wells, 120 to 230 m deep tapping about 60 m of saturated zone, yield 175 to 200 m³/hr for drawdown of 5.5 9.7 m. But in Kopili sub-basin i.e. (Jammu Command area) yields of deep tube wells is within one cusec (100m³/hr) for a drawdown of up to 12 m.

Hydrogeological map of Nagaon district are given in **Figure 4.5**.



Source: Central Ground Water Board

Figure 4.5: Hydrogeological map of Nagaon district

4.3.7 Ambient Air Quality

Based on site observation, it was found that the baseline at the SS is already above the standards prior to construction of the T/L. The ambient air quality monitoring conducted at Jakhlabandha S/s is given below.

Table 4.1: Ambient air quality monitoring results of Jakhlabandha S/s

Pollutant	Time Weighted Average	Concentration in Ambient air (mg/m ³), NAAQS, MoEF&CC 2009		WHO AQGs 2021	Results (Baseline data) (Dated- 05.02.2022)	Results (Data generated for post-monsoon season 2024) (Dated- 06.11.2024)
		Industrial, Residential, Rural and Other Areas	Ecologically Sensitive Areas			
Particulate Matter: PM10 (<10 µm)	Annual 24 hr	60	60	15	68	58
		100	100	45		
Particulate Matter: PM2.5 (<2.5 µm)	Annual 24 hr	40	40	5	27	29
		60	60	15		

The ambient air quality of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.3.8 Ambient Noise Level

The ambient noise level monitoring conducted in Jakkhalabandha S/s is given below.

Table 4.2: Ambient noise level monitoring results of Jakkhalabandha S/s

Area Code	Category	Sound Parameters (dBA)				Results (Baseline data) (Dated- 05.02.2022)		Results (Data generated for post-monsoon season 2024) (Dated- 06.11.2024)	
		CPCB Ambient Noise Standards [Limit in dB (A) Leq]		WBG Noise Standards		Day Time	Night Time	Day Time	Night Time
		Day Time	Night Time	Day Time	Night Time				
A	Industrial	75	70	70	70	37.5	58.6	42.5	
B	Commercial	65	55	70	70				
C	Residential	55	45	55	45				
D	Silence Zones	50	40	55	45				

The ambient noise level of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.3.9 Surface and Ground Water Quality

The Water Quality monitoring conducted in Jakkhalabandha S/s is given below.

Table 4.3: Water Quality monitoring results of Jakkhalabandha S/s

Parameters	Results (Baseline data) (Dated-05.02.2022)	IS-10500-2012 Requirement Acceptable Limit)	IS-10500-2012 Permissible Limit in the absence of alternate source	Results (Data generated for post-monsoon season 2024) (Dated-06.11.2024)	Requirement Acceptable Limit	Permissible Limit in the absence of alternate source
pH	6.74	6.5-8.5	No relaxation	6.58	6.5-8.5	No relaxation
Conductivity	0.076	---	---	0.106	---	---
Colour	1	5	15	1	5	15
Total Dissolved Solids	39	500	2000	52	500	2000
Total Suspended solids	<10	---	---	<10	---	---
Turbidity	2	1	5	0.65	1	5
Dissolved Oxygen	5.2	---	---	4.6	---	---
Chlorides	1	250	1000	<2	250	1000
Fluoride	<0.5	1	1.5	<0.5	1	1.5
Iron	0.11	0.3	No relaxation	0.20	0.3	No relaxation
Oil and Grease	<2	---	---	<2	---	---
Sulphates	12.1	200	400	3.4	200	400
Hardness	22.1	200	600	37.8	200	600
Nitrate	<1	45	No relaxation	<1	45	No relaxation
Odour	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
E.Coli	Absent	Absent	Absent	Absent	Absent	Absent
Total Coliform	Absent	Absent	Absent	Absent	Absent	Absent
Pesticides	BDL	---	---	BDL	---	---
Taste	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
Floating Materials	Not Visible	---	---	Not Visible	---	---

The water quality of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.3.10. Soil Quality

The Soil Quality monitoring conducted in akhlabandha S/s is given below.

Table 4.4: The Soil Quality monitoring results of Jakhlabandha S/s

Parameters	Results (Baseline data) (Dated-05.02.2022)	Results (Data generated for post- monsoon season 2024) (Dated- 06.11.2024)	CPCB Soil Standards
pH value (1.5)	6.42	5.33	6-7.5 (ISO: 10390)
Sulphite in SO ₃ in %	4.63	5.8	---
Chloride in mg/kg	7.6	14.6	< 100 mg/kg (ISO: 10304-1)
ORP in mV	520	396	---
Water soluble salts as EC in mS/m	490	153	400 mS/m (ISO: 11265)

Parameters	Results (Baseline data) (Dated- 05.02.2022)	Results (Data generated for post- monsoon season 2024) (Dated- 06.11.2024)	CPCB Soil Standards
Organic matter in %	4.2	1.4	2–10%
Moisture Content in %	28	12.8	<ul style="list-style-type: none"> ● Sandy: 5–10%, ● Clayey: up to 30% or more.

The soil quality of the project area is found within the permissible limit. **The test results are provided in Appendix-8.**

4.3.11 Sensitive Receptors

There are 4 places of worship, 2 Schools and 1 market place coming within a radius of 500 m from the proposed LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S. Details of sensitive receptors within 500 m from the centerline of the TL against the tower are given in table below.

Table 4.5: Details of sensitive receptors within 500 m from the centerline of the TL

Sl. No.	Tower No.	Geographical Coordinates	Environmental Sensitive receptors within 500m from Centre Line (CL)	Distance (in m) of Environmental Sensitive receptors from CL	Photograph
LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S – 2.592 km					
1.	AP- 2A	93°1'0.70"E 26°33'53.90"N	Tetulguri M.E. & L.P. School (93° 1'14.16"E 26°34'5.54"N)	490	
2.	AP-3	93°0'55.80"E 26°34'0.70"N			
3.	3/1	93°0'47.68"E 26°34'5.15"N	Seconee Borhulla Ayushman Arogya Mandir (93° 0'37.31"E 26°34'1.62"N)	247	
4.	AP-4	93°0'37.70"E 26°34'10.80"N	Panika Gurudwara (93°0'36.59"E 26°34'1.69"N)	255	
5.	AP-6	93°0'20.50"E 26°34'16.30"N	Lakhi Mandir (93°0'18.66"E 26°34'23.03"N)	168	

6.	AP-7	93°0'8.20"E 26°34'21.10"N			
7.	AP-9	92°59'54.09"E 26°34'18.11"N	Old Seconee Borhola Masjid	455	
8.	AP-10	92°59'48.79"E 26°34'17.15"N	(92°59'53.63"E 26°34'2.97"N)		
9.	AP-11	92°59'47.39"E 26°34'18.07"N	Seconee Borhola High Secondary School	70	
10.	Gantry	92°59'46.43"E 26°34'19.09"N	Garubandha New Market	296	

Source: Environment and Social Team

4.5 Social Environment Baseline of the Study Area

4.5.1 State Profile: Assam

As per the Census 2011, the total population of Assam is 3.12 Cr. Thus, the population of Assam forms 2.58 percent of India in 2011. Assam has total population of 31,205,576 in which males were 15,939,443 while females were 15,266,133.

The total area of Assam is 78,438 square km. Thus, the population Density of Assam is 398 per square km which is higher than the national average of 382 per square km.

Table 4.7: Assam Demographic Profile

Attribute	Number	% of India
Area (sq. km)	78,438	9.37
Total population	31,205,576	6.0
Males	15,939,443	6.03
Females	15,266,133	5.97
Sex ratio	958	NA

Attribute	Number	% of India
Percentage of rural Population	86	NA
Percentage of urban population	14	NA
Population density	398	NA
Percentage of SC population	7.15	NA
Percentage of ST population	12.4	NA
Total literacy rate	72.19	NA
Male Literacy rate	77.85	NA
Female Literacy Rate	66.27	NA
Rural Literacy	69.34	NA

Source: Census of India, 2011 data

Demography & Socio-Economic Condition

The literacy rate of Assam is nearly 72 % (of which the rural literacy stands at 69.34%) which lower is slightly than that of the country, at 74.04%. The male literacy rate is relatively higher, at 77.85% while the female literacy rate is 66.27% which is slight high when compared to the national female literacy rate of 65.46%.

According to the census of India, life expectancy in Assam has changed from 57.8 years of Males and 58.3 years of females in 2001 to 62.7 and 65.5 years in 2011 for males and females respectively.

Assam is categorized as a low HIV Prevalence state with an estimated adult HIV Prevalence of 0.07% which is lower than the National Prevalence of 0.27%. However, the adult HIV Prevalence in the state has increased from 0.04% in 2007 to 0.07% in 2011.

In 2011, Assam had 1,48,124 Sub Centers, 23,887 Primary Health Centers, and 4,809 Community Health Centers, along with 7,347 hospitals in rural areas and 4,146 in urban areas.

In 2011, Assam had 48,050 elementary schools, with a significant increase from 41,579 in 2000-01. The Ministry of Education's data for 2011-12 categorized schools based on highest class level, including Senior Secondary, Secondary, Upper Primary, and Primary schools.

The energy sector in 2011 was largely dependent on hydro power, fossil fuels, with gas and coal contributing significantly to electricity generation. Only 37% of the state was electrified, with a significant rural-urban disparity in electricity access. The Power demand for Assam ranged between 700 MW to 2400 MW at present.

Assam's economy was predominantly agrarian, with agriculture being the largest source of income and employment, and a significant portion of the population residing in rural areas as per census 2011. In 2011, Assam had a workforce participation rate of 53.26% for males and 25.51% for females. This indicates a significant gender gap in employment in Assam. Specifically, the male workforce participation rate was more than double that of females. The significant gender gap in workforce participation in Assam stems from a combination of cultural, economic, educational, and infrastructural factors. Traditional gender roles and social norms prioritize women's responsibilities in household work and limit their mobility, while early marriage and childbearing further constrain opportunities. Economically, women's work is often unpaid or informal, with limited ownership of land and assets restricting access to credit and markets. Educational gaps, including high dropout rates and inadequate vocational training, reduce employability. Additionally, poor transport connectivity, lack of safe workplaces and childcare facilities, and weak institutional support

further discourage women from engaging in formal and remunerative employment.

Women in Assam are primarily engaged in agriculture, tea plantations, handloom weaving, handicrafts, domestic work, and micro-enterprises through self-help groups. Much of this employment is informal and low-paid. In agriculture and tea gardens, women perform essential tasks. Handloom and handicraft work is largely home-based, with limited market linkages and poor access to credit or modern technology. Domestic work and construction labor also remain unregulated and precarious. Overall, these sectors are not adequately supported or formalized, leaving women workers economically vulnerable and with limited opportunities for skill development and upward mobility.

The state's economy also included sectors like oil and gas production, tea cultivation, and tourism. The growth of 8.42 percent in Gross State Domestic Product (GSDP) of the State for 2011-12 comprises of a growth of 6.43 percent in Agriculture and Allied sector, 7.19 percent in Industry sector and 9.74 percent in services sector.

Indigenous Peoples (IP) Profile and Risk Assessment

1. Demographic Profile

Assam is home to a rich diversity of Indigenous Peoples, including both Scheduled Tribes (STs) and Scheduled Castes (SCs), residing across rural, forest, and peri-urban areas.

- In the 2011 census, Assam's Scheduled Caste (SC) population was 2,231,321, which constituted 7.15% of the state's total population,
- In the 2011 Census, Assam's Scheduled Tribe (ST) population was 3,884,371, which constituted 12.4% of the state's total population.
- Major ST Communities include Bodo, Mishing, Karbi, Rabha, Dimasa, Sonowal Kachari, Deori, Tiwa, and others.
- Many communities live in notified Sixth Schedule areas (Autonomous Districts).
- Settlements are often in contiguous clusters within villages and revenue circles.

2. Socio-Economic Conditions

- Predominantly engaged in agriculture, horticulture, fishing, forest-based livelihoods, and wage labor.
- Land holdings are typically small and, in some areas, governed by customary land tenure systems rather than formal titles.
- Literacy rates and access to public services vary, with some groups facing socio-economic marginalization and higher poverty levels.
- The literacy rate for the Scheduled Caste (SC) population in Assam, according to the 2011 Census, was 66.76%. This is compared to the overall literacy rate for Assam, which was 72.19%. The literacy rate for the Scheduled Tribe (ST) population in Assam, according to the 2011 census, is 72.1%.

3. Cultural and Livelihood Practices

- Many IP communities maintain distinct languages, traditions, festivals, and social institutions (e.g., village councils, clan systems).
- Livelihoods are closely linked to natural resources, including shifting cultivation, fishing, and collection of minor forest produce.
- Traditional practices and cultural sites (e.g., sacred groves, burial grounds) are important for identity and heritage.

4. Legal Status and Land Tenure Systems

- Land rights are governed by a mix of formal land revenue laws and customary tenure, especially in hill districts.

- In Sixth Schedule areas (e.g., Karbi Anglong, Dima Hasao), Autonomous Councils have authority over land management and resource use.

4.5.2 District Profile: Nagaon District

Nagaon is a centrally located district in Assam, situated on the Southern bank of the Brahmaputra River between 25°45' to 26°45' North latitudes and 91°50' and 93°20' East longitude. It is bounded by Sonitpur and the Brahmaputra to the North, West Karbi Anglong, Hojai and Dima Hasao to the South, East Karbi Anglong and Golaghat to the East and Morigaon to the West.

Agriculture is the main source of livelihood of the major population of Nagaon. There is an abundance of forest-based small-scale industries like Agar Wood Distillation units, Saw Mills and Bamboo & Cane furniture's manufacturing units. The ethnic groups of this region depend on their traditional activities like weaving, animal rearing, etc. Nagaon is also noted for its numerous ancient archaeological sites.

Table 4.8: Nagaon district Demographic Profile vis-à-vis Assam

Attribute	Nagaon District
Population	28,23,768
Population Density	711/km ²
SC population percentage	9.4
ST population percentage	4.57
Sex Ratio (number of females per thousand male)	962
Total literacy rate percentage	72.37%
Male literacy rate percentage	76.51
Female literacy rate percentage	68.07
Rural population percentage	86.91%

Source: Census of India 2011 data

Demography & Socio-Economic Condition

In 2011, Nagaon had population of 2,823,768 of which male and female were 1,439,112 and 1,384,656 respectively. The 2011 census shows that density of Nagaon district for 2011 is 711 people per sq. km. In 2001, Nagaon district density was at 582 people per sq. km.

Average literacy rate of Nagaon in 2011 were 72.37 compared to 72.37 of 2001. The male and female literacy rates were 76.51 and 68.07 percent respectively. Total literate in Nagaon District were 1,710,716 of which male and female were 921,850 and 788,866 respectively in 2011 census.

As per the 2011 Census, the employment rate in Nagaon district disaggregated by gender shows a clear gender disparity. Among males, the work participation rate is approximately **53.1%**, while for females it is around **22.9%**. This indicates that men are about twice as likely to be engaged in work compared to women in the district. The percentage of people below the poverty line in rural Nagaon district as per 2011 estimates is **about 36–38%**. This reflects significant challenges related to livelihoods and poverty, particularly among women and vulnerable households.

As per 2011 census, 86.91 % population of Nagaon districts lives in rural areas of villages. The total Nagaon district population living in rural areas is 2,454,234 of which males and females are 1,250,985 and 1,203,249 respectively.

The life expectancy in Nagaon district is 63-58 years. Specifically, the average life expectancy for males was 62.6 years and for females was 64.2 years, which is below the state average for Assam. The level of HIV positivity among antenatal care (ANC) clients in the district is low, indicating a generally low prevalence of HIV in the area.

As per the Census of India 2011, the elderly population (aged 60 years and above) constituted about 8% of Assam's total population. In Nagaon district, approximately 225,901 residents were elderly or senior citizens. The district is predominantly rural, with nearly 86% of its total population residing in rural areas, indicating that the majority of elderly persons in Nagaon live in rural settings, often dependent on agriculture and informal livelihoods.

The district recorded 45,125 disabled persons across various categories, including 7,203 with visual impairment, 9,678 with hearing impairment, 3,804 with speech impairment, 7,967 with movement-related disability, 2,688 with mental retardation, 1,986 with mental illness, 6,399 with other disabilities, and 5,400 with multiple disabilities.

Access to Infrastructure and Services

In 2011, Nagaon district had 80 Primary Health Centers (PHCs). There were 29 Veterinary dispensaries/hospitals and 46 sub-centres in Nagaon district which providing basic healthcare services in rural and urban areas.

The Nagaon district had 33,875 numbers of lower primary schools, 6,160 upper primary schools, 40,035 elementary schools, and 4,529 secondary/senior secondary schools and 25 colleges.

The district receives electricity from the state grid, which is utilized for various purposes, including domestic, industrial, and commercial use. Conventional grid-based electricity is primarily used for domestic and industrial needs.

Livelihood and Economic Activities

In 2011, the economy of Nagaon district in Assam was heavily reliant on agriculture and fisheries. Agriculture provided livelihood to a significant portion of the population, while fisheries, particularly aquaculture, were a major economic driver, with the district holding the top position in fish production in the state. The district is highly dependent on agriculture, and a large portion of its land is dedicated to crop cultivation. Paddy is the most important crop, accounting for a substantial area of the gross cropped area, followed by vegetables, mustard, and horticultural crops. Pig and poultry farming also plays a role in providing livelihoods for the poor and marginalized farmers.

Gender role and dynamics

The prevalence of gender-based violence (GBV) in Nagaon, while not uniquely high compared to other districts in Assam, remains a significant concern. Cases of domestic violence, child marriage, and sexual

harassment are often underreported due to social stigma, lack of awareness, and limited access to justice mechanisms. Cultural silence around violence, along with inadequate support services, further compounds the issue, such as limited access to formal employment opportunities, unequal control over land and productive resources, low representation in decision-making bodies, and a heavy burden of unpaid domestic and agricultural labor. The National Family Health Survey (NFHS-4) indicates that a limited percentage of women in Assam have experienced physical or sexual violence, a trend that likely reflects conditions in districts like Nagaon.

Gender norms in Nagaon district reflect traditional social structures and cultural practices common across much of rural Assam. As per the Census of India 2011, the district has a sex ratio of 962 females per 1,000 males, with women constituting nearly half of the population. However, gender disparities persist in literacy and workforce participation—female literacy stands at around 65.5% compared to 74.2% for males, and women are more engaged in domestic and marginal agricultural work. Social expectations continue to assign women primary responsibility for domestic duties and caregiving, while men dominate income-generating and leadership roles. Women’s collectives in Nagaon district play an active role in promoting empowerment, enhancing legal awareness, and encouraging women’s participation in community development activities. Through initiatives such as Mahila Samitis and self-help groups, women engage in capacity-building, livelihood enhancement, and social advocacy efforts. These organizations serve as vital platforms for addressing issues related to gender equality, domestic violence, and access to government welfare schemes, thereby contributing to greater social inclusion and empowerment of women at the grassroots level

PCRs/CPRs/ Archaeological and Historical Monuments

As per the check survey, no impact is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs) or archaeological/historical sites as assessed during the detailed and check survey. However, there are schools, an Anganwadi Centre (AWC), places of worship located beyond the RoW. Moreover, no such monuments are coming in the proposed route alignments. Furthermore, "Utmost care shall be taken during the check survey to avoid such areas. However, if any archaeological or cultural artifacts are discovered during construction, all work in the area will be stopped immediately, the site will be secured, and the concerned authorities will be notified prior to resuming of construction activities.

The major archaeological and historical monuments found in Nagaon district is as follows:

1. The hatimura temple site located on a hilltop near the Brahmaputra which is 6.6 Km from Jakhalabandha substation site.
2. The Seconee Silkhong Temple site is located at Seconee in Nagaon District is 3.3 Km from Jakhalabandha substation site.
3. The Haldibari Burhi Aair Than site is located in Haldibari, Golaghat District is about 34 km from Jakhalabandha substation site.
4. The Maa kamakhya mandir Silghat located at Silghat, Nagaon district is about 12.7 Km from Jakhalabandha substation site.

4.5.3 Study Area Profile

The study area, for the LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S is spread across 2 villages namely at Seconee Pathar and Barholagaon under Kaliabor Tehsil in Nagaon District.

Kaliabor Revenue Circle, located in the Nagaon district of Assam, is predominantly rural in character and home to approximately 197,470 people as per the 2011 Census. The population exhibits a fairly balanced sex ratio of around 974 females per 1,000 males, with children (aged 0–6) making up a significant proportion. The literacy rate stands at about 69.6%, with a noticeable gender gap—male literacy is around 76%, while female literacy is approximately 63%. Scheduled Castes (SC) and Scheduled Tribes (ST) constitute about 10.4% and 2.7% of the population respectively.

The characteristics of SC and ST groups are:

Scheduled Caste (SC) Population of the project area (Kaliabor Circle)

- The Scheduled Caste (SC) population of Kaliabor Circle totals **20,505 persons** (10,537 males; 9,968 females), representing about **10.4% of the circle's total population** (Census 2011).
- The **sex ratio** among SCs is **946 females per 1,000 males**, slightly lower than the overall circle average of 974, suggesting a mild gender imbalance possibly due to migration of male workers for employment.
- The **literacy rate** for the general population in Kaliabor Circle is **69.59%** (Male: ~65.17%; Female: ~53.72%). While disaggregated SC data are not published, the SC literacy rate is expected to be **below the district SC average (79.98%)**, indicating educational disadvantage and limited access to higher education.
- Educational attainment among SCs is largely confined to **primary and middle levels**, with relatively fewer individuals completing secondary or tertiary education. Female literacy lags behind male literacy by more than 10 percentage points.
- The **SC population is predominantly rural**, residing across agricultural villages where livelihoods depend on small landholdings or agricultural labour. Land ownership among SC households is often limited, with many engaged as sharecroppers or farm labourers on tea garden peripheries or paddy fields.
- **Occupational patterns** show a concentration in cultivation, agricultural labour, construction work, and informal service activities such as domestic work, transportation, and petty trade. Participation in formal government or industrial employment is low.
- **Economic status** is modest, with household incomes typically dependent on seasonal farm work or casual wage employment. Access to institutional credit, market linkages, and skill-based jobs remains limited.
- The **housing profile** of SC families largely comprises semi-permanent or kutcha houses, though access to basic amenities such as electricity and drinking water has improved under recent government schemes. Sanitation facilities are still inadequate in some rural settlements.
- **Socially**, the SC community in Kaliabor is cohesive, with traditional caste associations and self-help groups increasingly active in community-level initiatives. Women's participation in self-help groups and local cooperatives has improved but remains below the district average.

- In summary, the SC population of Kaliabor reflects a **higher demographic presence but moderate socio-economic progress**. Challenges include lower literacy, limited land ownership, low income diversification, and persistent gender gaps in education and employment

Scheduled Tribe (ST) Population of the project area (Kaliabor Circle)

- The Scheduled Tribe (ST) population in Kaliabor Circle stands at 5,286 persons (2,586 males; 2,700 females), constituting about 2.7% of the circle's total population (Census 2011).
- The sex ratio of 1,044 females per 1,000 males is notably higher than both the circle (974) and district (962) averages, reflecting a balanced and positive demographic structure.
- The literacy level of STs is estimated at or below the circle average of 69.59%, with a marked gender gap in educational attainment. Male literacy is significantly higher, and a majority of ST adults possess only basic schooling or informal literacy.
- The ST households are scattered and small in size, often situated in rural.
- Livelihoods are primarily based on agriculture, fishing, and forest-related activities. Many ST families cultivate paddy, vegetables, and seasonal crops on small plots, while others depend on wage labour in nearby tea gardens or construction work.
- Income levels are modest, with seasonal variations linked to agricultural productivity and local wage opportunities. Access to formal employment or business ownership remains limited due to educational and financial barriers.
- Housing and amenities vary from semi-permanent to kutcha types, with gradual improvements in electricity and drinking water access. However, sanitation, road connectivity, and health infrastructure in tribal villages remain below the district standard.
- Women play an active role in agricultural labour, weaving, and small-scale trading, and ST communities generally exhibit better gender parity than other groups, as reflected in their favourable sex ratio.
- Despite strong community cohesion, ST households face challenges such as low income diversification, inadequate educational attainment, and limited access to government welfare schemes, primarily due to remoteness and information gaps.
- Overall, the ST population of Kaliabor demonstrates social cohesion and gender balance but remains economically vulnerable, relying heavily on primary-sector occupations. Enhanced focus on education (especially for girls), vocational training, market-oriented agriculture, and infrastructure development is necessary to improve their socio-economic conditions.

The socio-economic condition of Kaliabor is largely influenced by its agrarian base. Most residents are engaged in agriculture and allied activities such as paddy cultivation, jute, mustard, and vegetable farming. Pisciculture is an emerging livelihood option in several villages due to the presence of wetlands and nearby fish markets. However, landholding patterns show a predominance of marginal and small farmers. Women's participation in the workforce remains low, and the gender gap in education is substantial.

Culturally, Kaliabor is known for its strong Vaishnavite heritage, with Namghars and Satras playing a key role in community life and governance. Among the indigenous communities, the Thengal Kacharis are notable for maintaining their clan-based social institutions and traditional practices, although Assamese is the lingua franca across the region. Customary institutions such as clan councils and Namghars function alongside formal systems.

The legal status of land in the region generally falls under the state-administered patta system, with most cultivable land privately owned, although there are cases of informal or customary tenure, particularly among tribal groups.

Moreover, in the case of the LILO of 220 kV S/C Samaguri–Mariani Line–1 at the proposed Jakhalabandha Substation, screening was conducted to determine the presence of Indigenous Peoples in accordance with the four defining characteristics outlined under ESS 3.

The screening findings, verified through field observations and meaningful public consultations with the tribal households carried out (Refer **Appendix 15** Photographs and attendance sheet of public consultation with Tribal households) indicate that although these individuals belong to the Scheduled Tribe (ST) Plains community and are affected by the proposed transmission line, they do not exhibit the substantive socio-cultural characteristics typically associated with Indigenous Peoples as per ESS 3. Specifically:

1. **Self-identification and recognition by others:**
The affected individuals identify as members of the ST Plains community but are socially and culturally integrated with the mainstream population. They are not recognized by others as a distinct indigenous group.
2. **Collective attachment to ancestral territories or natural resources:**
The affected individuals do not demonstrate collective attachment to any geographically distinct habitat, ancestral territory, or specific natural resources within the project area.
3. **Distinct customary institutions:**
The affected households follow the same administrative, social, and political systems as the dominant local society, with no separate customary institutions governing their affairs.
4. **Distinct language:**
The affected individuals communicate primarily in Assamese and do not possess a distinct indigenous language different from the official or regional language.

Furthermore, the project area is not located within a Sixth Schedule area under the Indian Constitution.

5 ANALYSIS OF ALTERNATIVES

This chapter elucidates detailed analysis about different options of transmission line route alignment with respect to design, environmental, social and economic aspects during project conception and planning phase.

It is to be noted that during ESIA study, the route for transmission line was already finalized by AEGCL considering following environmental and social criteria for route selection apart from the technical consideration:

- TL route does not involve any human settlement;
- TL route does not affect on any archaeological / cultural monument;
- Avoid forest area;
- TL route does not pass through any protected area such as National Park / Wildlife Sanctuary;
- TL route avoid disturbance to public utility services such as school, hospital playground, bus stop etc.;

Further, optimization was done during the detailed survey. During route alignment, all possible efforts were made to avoid the environmental and social sensitivities or to keep it to the minimum. Following table shows the analysis of 3 Alternative routes.



Figure 5.1: Map showing all three alternative transmission lines routes of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S

Table 5.1: Assessment of Alternative Routes

Description	Alternative- I (Optimum/Proposed Route)	Alternative-II	Alternative-III
LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S – 2.592 km			
Route Length (in Kms.)	2.592 KM	2.654 KM	2.746 KM
Angle Point	12	14	17
River Crossing (Major)	NIL	NIL	NIL
River Crossing (Minor)	NIL	NIL	NIL
Forest (Reserved Forest & Protected Forest)	NIL	NIL	NIL
Tea Garden (Affected Route length)	NIL	NIL	NIL
Low Land Area	NIL	NIL	NIL
Habitation area	Mostly avoided	Partially involved (Passing through Brick Industry/clin)	Partially involved
Railway Crossing	NIL	NIL	NIL
Power Line crossing	NIL	NIL	NIL
Road crossing	Crossing at village roads involved.	Crossing at village roads involved.	Crossing at village roads involved.
Trees / Bamboo	145	257	308
RoW issues	Anticipated very few	Anticipated very high	Anticipated very high
Compensation related issues	Anticipated to be minimum	High	High
Accessibility to tower location	Easily accessible	Difficult to access	Difficult to access

Source: Check Survey report

Pros and cons of the alignment options

Technological options for towers, construction methodology options considered for the project components are as follows:

- Optimum route length;
- Minimum nos. of angle towers to reduce the tension;
- Minimum nos. of crossing lines, highway, railway, other transmission lines, river crossing;
- Maintain distance from the Air defence / Air traffic;

The following areas, however, are to be avoided as far as possible while selecting the routes of the line:

- Tough inaccessible areas where approach is difficult.
- Towns and villages, leaving sufficient margin for their growth.
- Areas subject to floods and other natural hazards gushing nalas during rainy seasons, tanks, ponds, lakes, etc.
- Wooded areas with high trees or fruit bearing trees involving payment of heavy compensations for cutting of the trees.
- Swamps and shallow lands subject to flood, marshy areas, low lying lands, river beds and earth slip zones, etc. involving risk to stability to foundations.
- High hillocks / hilly areas / sand dunes and areas involving abrupt changes in levels and requiring too many long spans.
- Series of irrigation wells.
- Shooting areas and other protected areas such as army / defence installations/ ammunition depots, areas of archaeological importance, forest areas and wild life sanctuary.
- Areas which involve risk to human life, damage to public & private properties, religious places, cremation grounds, quarry sites and underground mines, gardens, orchards and plantations.
- Areas that may create probable RoW issues.
- Buildings/ Storage areas for explosives or inflammable materials, bulk oil storage tanks, oil or gas pipelines, etc.

Based on the latest design of Tower considering soil condition and seismic hazard, optimization of line length, selection of appropriate tower based on the profile of the line and tower spotting data has been done. Also, number of towers and type of tower has been selected to minimize Zirat damage (surface damage) and minimize the area involved for tower location.

Justification for the selected alignment option

LILLO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S: Alternative III is longest in length than Alternative I & II. Angle Point in alternative I is less i.e.12 as compared to alternate II & III, i.e. 14 & 17 respectively. Route length of Alternative I is shorter than alternate II & III. Also based on Environmental & Social considerations analysed for all the three route alternatives, Alt-I route is found to be most feasible. Based on above facts, Alternative I was considered as the most optimal route and recommended for erection of transmission line.

6 ASSESSMENT FOR POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATION MEASURES

6.1 Introduction

This chapter outlines the impact assessment methodology and summarizes the anticipated project impacts on the physical, biological and social environments. It includes biodiversity & critical habitat assessment using tools such as AVISTEP, IBA/KBA mapping tools. The assessment is based on baseline features of the project during its design, construction & operation phase. Additionally, the chapter presents suggested mitigation measures for all identified impacts and provides a summary of overall impact assessment.

6.2 Impact Assessment Methodology

The Environmental Impact Assessment (EIA) methodology for transmission line projects involves a systematic evaluation of potential environmental and social impacts during the design, construction, and operation phases. The assessment is conducted in line with relevant GoI guidelines/regulations, AIBB environment & social framework & international best practices. A proximity analysis was undertaken to assess the alignment of the proposed transmission line with respect to Key Biodiversity Areas (KBAs) and Important Bird and Biodiversity Areas (IBAs). This spatial analysis helps identify ecologically sensitive zones and potential wildlife corridors that may be impacted by the project. To address avian risks, the AVISTEP (Avian Sensitivity Tool for Energy Planning) tool is used to assess bird collision sensitivity. AVISTEP integrates spatial data on bird migration, habitat, and behavior to highlight high-risk zones, thereby guiding the design of mitigation strategies such as rerouting, installation of bird diverters, and seasonal construction planning. The overall impact assessment process combines GIS-based analysis, field surveys, stakeholder consultations followed by the formulation of avoidance, minimization, and compensatory measures. The outcomes feed into the Environmental and Social Management Plan (ESMP), ensuring compliance and sustainable implementation of the project.

6.2.1 Screening and Scoping

Screening and scoping are critical initial steps in the Environmental Impact Assessment (EIA) of transmission line projects. Screening determines whether the project requires a full EIA based on its scale, location, and potential impacts. As per the AIBB, transmission line projects are screened as Category B: Projects with limited, site-specific, and reversible impacts. Scoping identifies the key environmental issues to be studied in detail, such as impacts on forests, wildlife, communities, and electromagnetic fields. Together, they help streamline the assessment process, ensuring focus on significant environmental concerns and facilitating informed decision-making.

Identification of impacts of proposed transmission project on Physical, Biological & Social environments of the project area are summarized below.

Table 6.1: Screening for Impacts

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
Physical Environment		
Land use Land cover	In general the land use of the project area including transmission line RoW and tower footing are agricultural land, some habitation area etc. The Right of Way is considered 35 Mtr. Area required for transmission tower for the LILo line:- for DA type towers 35 to 51 sqm, DB type towers 47 to 66 sqm, DC type towers 50 to 70 sqm and DD type towers 57 to 79 sqm.	<ul style="list-style-type: none"> ● Permanent change in land use at Tower locations. ● Limited change in land use of the RoW of Transmission line in form of restrictions on activities such as growing of large trees;
Topography	Topography of Nagaon district in Assam exhibits a geology characterized by mixed plains and foothills. The soils are primarily	There will be no significant change in the existing topography due to implementation of this project.

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
	alluvial, classified as Entisols and Inceptisols, and are mostly sandy and silty loam or clay loam in nature are mainly plain including some hilly areas. Topography of the project area of transmission line is mostly plain land.	
Soil	<p>The Nagaon district represents various soil types depending upon the composition of the parent materials, palaeogeographical and climatic conditions prevailing at the time of its formation. The variation of soil type is described as follows:</p> <p>a. The flood plain of the district has mostly soils of loamy nature which varies from silty loam o clayey loam or loamy clay</p> <p>b. High level alluvial soils are found in relatively high land in comparison to the recent flood plain and around the inselbergs.</p>	<ul style="list-style-type: none"> ● Generation of construction debris; ● Impact on soil and land environment due to improper management of domestic solid waste; ● Improper storage and handling of hazardous materials (e.g., fuel and lubricant) and generation of hazardous waste during operation. ● Waste generated from operation of construction equipment and machinery and their maintenance leading to soil contamination due to leakage / spillage;
Water Resources and Quality	<p>Ground water in Nagaon district occurs in the semi consolidated and unconsolidated formations of Tertiary and Quaternary age respectively and in secondary porosity like fractures, fissures of Precambrian rocks. While the greater part of the district falls in Kalang sub-basin, in the Kalang sub-basin the alluvial formations show two characteristic features. In the northern part of the district particularly north of Sonai river, the alluvium comprising medium to coarse sand with gravel and pebbles form a single aquifer system of massive thickness, but in the south central and southern parts, which is broadly underlain by older alluvium, the clay proportion increases markedly. The clay beds act as confining layers. Thus ground water occurs both under confined, semi-confined and unconfined conditions.</p>	<p>Insignificant stress on local water resources due to water requirement for the foundation activities, labour camp;</p>
Drainage	<p>Transmission line does not pass through minor river, canal, nala and ponds in tower locations.</p>	<p>No potential impacts due to sediments including residual construction waste transport to nearby water bodies from tower locations.</p>

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
Ambient Air Quality	Based on the observation at site it has been perceived that the ambient air quality of the project footprint and study area is good.	Dust emissions associated with foundation activities at tower locations, transportation of construction material, machineries etc.
Ambient Noise Level	Based on the observation at site it has been perceived that the ambient noise level of the project footprint and study area is good.	<ul style="list-style-type: none"> ● Noise generation due to movement of vehicles; ● Noise from construction activities; ● Generation of noise during operation of DG Set.
Biological Environment		
Ecology	<p>Critical wildlife habitats are not present in the project area since the land use is mainly agricultural land, water bodies, some residential areas etc.</p> <p>The project area specifically the transmission line corridor (35 m) does not involved part of any critical wildlife habitats (IBA/KBA Sites) and any reserved of protected areas.</p>	<ul style="list-style-type: none"> ● Removal of vegetation causing impact on ecology of the area; ● Habitat destruction during temporary laying of wires adjacent to the RoW of transmission lines; ● May collision and electrocution risks to avifauna and other fauna during operational phases.
Occupational health and safety	Workers may also face physical hazards from working at heights, lifting heavy materials, and operating machinery. Prolonged exposure to noise, extreme weather conditions, and electromagnetic fields can further impact health. Additionally, poor ergonomics and inadequate personal protective equipment (PPE) may contribute to musculoskeletal injuries and long-term health issues if safety protocols are not strictly followed.	<ul style="list-style-type: none"> ● Occupational health hazards due to dust; ● Exposure to noise during construction activities; ● Safety risk due to wrong handling of construction machinery, working at height, during stringing and erection; ● Exposure of workers to Electromagnetic field (EMF) while working in proximity to charged electric power lines during operation and maintenance.
Social Environment		
Demographics	<p>The study area of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S Transmission line tower base is comprised of land from two villages.</p> <p>The other details shall be provided after conducting the socio-economic survey.</p>	<ul style="list-style-type: none"> ● Influx of people for employment opportunity. ● Migrant labour from other districts. ● Potential for social conflict and unrest due to conflict of local community with labourers.
Economy and Employment	The economy of the study area in Nagaon district's economy is heavily reliant on agriculture, with rice as the principal crop and staple food. Fisheries are also a major component of the district's economy, and	<ul style="list-style-type: none"> ● For the project activities, job opportunities will be created, with an estimated 70% of these opportunities likely to benefit the local community.

Environmental and Social features	Description	Potential Impacts / Impacts likely to occur
	Nagaon has been a leader in fish and fish seed production in Assam. Other economic activities include poultry farming, brick manufacturing, and livestock rearing.	<ul style="list-style-type: none"> ● Indirect positive impact on local economy through development of secondary amenities.
Land based, Livelihood	The study area of the LILO Transmission Line at Jakhalabandha Transmission Line will involve temporary/permanent land use, which is expected to impact livelihoods, particularly agricultural activities such as paddy (rice) cultivation in RoW and tower base area.	<ul style="list-style-type: none"> ● Due to project activities the loss of access (temporary and permanent) parcels of land for transmission tower foundation / erection activities will impacts on livelihood. ● Erection of transmission tower and the RoW of the transmission line will result in an impact on approx. 13 land owners including one tower on encroached Government Land. ● While the construction of towers is not likely to result in landlessness or physical displacement, it will result in crop losses during foundation, erection and stringing activities in the RoW.
Loss of CPRs, and Access	The land within the RoW of the Transmission Line is mainly of Agriculture land and one fall on government land. No CPRs are available within the RoW.	However, if there is any loss of access to common property resources (CPRs) during the construction of the transmission line, it shall be addressed in the Abbreviated Resettlement Action Plan (ARAP).
Community health and safety	<ul style="list-style-type: none"> ● Most of the tower locations are situated beyond residential areas and other sensitive zones, and therefore, no electromagnetic radiation impact on the surrounding community is anticipated. ● Labourers in close proximity to community. 	<ul style="list-style-type: none"> ● Transportation of tower components, other construction materials and increased vehicular movement will lead to traffic hazards for community residing close to the access roads; ● Damage to access roads. ● Potential gender-based violence (sexual exploitation and abuse/sexual harassment)
Labour Welfare	<ul style="list-style-type: none"> ● The labours would be engaged by the EPC contractor. ● The labourers would be engaged from both local and migrant workers from other districts of Assam. 	<ul style="list-style-type: none"> ● The key potential impacts in terms of labour welfare include the following: <ul style="list-style-type: none"> ● Access to resources such as water, sanitation, cooking fuel etc.; ● Conflict with local community. ● Timely payment of wages and other labour compliances.

6.2.2 Identification of Impacts

Various project features and activities that could reasonably act as a source of impact which has been identified for detailed assessment for different stages of the project are as follows:

Planning and Construction Phase

- Land use and Land cover
- Soil environment
- Water resources and quality
- Drainage
- Ambient air quality
- Ambient noise level
- Occupational health and safety
- Flora and fauna- vegetation Clearance
- Flora and fauna- Construction activities
- Impact on Private Land owners in Tower Base Area and below conductors during Stringing Exercise
- Impact on private land owners within RoW due to imposition of land use restrictions
- Impacts due to Labour Influx
- Impact on Community Health and Safety
- Impact on Economy and Employment in the Study Area

Operation Phase

- Soil Environment
- Noise Level
- Visual Impacts
- Electro-magnetic fields
- Health and safety
- Flora and fauna- Collision and Electrical hazards for avifaunal species
- Impacts of economic loss due to damage to standing crops during maintenance work
- Impact on Community Health and Safety

6.2.3 Assessment of Impact Significance

Table 6.2: Impact Assessment Significance

Significance Rating	Interpretation
Very High	Impacts where an accepted limit or standard is far exceeded, changes are well outside the range of normal variation, or where long-term to permanent impacts of large magnitude (or consequence) occur to highly sensitive resources or receptors. For adverse residual impacts of very high significance, there is no possible further feasible mitigation that could reduce the impact to an acceptable level or offset the impact, and natural recovery or restoration is unlikely. The impact may represent a possible fatal flaw and decision making will need to evaluate the trade-offs with potential social or economic benefits. Positive social impacts of very

Significance Rating	Interpretation
	high significance would be those where substantial economic or social benefits are obtained from the project for significant duration (many years).
High	Impacts where an accepted limit or standard is exceeded; impacts are outside the range of normal variation or adverse changes to a receptor are long-term. Natural recovery is unlikely or may only occur in the long-term and assisted and ongoing rehabilitation is likely to be required to reduce the impact to an acceptable level. High significance residual impacts warrant close scrutiny in decision-making and strict conditions and monitoring to ensure compliance with mitigation or other compensation requirements. Positive social impacts of high significance would be those where considerable economic or social benefits are obtained from the project for an extended duration in the order of years.
Medium	Moderate adverse changes to a receptor where changes may exceed the range of natural variation or where accepted limits or standards are exceeded at times. Potential for natural recovery in the medium-term is good, although a low level of residual impact may remain. Medium impacts will require mitigation to be undertaken and demonstration that the impact has been reduced to as low as reasonably practicable (even if the residual impact is not reduced to Low significance). Positive social impacts of medium significance would be those where a moderate level of benefit is obtained by people or a community, or the local, regional or national economy for a sustained period, generally more than a year.
Low	Minor effects will be experienced, but the impact magnitude (or consequence) is sufficiently small (with and without mitigation) and well within the range of normal variation or accepted standards, or where effects are short-lived. Natural recovery is expected in the short-term, although a low level of localised residual impact may remain. In general, impacts of low significance can be controlled by normal good practice but may require monitoring to ensure operational controls or mitigation is effective. Positive social impacts of low significance would be those where a few people or a small proportion of a community in a localised area may benefit for a few months.
Very Low	Very minor effects on resources or receptors are possible but the predicted effect represents a minimal change to the distribution, presence, function or health of the affected receptor and no mitigation is required.
Insignificant	Predicted impacts on resources or receptors of very low or low sensitivity are imperceptible or indistinguishable from natural background variations, and no mitigation is required.

The significance of an impact is based on expert judgement of the sensitivity (importance or vulnerability) of a receptor and the magnitude (or consequence) of the effect that will be caused by a project-induced change. In summary, the impact assessment method is based on the following approach:

Significance = Magnitude x Sensitivity

Where, Magnitude = Intensity +Extent + Duration

Once ratings are applied to each of these parameters the following matrix is used to derive Significance:

Table 6.3: Impact Sensitivity Assessment Matrix

		SENSITIVITY				
		VERY LOW	LOW	MEDIUM	HIGH	VERY HIGH
MAGNITUDE (OR CONSEQUENCE)	VERY LOW	NEGLECTIBLE	NEGLECTIBLE	VERY LOW	LOW	LOW
	LOW	VERY LOW	VERY LOW	LOW	LOW	MEDIUM
	MEDIUM	LOW	LOW	MEDIUM	MEDIUM	HIGH
	HIGH	MEDIUM	MEDIUM	HIGH	HIGH	VERY HIGH
	VERY HIGH	HIGH	HIGH	HIGH	VERY HIGH	VERY HIGH

Broad definitions of impact significance ratings are provided in the table below. Impacts of ‘High’ and ‘Very High’ significance require careful evaluation during decision-making and need to be weighed up against potential long-term socio-economic benefits of the project to inform project authorisation. Where there are residual biodiversity impacts of ‘High’ and ‘Very High’ significance this will require careful examination of offset feasibility and confirmation that an offset is possible prior to decision-making.

6.2.4 Preparation of Environment and Social Management Plan

The universally accepted mitigation hierarchies adopted for impact assessment is described below:

- Avoid, if possible;
- If avoidance is not possible reduce the magnitude of the impact by applying mitigation measures at source;
- If mitigation measures at source of impact did not succeed to mitigate the impact, then abatement or compensatory measure or offsets are recommended.

The mitigation measures recommended in individual impact assessments will be compiled for project construction and operation phases. The ESMP prepared has also taken organization structure for implementation of mitigation measures.

6.3 Impacts on Physical Environment

Impact assessment focuses on the following which are impacted due to the project activities.

- Land use and land cover;
- Soil environment;
- Ambient Air Quality;
- Ambient Noise Level;
- Water resources, Quality and Drainage; and
- Occupational health and safety.

6.3.1 Impacts during Planning and Construction Phase

The project activities during construction phase include:

- Selective clearing of vegetation in designated areas for Transmission tower erection and RoW;
- Movement of construction machineries, transportation of construction material, tower components, stringing wire etc.;

- Establishment of labour camp;
- Storage of materials;
- Excavation, foundation and construction works;
- Erection of Tower;
- Stringing activities.

Mitigation measures provided for construction activities at site (tower foundation, erection of remaining towers, stringing) are given table as follows.

Table 6.4: Impacts on physical environment and mitigation measures during construction phase

Land use and Land Cover	
Context and receptor	<ul style="list-style-type: none"> ● In the project area the land is primarily used for agriculture/crops. The other land uses in the area are some residential areas (Table 2.3). ● No major anthropogenic activities are observed in the project area except agricultural activities. ● The project will result in change of the land use within the land parcels where the transmission towers are located. The actual area of land use impact is limited to the footprint (tower base) of the 13 transmission towers which represent around 0.144 hectares for the LILO line. Besides this the land falling under the RoW of transmission line will also have limited change in land use in terms of restriction of activities to be undertaken on this area.
Mitigation measure	The land requirement for the tower base has been considered optimum as per the IS standards.
Impact Significance	<ul style="list-style-type: none"> ● A total of 0.144 hectares will experience permanent change in land use. The RoW of transmission line required 145 numbers of trees including fruit & non fruit bearing, bamboos etc. to be felled or looped. During operation phase, RoW will have limited restriction in terms of prohibiting plantation of any large tree, construction of any structure. The agricultural activities in the RoW area could be continued as earlier. Considering this, the magnitude of the impact is assessed as medium. ● Out of total land to undergo permanent land use change is 9.072 hectares are primarily used for agriculture, crops, residential and range land. Hence, the resource sensitivity is assessed as medium. ● As per the Impact Sensitivity Assessment Matrix (refer Table 6.3) a combination of medium impact magnitude with medium receptor sensitivity results in impact significance as moderate.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	-
Soil Environment	
Context and receptor	<ul style="list-style-type: none"> ● Digging of foundation pits for the towers may affect the soil quality. ● Foundations shall dig up to a depth of 3-3.5 m depending upon the tower type and soil characteristics. At the tower sites, all vegetation within the footprint of the tower base and

	<p>additional surrounding area shall be cleared for ground vegetation. Foundation pits shall be backfilled by the excavated soils;</p> <ul style="list-style-type: none"> ● Compaction of soil during excavation, transportation of construction material & tower components, foundation work, backfilling, tower erection and stringing lead to temporary effects on natural infiltration of rainwater, but these impacts are temporary, localized and marginal; ● Soil contamination at tower locations shall be from result of leaks and spills of oil, lubricants, or fuel from construction equipment. ● General construction waste generated onsite comprised of waste concrete, wooden pallets, steel cuttings / filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminium cans and waste paper shall also be generated by the construction workforce and labour camp site. A small proportion of the waste generated during construction phase shall be hazardous and include used oil, grease and waste oil containing rags. ● During foundation activities at tower locations, excess excavated material shall be generated.
<p>Mitigation measure</p>	<ul style="list-style-type: none"> ● Vegetation clearance and excavation to be done in the marked excavation and construction area only; ● The excavated soil to be stored on site for back filling; ● Any top soil that is to be removed for construction of tower Footings / foundations to be stored on a designated, bunded area with cover, away from drains and then be used as a (soil) top cover after construction activities are complete; ● After completion of construction activities, site will be cleared for any excess excavated material and leftover construction material. Disposal areas for same will be identified in consultation concerned department; ● Spill management kit will be provided and immediately clean-up of any spillages; ● Provision of waste collection bin and disposal of domestic waste will be provided at labour camp site; ● Tower components and materials shall be placed on stable, level ground with minimal disturbance nearby, thereby reducing disturbance to surrounding standing crop and vegetation; ● The existing roads to be used for approaching tower locations.
<p>Impact Significance</p>	<ul style="list-style-type: none"> ● The impact on soil quality will be limited to transmission tower locations. The land area already disturbed during foundation activities for some tower footing and foundation and shall be continued for remaining tower footing and foundations. ● Compaction of soil may be happened due to vehicular movement for remaining tower footing and foundations, tower erection and stringing activities. However, the compacted soil in surroundings of tower locations will reinstate their original conditions through ploughing activities in fields. ● On basis of this, the magnitude of impact is assessed as small. ● The foundation activities at 13 tower locations shall cause disturbance to the fertile top soil in agricultural fields. Considering this, the resource sensitivity is assessed as medium. ● As per the impact significant assessment matrix (refer Table 6.2) a combination of small impact magnitude with medium receptor sensitivity results in impact significance as moderate.

Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Ambient Air Quality	
Context and receptor	<ul style="list-style-type: none"> ● Ambient air quality will largely impact from the following sources during the construction phase: ● Fugitive dust emissions from transportation of material, excavation, drilling, back filling, emission due to movements of vehicles, plying of heavy construction machinery etc.; ● Emissions from diesel generator for construction activities. ● The nearest receptor for dust emissions located outside 500 m distance from transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.
Mitigation measure	<ul style="list-style-type: none"> ● All vehicles shall be properly maintained i.e. serviced every 3 months or 5,000 km, ensuring brakes, lights, emissions, and tires are in good condition and vehicle statutory permits also updated as and when necessary. ● Excavation activities to be avoided during windy weather conditions; ● The unpaved access roads shall be sprinkled with water as necessary to reduce dust, especially during summer windy conditions.
Impact Significance	<ul style="list-style-type: none"> ● The major activities contributing to air emissions, i.e., foundation activities along the transmission line. ● The vehicles and construction machinery plying onsite will generate particulate and gaseous emissions of CO, SO₂, NO_x and CO₂. These emissions will be dispersed into the unpolluted environment of the project area. Dust and air emissions resulting from the above activities may affect environment depending upon prevailing wind directions and speed. In addition, fugitive dust emissions generated in the project activities will add to the particulate levels in the project area. Emissions from the DG set and other stationary machines will also generate gaseous emissions. ● Considering above, magnitude of impact is assessed as medium. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● There are no ecological sensitivities located in the RoW of transmission line route. ● Hence, the receptor sensitivity is considered as medium. ● As per the impact significant assessment matrix (refer Table 6.3) a combination of small impact magnitude with medium receptor sensitivity results in impact significance a moderate.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Ambient Noise Level	

Context and receptor	<ul style="list-style-type: none"> ● The foundation activities at transmission tower locations will increase the noise level due to operation of concrete mixer, DG set, vehicular movement for transportation of materials. ● During erection of tower and stringing there can be some disturbance from noise due to vehicular movement for transportation of tower components, strings, and communications during erection and stringing. Also, during stringing there will be continuous operation of tractors carrying the strings from one tower to other. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● No ecological sensitivities located in the RoW of transmission line route.
Mitigation measure	<ul style="list-style-type: none"> ● Construction activities are to be carried out during the daytime (6:00 am- 6:00 pm); ● Avoid unnecessary honking of horns.
Impact Significance	<ul style="list-style-type: none"> ● In case of transmission line, the noise causing construction activities (drilling, rock breaking and material transportation) at any tower location will be limited to 2-3 days. ● The increase in traffic volumes during the erection of the transmission tower and stringing is expected to be occasional and negligible. ● Hence, the magnitude of impact on ambient noise level is assessed as medium. ● As mentioned above, there are habitations present within 500 m distance from the Transmission line route. ● There are no ecological sensitivities located in the RoW of transmission line route. ● Hence, the receptor sensitivity is considered as medium. ● As per the impact significant assessment matrix (refer Table 6.3) a combination of small impact magnitude with medium receptor sensitivity results in impact significance as moderate.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Water Resources and Quality	
Context and receptor	<ul style="list-style-type: none"> ● The transmission line generally requires about 50 m³ of water for casting of foundations for each tower, which shall be sourced from local sources through tankers. ● The transmission line does not pass through River and nallahs etc. Refer Table 2.3 for details.
Mitigation measure	<ul style="list-style-type: none"> ● Location of storage area to be avoided on agricultural land and in close proximity i.e. within 50 meters of water bodies wherever possible. ● Excess excavated material not to be dumped in Nallah / water course / drainages. ● Proper arrangement for clean bathing / washing water i.e. provide bathing cubicles with drainage and water supply to be made at labour camps; ● Approved water supply resource to be used for water requirements for concreting and curing during foundation activities; ● Wastewater generated at labour camp will have proper disposal arrangements such as drainage arrangements linked to the septic tanks and soak pits for abating water contamination.

Impact Significance	<ul style="list-style-type: none"> ● The sensitivity of water resource in the area is considered as low. ● The magnitude of impact is assessed as small considering the amount of water consumption at foundation activities at tower locations. ● Tower erection and stringing activities does not have water requirement. Further, the direct negative impact on water resources due to construction activities is short term and limited mainly to construction phase of the project. The transmission lines will have insignificant impact on the surface water and ground water. ● As per the impact significant assessment matrix (refer Table 6.3) a combination of small impact magnitude with medium receptor sensitivity results in impact significance as moderate.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	The significance of residual impacts for remaining construction activities will be negligible .
Drainage	
Context and receptor	<ul style="list-style-type: none"> ● The study area has natural drainage pattern. ● The transmission line does not pass through river and nallahs. Refer Table 2.3 for details.
Mitigation measure	Drainage system will not be blocked and polluted by the construction activity and shall be closely monitored at Site.
Impact Significance	<ul style="list-style-type: none"> ● The alteration in surface drainage pattern of the area due to construction of transmission line will be insignificant as the natural flow of water will not be altered. ● Considering this, magnitude of impact is assessed as small and resource sensitivity as low. ● As per the impact significant assessment matrix (refer Table 6.3) a combination of small impact magnitude with small receptor sensitivity results in impact significance as low.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating for remaining construction activities.
Occupational Health and Safety	
Context and receptor	<ul style="list-style-type: none"> ● The erection of transmission towers, stringing of line will require working at heights. The commissioning of the transmission line will also involve live power lines. ● The working at height has the risks of falling from the height and working on live wires carrying power has dangers of electric shock and electrocution. ● Besides this, there could be slip and trip hazards especially during monsoon season. ● The area experiences heavy rainfall. Working during very heavy rain could cause health hazards. Also working under extreme heat can cause health hazards. ● During tower erection and stringing activities, about 40 workers will be engaged in the LILO Transmission Line.
Mitigation measure	● Trained workers will be involved in the specific work activities such as tower erection and stringing;

	<ul style="list-style-type: none"> ● Prior to start of work, workers will be informed about the related safety risks and precautions to be taken; ● Stop work in monsoon season; ● During summer and rainy days with high temperature, work shall be started early in morning with no work during peak temperature in afternoon and rainy days. ● Generally, during hot days works start from 7 am to 11 am and in the afternoon 2.30 to 6.30 pm. ● Construction areas to be marked and cordoned off; ● Manual lifting by adult men to be less than 55kg and for women it should be less than 30kg; ● Eye protection for welding, cutting or similar operations which may cause hazard to eyes; ● All persons performing construction work to wear safety shoes and helmets conforming to national standard; ● Every worker engaged in handling sharp objects which may cause injury to hand shall be provided with suitable hand gloves; ● A construction worker handling cement and concrete to wear close fitting clothing, gloves, helmet / hard hat, proper foot wear, masks etc. and will take all precaution to keep the cement and concrete away from his skin; ● Moving parts of the hoists, grouting equipment used for concrete work are securely fenced to avoid any injury or unsafe condition; ● The mixing of the concrete is done in such a way that minimum of dust escapes into the air; ● Erection of steel structures should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc.; ● EPC contractor to ensure a First-aid Box is available at construction site; ● EPC contractor to ensure that health and safety procedures are in place and training on same are provided to the workers prior to construction; ● Once the stringing is complete, notices (danger sign boards) and anti-climbing devices to be put on all the faces of the tower; ● Emergency contact numbers and route to nearest hospital shall be displayed at construction site. ● The local / host community shall be kept at safe distance from construction site.
Impact Significance	<ul style="list-style-type: none"> ● The foundation activities, i.e. tower footing, the erection of transmission towers and stringing will be done through experienced and trained workers. ● Construction of foundation work at transmission towers shall involve local workers who were not having earlier experience. Hence, there will be greater vulnerability for accidents and therefore, receptor vulnerability is assessed as medium. ● ● Considering the worst-case scenario of an accident, which is a fatality, the magnitude of impact could be high. ● As per the impact significant assessment matrix (refer Table 6.3) a combination of small to low impact magnitude with medium receptor sensitivity results in impact significance as .small.
Additional mitigation measures	<ul style="list-style-type: none"> ● Safety induction training will be conducted on the joining date of the workers. ● Daily toolbox talks will be conducted for the workers before the commencement of any work.

	<ul style="list-style-type: none"> ● Refresher safety training, particularly on working heights, will be conducted by the contractor every six months for the workers engaged in the project including workers working at heights. ● A Workers/Labour Grievance Redress Mechanism (GRM) register will be maintained at the project site to address any grievances raised by the workers.
Residual impact significance	The significance of the residual impact after implementation of the recommended mitigation measures will be minor for remaining construction activities.

Impact on Sensitive Receptors

Impact on Sensitive Receptors: **There are 4 places of worship, 2 Schools and 1 market place** coming within a radius of 500 m from the proposed LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S.

During construction phase insignificant impact may occur to the above sensitive receptors, as most of the sensitive receptor locations are away from the center line of the transmission lines. Regular noise quality monitoring will be conducted during construction phase and will be compared with base line data. Appropriate measures will be taken if increase in noise level recorded.

6.3.2 Impacts during Operation Phase

The following sub-section provides details on the impacts during operation and maintenance phase. The project activities during operation phase include:

Power Transmission;

Preventive maintenance of Transmission line.

Table 6.5: Impacts on physical environment and mitigation measures during operation phase

Soil Environment	
Context and receptor	Waste Generation Any spillage of Aluminum oxide paint during operation and maintenance of the transmission line towers may impact soil quality.
Mitigation measure	Preventive maintenance plan will be prepared for transmission line.
Impact Significance	No impacts of any significance are predicted on vegetation and soil due to operation of the transmission line is small to low
Additional mitigation measures	Low frequency of painting as well as involving experienced personnel with mitigations like prior spread of sheets underneath the tower structure while painting could be considered.
Residual impact significance	No change in impact significance rating.
Noise Level	
Context and receptor	The likely noise impacts from operation of the transmission line will be due to: <ul style="list-style-type: none"> ● Maintenance and repair activities; ● ‘Corona discharge’ from the overhead lines;

	<ul style="list-style-type: none"> Once operational, noise from energised overhead lines along the transmission line route can be produced by a phenomenon known as ‘Corona Discharge’ (a limited electrical breakdown of the air). Conductors are designed and constructed to minimise corona effects, although, under certain conditions this can be audible as a ‘hissing’ sound, sometimes accompanied by a low frequency hum. Conductors designed and constructed to minimise corona effects will be chosen for transmission. It is highly unlikely that the corona discharge noise will exceed the normal background noise levels in the area and furthermore, such noises are mostly restricted to rainy weather conditions. The nearest receptor for noise emissions located within 500 m distance from transmission line route. No ecological sensitivities located in the RoW of transmission line route.
Mitigation measure	The project design specifications include the measures to reduce the noise generated along transmission line.
Impact Significance	<ul style="list-style-type: none"> The magnitude of noise generation from operational phase will be small but consistent for the entire life of transmission line. As mentioned above, there are habitations present within 500 m distance from the Transmission line route. There are no ecological sensitivities located in the RoW of transmission line route. Hence, the receptor sensitivity is considered as medium. As per the impact significant assessment matrix (refer Table 6.3) a combination of small impact magnitude with medium receptor sensitivity results in impact significance as moderate.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating.
Visual Impacts	
Context and receptor	<ul style="list-style-type: none"> The footprint of the project comprise of about 0.144 hectares will experience permanent change in land use and 9.072 hectares respectively for 2.592 km of Jakhalabandha transmission line with 13 towers. The transmission line route passes through agriculture/trees/crops/vegetation, residential and range land. The vertical forms of the transmission towers would be prominently visible from the road and nearby settlements. Besides this, the farmers in the field would have clear view of these towers. It is to be noted that the study area already had other existing transmission towers and the new transmission line will be easily absorb in the existing landscape. <p>The visual impacts will be perceived by two types of receptors, namely:</p> <ul style="list-style-type: none"> Receptors located at a fix point, i.e. habitations within the project foot print and area of influence; and Receptors who will temporarily come into contact with the transmission line such as passing motorists in the area.
Mitigation measure	The route of alignment had avoided settlement areas, forest areas during project planning.

Impact Significance	<ul style="list-style-type: none"> ● It is important to note that whether the visual impact is seen as positive or negative is highly subjective, and people’s attitude towards and perception of the visual impacts associated with the transmission line may differ vastly. The study area already had other existing transmission line. Hence, the magnitude of impact is assessed as small. ● Also, the local community does not perceive the transmission line as a new element in the existing visual landscape of the area as interpreted from consultations. Therefore, receptor vulnerability is considered as low. ● As per the impact significant assessment matrix (refer Table 6.3) a combination of small impact magnitude with low receptor sensitivity results in impact significance as small.
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	No change in impact significance rating.
Electro Magnetic Fields (EMF)	
Context and receptor	The power evacuation through the transmission line during operation phase will result in development of electromagnetic fields. There have been some concerns about possible health risk from exposure to electromagnetic radiation from overhead transmission line. People working in the vicinity of transmission line are potentially prone to exposure to EMF. However, while the evidence of adverse health risks is low, it is still sufficient to warrant limited concern.
Mitigation measure	The minimum distance clearance of 7 m from ground to the lowest conductor shall be provided in the project as CEA Safety regulations, 2023 which is considered adequate to mitigate potential exposure to electromagnetic fields (EMF). Details provided in Table 2.2
Impact Significance	There are no specific standards or guidance on EMF in India however the Indian Electricity Act and Rules clearly stipulate the minimum clearances required. As per ICNIRP standards, the EMF generated by 220 kV line is lesser than the suggested value.
Additional mitigation measures	<p>The recommendations applicable to the management of EMF exposures (as per IFC) as given below shall be followed:</p> <ul style="list-style-type: none"> ● Evaluation of potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ● Average and peak exposure levels shall remain below the ICNIRP recommendation for General Public Exposure (1). ● If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques will be considered to reduce the EMF produced by power lines, or transformers. <p>Examples of these techniques include:</p> <ul style="list-style-type: none"> ● Shielding with specific metal alloys; ● Increasing height of transmission towers; ● Modifications to size, spacing, and configuration of conductors; ● During operational phase, AEGCL will monitor the above measures as per requirements.
Residual impact significance	Not Applicable

Occupational Health and Safety	
Context and receptor	<ul style="list-style-type: none"> • The project will have transmission of 220 kV through the transmission line during operation phase. AEGCL will be responsible for O&M of the Transmission line. • There is a possibility of lines or towers / tower members falling to the ground, and safety risks during maintenance activities at towers, during the operational phase, contact with the transmission line can result in electrocution. • Ignorant people trying to tap electricity from high tension wire can lead to fatal accidents.
Mitigation measure	<ul style="list-style-type: none"> • Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower; • Once the stringing work is complete, notices and permanent anti climbing devices will be installed on the tower. The operational start date for electricity transmission and safety implications will be publicized locally in advance. • The SOP for preventive maintenance and repairing of fault will be defined and followed. Currently AEGCL has a Safety Manual on Transmission System for managing the HSE aspects of existing transmission line operations.
Impact Significance	Based on above, overall impact significance is assessed as small .
Additional mitigation measures	<ul style="list-style-type: none"> • The lock in-lock out system will be followed during maintenance/ repair activities at transmission line; • Records of incident / accidents shall be maintained; • Root cause analysis shall be carried out for any incident / accident.
Residual impact significance	No change in impact significance rating.

6.4 Impacts on Biological Environment (Biodiversity Assessment, Critical Habitat Assessment Using Tools like KBA/IBA/Avistep etc.)

Impact Assessment Standards defines sensitivity of ecological receptors by determining the significance of effects on species and habitats separately. Impacts during construction and operation phases are presented below.

6.4.1 Impacts during Planning and Construction Phase

The source of impact to biological environment during the construction phase is associated with the clearing of vegetation and the construction activities. As the RoW of the transmission line primarily included agricultural and crop land the impact from clearance of vegetation will be considerably minimum.

Table 6.6: Impacts on biological environment and mitigation measures during Planning and Construction Phase

Impacts due to Vegetation Clearance	
Context and receptor	<ul style="list-style-type: none"> • Vegetation clearance is the first step in the establishment of access / internal roads and excavation for the erection of tower footing and transmission tower foundations and ancillary facilities. Impact of vegetation clearance could happen at the time of line stringing at few places.

	<ul style="list-style-type: none"> ● Most commonly found species within the transmission line corridor are crops like rice, jowar, arhar, tur, moong, til, groundnut, soyabean, chilly and, ginger, onion, chilly, brinjal, bhindi, wheat, gram, mustard, turmeric, potato, carrot, pea. ● Ground clearance will be maintained from the lowest cable and any object that is grounded (tree etc.). ● Clearing of vegetation from agriculture / crops, trees / vegetation, built up area reduces options for nesting habitat for birds, shelter from predators, foraging resources, shade, perching habitat and breeding sites. The loss of vegetation can also have a negative effect on soil quality and hamper survival of neighbouring floral species, burrowing faunal species and foraging resources for herbivores in the area.
Mitigation measure	<p>In tower foundation location and transmission line corridor no mature fruiting tree or any other tree that is important for community will be felled. The tower locations will be adjusted to avoid mature trees that are important for the community. In case it is absolutely necessary, chopping and trimming of the branches will be undertaken.</p>
Impact Significance	<ul style="list-style-type: none"> ● Construction of towers and stringing of transmission lines may lead to chopping / trimming or clearing of tree species. This may also happen (or already happened) during line stringing. ● In addition, vegetation clearance may remove few shrub and herb species. Vegetation clearance will lead to habitat disturbance for fauna. ● The clearance of vegetation in agriculture / crops, trees / vegetation, built up, habitat is expected to occur at a scale to have an impact on habitat for species (birds, mammals and some reptiles) that utilize those resources. ● Vegetation is small enough and construction activities that will disrupt connectivity of habitats for species utilizing the area. However, there is substantial habitat for these species in the region and any impact that likely to happen is unlikely to cause loss of habitat viability and function in the region. The loss of habitat in the agricultural land pertains to any areas that provide connectivity to water bodies and vegetation patches. ● Once again agriculture / crops, trees / vegetation, built up is widespread in the region and therefore impacts from vegetation clearance for construction of transmission line that expected to happen is not expected to cause any long-term disruption of habitat viability and function. ● Impact magnitude is thereby considered small. The sensitivity of these habitats is considered low as they may have some significance for IUCN Least Concern Species alone and are common. ● The species dependent on agriculture / crops, trees / vegetation, built up, habitats are included within the Least Concern category. However, the site has bird species protected under IUCN conservation; therefore the site has been deemed to have medium sensitivity. The impacts described above are not expected to cause a significant change in the population of these species and therefore the impact magnitude has been deemed small. ● The overall impact significance has been assessed as not significant for habitats and minor for species.
Additional mitigation measures	<ul style="list-style-type: none"> ● The following mitigation measures will further reduce the impact significance on the habitat and species for the remaining construction works that require vegetation clearance:

	<ul style="list-style-type: none"> ● Vegetation disturbance and clearance should be restricted to the project activity area; ● Strict prohibition should be maintained on use of fuel wood and shrubs from nearby areas as kitchen fuel.
Residual impact significance	Removal of vegetation can have a direct and indirect impact on the local ecology. While the impact is limited to the relatively short construction phase of the project, the recovery time to return to pre-project conditions is long and therefore the significance of the residual impacts will remain minor for species.
Impacts due to Construction Activities	
Context and receptor	<ul style="list-style-type: none"> ● Construction activities include excavation, movement of machineries, increased anthropogenic movement (men and transport) in the project study area. These activities are assessed with respect to disturbance of habitats and species. ● Excavation for the construction of the foundations for transmission towers and ancillary facilities shall have direct impact on burrowing fauna, mammalian fauna and an indirect impact on flora / fauna through the changing of soil properties. This type of impact could happen for each tower footing that is yet to be constructed. ● Anthropogenic movement will result in increased stress placed on fauna in the area that remain alert for an extended period of time and may prevent proper breeding, nesting, mating, socializing and foraging. ● Noise from anthropogenic movement (men and transport) for the construction activities shall cause disturbance to fauna in the nearby areas. ● This type of impact could happen during the remaining footprint and tower foundation stringing activities of the transmission line.
Mitigation measure	In-house training provided to the labour force and supervisory staff for situations dealing with wildlife encounters.
Impact Significance	<ul style="list-style-type: none"> ● The significance of impacts from construction activities is being assessed for agriculture / crops, trees / vegetation, built up for faunal species. ● Excavation activities have the potential to cause detrimental impact on the soil properties in the area and on burrowing species, neighbouring flora, herbivores and small carnivores. ● Burrowing animals including reptiles and ground-roosting bird species and lizard burrowing holes can be directly affected by excavation. ● Mammalian species could fall in the ditch constructed for the remaining tower footings and get injured. ● Anthropogenic movement could create increased stress on mammals, birds and reptiles in the project study area in proximity to the areas tower construction and stringing activities are proposed. Mammal species are also susceptible to higher noise levels from anthropogenic movement and construction due to their better auditory perception. Noise can affect mating and breeding behaviour in all species that utilize sound to communicate with one another and find suitable mates. ● Impact magnitude is considered small. The sensitivity of these habitats is considered low as they may have significance as per IUCN Least Concern Species alone and are common. ● The species dependent on agriculture / crops, trees / vegetation, built up and range land habitats (reptiles, birds and mammals) are included within the Least Concern category. ● However, the site has bird species protected under IUCN Conservation Status and therefore the site has been deemed to have medium sensitivity. The impacts described

	<p>above are not expected to cause a significant change in the population of these species and therefore the impact magnitude has been deemed small.</p> <ul style="list-style-type: none"> ● The overall impact significance has been assessed as not significant for habitat and minor for species.
Additional mitigation measures	<p>The following mitigation measures will further reduce the impact significance on the species for the remaining construction works:</p> <ul style="list-style-type: none"> ● Construction and transportation activities should be avoided at night (6:00 pm to 6:00 am); ● Temporary barriers with wire mesh should be installed on excavated areas to prevent falling of mammalian species; ● Good i.e regularly on daily basis the housekeeping should be followed for construction activities; ● Anti-poaching, trapping and hunting policy among employees and contractors should be strictly enforced; and ● General awareness regarding fauna should be enhanced through trainings, posters, etc. among the staff and labourers.
Residual impact significance	<p>The implementation of suggested mitigation measures can significantly reduce the impacts from construction activities but there will still be some impacts due to noise and anthropogenic movement. The residual impacts for species will remain minor. However, as impacts of construction activity will be reduced there will continue to be disturbance to fauna and flora will be reduced.</p>
Habitats of Critically Endangered and Endangered species	
Context and receptor	<p>Key Biodiversity Areas within 10 km radius:</p> <p>An analysis for Key Biodiversity Areas (KBA) within 10 Km buffer from the center line of the LILO line were assessed by obtaining data from the World Database of Key Biodiversity Areas and it is found that critical wildlife habitat including KBA Sites are not present within 10 KM buffer of the LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S. The nearest KBA site i.e., Kaziranga national park is at an offset of approx. 15 Km from the transmission line. A map showing the project area vis-a-vis location of Critical Wildlife Habitat is already shown in Figure 4.7 of this report. The faunal assessment of the project area reveals presence of common domesticated fauna only like Cow, buffalo, goat, pig, dog etc. Also, common species of birds and other mammals are found. As per the site assessment and public consultation, presence of wildlife species is very rare but the possibility of occasional presence of some wildlife species like elephant, wild boar, fox, mongoose etc. in the vicinity of project area cannot be entirely ruled out.</p>
Mitigation measure	<p>Adoption of general mitigation measures like awareness program for the construction workers, planning of construction work, adoption of safety measures is envisaged and will be sufficient. In-house training is to be provided to the labour force and supervisory staff for situations dealing with wildlife encounters.</p>
Impact Significance	<p>Based on above, overall impact significance is assessed as Small.</p>
Additional mitigation measures	<p>-</p>

Residual impact significance	No change in impact significance rating.
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6.4.2 Impacts during Operation Phase

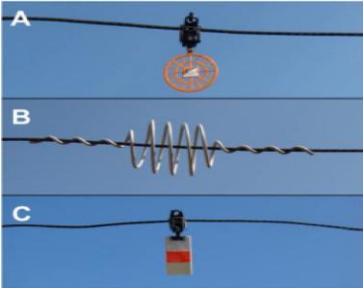
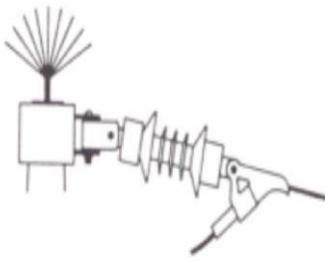
The source of ecological impacts in the operation phase is associated with electrical and collision hazards from transmission infrastructure. The impacts in the operation phase are considerably larger due to the presence of other transmission lines in the area that multiply the hazards for flying bird species.

Impacts from the operation phase of the project on the local ecology have been assessed with respect to the following activities:

Perching on transmission lines and towers and flying in proximity to the conductors for avifauna.

Based on the facts that minimum clearance between conductor and trees ranges from 4 to 5.5 m; minimum ground clearance as per Electrical standard is 6.1 to 8.44 m and Spacing between the lines/cables is 3.05 to 5.49 m, it can be assumed that, electrocution of primate/monkey and bird’s wingspan has not been anticipated by touching two cables.

Table 6.7: Impacts on biological environment and mitigation measures during Operation Phase

Collision and Electrical hazards for avifaunal species	
Context and receptor	<ul style="list-style-type: none"> During the ecological assessment bird species were found roosting on wires and poles in the area. Some birds also utilize the transmission towers for nesting by placing the nests across wires or using holes in the tower itself. Collision of birds can happen with transmission line due to specific behaviours like courtship displays, aerial hunting as they may distract the birds from the presence of the power lines. Collision may happen for birds that make regular and repeated flights between roosting and feeding areas in proximity to power lines. Stretch nearby the water bodies is vulnerable to bird collision. Avifaunal species forages nearby in and around the river for their daily needs.
Mitigation measure	<p>The following mitigation measures will reduce the impact significance on avifaunal species:</p> <ul style="list-style-type: none"> Installing perch rejecter (Upright “whisk brooms” - Picture 4) on the cross arms (Picture 1). In order to mitigate and minimize collision of birds, power line markers should be used (Picture 2), which reduce the risk by increasing the visibility of overhead lines to birds (Sporer et al. 2013). These items are included in Sl. No. 5 of BOQ. Total 2 nos. of above mention items will be used for the LILO line as per site requirement. <p>Electrical Pole Modification</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Picture 1: Power line markers*</p> </div> <div style="text-align: center;">  <p>Picture 2: Perch Rejecter</p> </div> </div>

Impact Significance	<p>During the ecological assessment bird species were found roosting on wires and poles in the area. In addition, birds may collide when moving across water bodies in the study area. Some birds with large wing span may get electrocuted.</p> <p>However, it is unlikely that mortality from collision/electrocution will cause any changes in the population regionally. Moreover, appropriate mitigation measures will be implemented to address any potential negative impacts on Avifauna. The impact magnitude has been assessed as small. Furthermore, impact significance to species is considered moderate.</p>
Additional mitigation measures	No additional mitigation measures suggested.
Residual impact significance	After implementation of mitigation measures, the significance of residual impacts will be moderate . We retain this significance, as while the mitigation measures are likely to reduce the impact, the probability of electrocution still cannot be ruled out.
Critical habitats of Critically Endangered and Endangered species (AVIFAUNA)	
Context and receptor	<p>AVISTEP as the Avian Sensitivity Tool for Energy Planning has been used for the project area to 1. Identify areas of high avian sensitivity across landscapes where power infrastructure like transmission lines is proposed. 2. Minimize impacts on bird habitats and migratory paths during planning and route alignment. 3. Support environmentally responsible decision-making in the energy sector. 4. Promote biodiversity conservation while allowing energy infrastructure development. The AVISTEP analysis is based on spatial data such as: Important Bird Areas (IBAs), Migratory corridors, Wetlands, forests, and other ecologically sensitive zones of the area.</p> <p>Detail of Avifauna species wrt their collision sensitivity & occurrence certainty in the project area as per AVISTEP analysis is provided in Appendix – 9.</p> <p>Further a proximity analysis of IBA sites with regards to project area also concludes that any IBA sites are not present in the buffer of 10 KM radius from LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S. The nearest KBA site i.e., Kaziranga National Park is at an offset of approx. 15 Km from the transmission line. (Map showing the nearest IBA sites from the project area and detail of IBA sites of Assam is enclosed for reference in Appendix- 11 & 12 respectively.</p> <p>Also the site avifauna assessment reveals that mostly common bird species like crow, dove, crane, water dwelling birds, etc. are prevalent in the project area. Although the occurrence of CR/EN/VU avifauna species in the project area is assessed to be minimal but the possibility of their occasional presence cannot be entirely ruled out in the project area.</p>
Mitigation measure	<p>In order to mitigate and minimize collision of birds, power line markers will be used at selected section of the transmission line in proximity to birds flying routes, water bodies as per site assessment, which will reduce the risk by increasing the visibility of overhead lines to birds.</p> <p>A specific monitoring requirement in the form of wildlife monitoring checklist for LILO operator to regularly monitor/observe and record bird collisions and deaths along the transmission line ROW. The bird/wildlife monitoring is to be regularly reported to the PMU and the AIIB. Checklist provided in Appendix – 7.</p>
Impact Significance	Based on above, overall impact significance is assessed as Moderate

Additional mitigation measures	Adoption of general mitigation measures like awareness program for the construction workers, prohibition order for bird hunting in the project site, planning of construction work etc. are envisaged and will be sufficient.
Residual impact significance	No change in impact significance rating.

6.4.3 Cumulative Impact for Avifauna

The cumulative impacts to the avifauna species are considered as **moderate** since there is a possibility of impact to the globally threatened migratory avifaunal species.

6.5 Impacts on Social Environment

6.5.1 Impacts during Planning and Construction Phase

Table 6.8: Impacts on social environment and mitigation measures during Planning and Construction Phase

Economic loss to private landowners in the tower base area and beneath the conductors due to crop damage during civil construction and stringing activities.	
Context and receptor	<p>For LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S is spread across two villages namely; Seconee Pathar and Barholagaon under Kaliabor Tehsil in Nagaon District.</p> <p>No physical displacement or loss of residential structures is anticipated for any private landowner, as confirmed during the check survey. However, project activities may result in economic displacement as there will be some crop loss due to foundation and tower erection works, temporary access road creation, and transmission line stringing. The joint verification for identification of landowners for proposed LILO transmission line for tower footing area has been completed by concerned revenue Circle.</p> <p>Compensation will be provided to affected landowners after completion of the identification of landowners and the approval of the Land Scheduling Report from concerned Circle Offices and before commencement of works. Land is not acquired for the project as per Electricity Act of 2003, and ownership remains with the landowners. However, there will be permanent restriction of land use for tower footings area. Agricultural activities may continue in the RoW area post-construction, except at tower base locations, where farming is discouraged due to electrical safety concern.</p>
Embedded / in built measures	<p>The crop compensation will be based on the crop damaged at the time of the tower foundation work and stringing activity. The compensation shall be paid based on the rate provided by the concerned department as determined by the agriculture, horticulture & forest department etc. based on the market value and according to RAP.</p> <p>The assessment for the loss of crops and trees shall be done jointly by concerned line department, Circle Offices, AEGCL, PMC and EPC contractor in presence of the affected land owners for payment of compensation.</p>
Impact Significance	The construction activities along the tower base are anticipated to result in a one-time loss of crops. Even though most of the construction activity has been planned during the dry season, there may be instances where the construction of the

	<p>transmission tower foundation, erection of towers, and subsequent stringing of transmission line involve movement of men, machinery, and equipment across agricultural fields leading to the tower locations. This movement could potentially damage standing crops, not only at the tower base and Right of Way (RoW) of the transmission line but also in adjacent agricultural plots. This damage would lead to temporary income loss for the cultivators.</p> <p>There will be no physical displacement or loss of residential structures for any private landowners, and no impact is expected on Protected Cultural Resources (PCRs), Common Property Resources (CPRs), or archaeological/historical sites, as assessed during the check survey. However, there are schools, places of worship, and a market place located beyond the RoW.</p> <p>The overall impact on land holdings in the RoW can be ascertained after conducting a socio-economic survey, which will be carried based on approved check survey report. Since most of the community members and villagers primarily depend on agriculture as a source of livelihood, the impact significance is considered medium.</p>
Additional mitigation measures	<p>Utmost care will be taken to avoid crop damage and the construction activity will be carried-out during lean season. In addition to this, an Abbreviated/ Resettlement Action Plan (A/RAP) shall be prepared for the transmission line route in keeping with applicable reference of Environmental and Social Management Planning Framework (ESMPF) requirements. In addition, compensation will be paid to affected households and individuals before commencement of work. A GRM shall also be established for affected people to raise any related concern.</p>
Residual impact significance	<p>The residual impact significance of the impact on private land owners in Tower Base Area and below conductors during Stringing Exercise is anticipated as moderate.</p>
<p>Economic Loss to private land owners within RoW due to imposition of land use restrictions</p>	
Context and receptor	<p>The economic loss to private land owners within the RoW can be determine after conducting the socio-economic survey report, which will be carried out based on approved check survey report.</p> <p>The alignment will mostly pass through agricultural land, resulting in the loss of areas used for paddy (rice) cultivation.</p> <p>In keeping with these that the MoP guidelines as well as Government of Assam Notification on land compensation for tower footing and RoW Corridor on 10th March 2017 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024 for payment of compensation for land within the RoW and the base area have been introduced. These guidelines were formulated based on a report submitted by a committee headed by the special Secretary of the Union Power Ministry. This report noted the resistance being posed by land owners and farmers to the construction of transmission lines, demanding higher compensation owing to the diminution of land value below towers and under the corridor.</p>
Embedded/ in built measures	<p>Compensation for RoW area will be paid to the individual land owners as per compensation procedures and in line with RAP. Further, in line with the guidelines</p>

	of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024. which stipulates compensation of 200% for tower footing area and 30% for RoW
Impact Significance	The land within the Right of Way (RoW) is currently used primarily for agriculture, with crop heights not affecting safety clearance, allowing continued cultivation. While some road-facing plots have potential for future non-agricultural use, restrictions on land-use will have a lasting impact on such conversions. However, these areas were largely avoided during the check survey, and as a result, the overall impact is considered Small .
Additional mitigation measures	-
Residual impact significance	The residual impact significance of the impact on private land owners within RoW due to imposition of land use restrictions is assessed as low .
Impact on Community Health and Safety	
Context and receptor	The receptors for impacts on community health and safety include project site workers, settlements in the close proximity of the project site, which will be exposed to health impacts from the project activities. The construction phase activities such as construction of transmission lines and movement of material and personnel may result in impacts on the health and safety of the community. As mentioned earlier in the report, the transmission line will pass through villages and will thus lead to significant impact on community health and safety during construction phase. Construction activities will involve the use of heavy machinery and live transmission power lines. Furthermore, the movement of material and personnel via the access roads may result in damage to human life or livestock due to accidents. The major community health and safety risks include structural failure of project infrastructure, life and fire safety, public accessibility and management of emergency situations. Based on the above analysis, the impact magnitude is assessed to be .small. Moreover, the potential for GBV/SEA/SH increases due to the presence of migrant male workers, especially in areas where there is close proximity between workers and local women and girls. Limited access to legal, health, and social services further heightens the vulnerability of affected populations. Additionally, social stigma and a lack of awareness regarding GBV-related issues contribute to underreporting and inadequate response mechanisms."
Mitigation measures implemented	The provisions for safety of the workers will be complied as per the provision of the EPC contractor agreement. The Contractor should conduct continuous awareness raising and training activities to ensure that workers abide by the Code of Conduct. Moreover, the Code of Conduct should be in local language (Assamese) and signed by each workers/labour. The format for CoC is appended at Appendix-10 . The establishment of a Grievance Redress Mechanism (GRM) will also include provisions to address grievances related to Gender-Based Violence (GBV) sensitively and confidentially.

Impact Significance	The impact to community health and safety during the construction phase is evaluated to be of minor to moderate significance due to proximity of the TL line passing through different villages. However, the significance of impact decreases because the project site consists of medium density of population and most of the unskilled labour will be engaged from the local habitation.
Additional mitigation measures	
Residual impact significance	After the implementation of the additional mitigation measures, the impact significance is expected to become negligible .
Impact on Economy and Employment in the Study Area	
Context and receptor	The construction phase of the project resulted in the creation of employment and economic opportunities for the local community. These economic opportunities comprised of the following: <ul style="list-style-type: none"> • Engagement of the local community as labourers in the project; • Contracting opportunities for locals possessing tractors, dumper trucks or other vehicles which would be needed to carry away excavated soil and other material. • Creation of indirect employment for local community through establishing small shops like tea stalls, supply of intermediate raw materials, repair outlets, hardware stores etc. However, these are likely to be temporary.
Mitigation measures implemented/observed on site	It is foreseen that the contractor would give preference for unskilled/semi-skilled workers from the local community. It is anticipated that around 90% of workers during the foundation activities would be locally hired workers.
Impact Significance	The overall impact significance of the impact on economy and employment during the construction phase is assessed as Small..
Impacts Due to Migrant Labour	
Context and receptor	As anticipated, the unskilled labourers may be recruited from the local villages, while the semi-skilled and skilled labourers may be hired from other districts of Assam. The labour camps shall be setup nearby the tower foundation work. These camps shall be set up by the contractors. The laborers shall be engaged from similar cultural background which reduces the chances of conflicting cultural values with host population and are benefiting the small business owners in the villages as customers.
Mitigation measures implemented	The EPC contractor engaged for the project is responsible for ensuring adequate accommodation facilities for the labourers. The key requirements of the ESMP in terms of the labour accommodation are as follows: <ul style="list-style-type: none"> • Contractor shall provide necessary water supply, sanitation, drainage and medical health facilities at campsite. • Contractor shall provide PPE such as safety goggles, helmets, safety belts, ear plugs, mask etc. to staff, workers and laborers. • Reverse horn for all construction equipment and vehicles should be kept in working order. • Required electrical safety measures such as double earthing for heavy electrical equipment, machinery, providing earth link circuit breaker (ELCB) for all electrical connections shall be undertaken by the contractor.

	<ul style="list-style-type: none"> • The contractor shall comply with all regulations regarding safe scaffolding, ladders, working platforms, gangway, stairwells, excavations, trenches and safe means of entry and egress. • The contractor shall also ensure that no paint containing lead or lead products is used except in the form of paste or readymade paint. • Contractor shall provide facemasks to the workers when paint is applied in the form of spray or a surface having dry lead paint is rubbed and scrapped. • The Contractor shall mark ‘hard hat’ and ‘no smoking’ and other ‘high risk’ areas and enforce non-compliance of use of PPE with zero tolerance. • Maintaining first aid at construction sites. • Maintaining emergency response system. • Provision of waste collection and segregation with two bins systems (bio-degradable and non-bio degradable) and encourage labours to use the same; • Waste disposal- identifies existing locations for waste disposal in the area or creates safe disposal pits for biodegradable waste. Non-biodegradable waste shall be stored and disposed to nearest Municipal waste disposal facility.
Impact Significance	As this impact is restricted to the construction phase and the proportion of workers population is anticipated to be minimum, the impact magnitude is assessed as small. The labour camps shall usually be established in close vicinity of the village settlements; the sensitivity of the local community is assessed as low. As per the impact significant assessment matrix a combination of small impact magnitude with low receptor sensitivity results in impact significance as small to low.
Additional mitigation measures	The following additional mitigation measures would be taken to mitigate the negative impacts due to migrant labour: <ul style="list-style-type: none"> • The monitoring should be undertaken adequately to ensure the contractor’s • Compliance to the applicable rules and regulations and provisions as per the contractual agreement with EPC contractor. • The implementation of the GBV CoC for all workers • The health checkup for the migrant workers would be done before starting of construction activities, • The grievance redressal mechanism for the project can be access by the local community and labourers and can receive GBV related cases.
Residual impact significance	The residual impact significance will remain negligible

6.5.2 Impacts during Operations Phase

Table 6.9: Impacts on social environment and mitigation measures during Operation Phase

Impacts of economic loss due to damage to standing crops during Maintenance work	
Context and receptor	<p>During the operations phase, it is anticipated that it may loss the crop and tree due to the following:</p> <ul style="list-style-type: none"> • Due to movement of personnel and machinery for maintenance activities it may loss the crop. • Trimming of trees and vegetation in the RoW.
Planned / Implemented	The compensation for the impacts of crop loss will be paid in keeping with the Electricity act, 2003 and Government of Assam Notification on 10th March 2017 and

Mitigation Measures	new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) MoP new guideline March 2025 & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024. The assessment of loss will be done in the presence of the land owners. Further details regarding the application of this Act and the compensation amounts provided to the affected landowners will be included in the ARAP/RAP report.
Impact Significance	As the impact of maintenance activities along the RoW are expected to be limited and there is possibility of crop loss during emergencies or major repairing work. However, since the community is primarily dependent upon agriculture as a source of livelihood, the sensitivity is assessed as Medium. As per the impact a combination of small impact magnitude with medium receptor sensitivity results in impact significance as Medium to moderate .
Additional mitigation measures	-
Residual impact significance	-
Impact on Community Health and Safety	
Context and receptor	The impacts on community health and safety during the operations phase are likely to result from: <ul style="list-style-type: none"> • Movement of traffic and machinery for maintenance; • Tower falling; • Wire snapping; • Exposure to herbicide/pesticides used for maintenance of RoW; • Electro-Motive Force (EMF) generation and electromagnetic interference; • Electrocutation The above-mentioned impacts are likely to be restricted to those using the land within the RoW.
Planned /Implemented Mitigation Measures	<ul style="list-style-type: none"> • Conduct public awareness and education and physical measures the risks will be reduce during operation and also by attaching an appropriate warning sign on all faces of the tower; • Once the stringing work is complete, notices and permanent anti climbing devices will be installed on the tower. • The operational start date for electricity transmission and safety implications will be publicized locally in advance.
Impact Significance	There may be impact which is anticipated in the receptors within the RoW is Small to Low
Additional mitigation measures	The following additional mitigation measures have been identified for reducing the impacts on community health and safety: <ul style="list-style-type: none"> • Undertaking health awareness among the local community focused on aspects such as electrical safety, risks of climbing the towers, do’s and don’ts in case of wire snapping or tower collapse etc. • Undertaken awareness campaigns in the school regarding the hazards from the Transmission lines and the do’s and don’ts in case of any emergencies. • Access of the local community to the grievance redressal mechanism established by the project.

Residual impact significance	After the implementation of the additional mitigation measures, the impact significance is expected to be reduced to negligible.
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6.6 Summary of Impact Assessment

Table 6.10: Summary of Impacts

Category	Impact Significance (Without mitigation measures)	Significance (post-mitigation)
Construction Phase Impact		
Land use and Land cover	Medium	Moderate
Soil environment	Medium	Moderate
Water resources and quality	Medium	Moderate
Drainage	Small	Low
Ambient air quality	Medium	Moderate
Ambient noise level	Medium	Moderate
Occupational health and safety	Small	Low
Flora and fauna- vegetation Clearance	Small	Low
Flora and fauna- Construction Activities	Small	Low
Impact on critical wildlife habitat	Small	Low
Impact on Private Land owners in Tower Base Area and below conductors during Stringing Exercise	Medium	Moderate
Impact on private land owners within RoW due to imposition of land use restrictions	Small	Low
Impact on local community due to loss of grazing land for Grid Sub-station	Small	Low
Impacts Due to Migrant Labour	Small	Low
Impact on Community Health and Safety	Small	Low
Impact on Economy and Employment in the Study Area	Small	Low
Operation Phase		
Soil Environment	Small	Low
Noise level	Medium	Moderate
Visual Impacts	Small	Low
Electro-magnetic fields	No change in impact significance rating	
Health and safety	Small	Low
Flora and fauna- Collision and Electrical hazards for avifaunal species	Medium	Moderate
Impacts of economic loss due to damage to standing crops during Maintenance work	Medium	Moderate
Impact on Community Health and Safety	Small	Low

6.7 Overall cumulative and induced impacts of the project

Overall cumulative impacts are the effect on the environment that results from the incremental effects of a project in addition to other projects in the environmentally relevant area that might reasonably be expected to affect the same environmental resources, including future projects actually planned or for which a basis of expectation has been laid, regardless of what person undertakes the other projects or what jurisdictions have authority over the projects.

Induced impacts

Induced impacts refer to the broader effects that occur as a result of the transmission line project itself, which may not be immediately apparent but can unfold over time. These can include both positive and negative consequences that extend beyond the immediate scope of the project.

a. Environmental Induced Impacts

Land Use Changes: Establishment the transmission line may stimulate land use changes, including agricultural intensification, urban sprawl, or industrial development, which can increase pressure on local ecosystems.

Climate Change Effects: The transmission of electricity might enable greater reliance on energy-intensive industries or projects, leading to increased emissions over time, either directly or indirectly.

Pollution from Indirect Sources: As energy supply increases, it may attract more polluting industries (such as mining, manufacturing, or chemical production), leading to higher levels of industrial waste, air emissions, and water contamination.

b. Social and Economic Induced Impacts

Economic Growth and Job Creation: The project will likely induce economic activity, including the creation of new businesses, increased investment, and job opportunities in the area. However, the economic benefits may be unevenly distributed, leading to potential socio-economic disparities within the community.

Improved Access to Energy: The improved electricity infrastructure could indirectly promote local development, including better access to education, healthcare, and other services, enhancing overall quality of life.

Increased Traffic and Transportation Demands: The increased demand for goods, services, and workforce associated with the project may lead to higher traffic volumes, road wear, and congestion, impacting local transportation networks and road safety.

7 CLIMATE RISK AND ADAPTATION AT THE DESIGN STAGE

Following are the few climatic parameters along with remedial measures adapted for Transmission Line at design stage.

7.1 Temperature Rise

Climate Risk: Conductors elongate due to the increase in temperature which results in the reduction of ground clearance of transmission lines. This typically intensifies the risk of flashovers.

Adaption: By using higher rated conductors HTLS, this sagging affect of transmission lines can be reduced. Conductors made of material that can operate at higher temperatures yet causes lower sag (high temperature low sag or HTLS) may need to be specified at the project design. Strengthening of the towers, tower footings, conductors for extreme heat events, protective coatings to reduce dust deposits on insulators.

ACSR / AAAC conductor for new proposed lines, it's economical than HTLS.

7.2 High Winds and Storms

Climate Risk: High winds and storms can cause mechanical damage to overhead lines, towers, and poles etc. directly and by blowing debris against exposed grid system components indirectly. In transmission lines, high winds may lead to flashovers caused by live cables galloping and thus touching or getting too close to each other. Strong winds can blow trees over overhead lines and short circuit lower lying distribution grid system cables.

Adaption: Designing transmission towers to withstand the highest projected wind loadings, more frequently inspecting and maintaining their integrity, rerouting lines alongside roads or across open fields, more frequently and drastically trimming trees, and more effectively forecasting storms and hurricanes are examples of a wide range of already established adaptation options that may need to be increasingly used in the future.

As per latest Indian standard IS802-2015 (part1/sec1) the following changes will resolve tower failure from old code design. Such as:

1. Drag co-efficient for evaluating wind load on towers have been stipulated for different sections & the change in Drag Co-efficient for different solidity ratios.
2. Load combination for sag tension of conductor and ground wire / optical ground wire (OPGW) and for climate loads have been modified.
3. Narrow Front wind to be considered for Suspension tower.
4. For suspension tower, the loading condition also updated as 75% EDT wind to consider for wire loading calculation.
5. In Addition, the Wire loading also included additional load cases with angle of wind direction in 0, 30, 45 Deg.
6. Material requirement for bolts and nuts have been modified.
7. Tower should be tested as per provisions of relevant Indian standard and observed until the specified waiting period is over.

However, the above changes will affect the design margin and objectives are to optimization in Tower design.

7.3 Thunder & Lightning Risk

Climate Risk: Thunder and lightning can cause transmission lines to trip and become temporarily unavailable for operation. The extremely high voltages of a lightning impulse can result in short circuits which can lead to permanent damage of conductors, insulators and the structures.

Lightning close to or directly on-line conductor's produces ionized gases that can cause a short circuit fault as the electrical protection disconnects the affected circuit. Such flashover faults may increase in many regions owing to greater lightning frequency.

Adaption: Vulnerability can be reduced by adding earth and fitting spark gaps and surge arresters.

A lightning arrester is placed where wires enter a structure, preventing damage to transmission lines within and ensuring the safety of individuals near them. Lightning arresters, also called surge protectors, are devices that are connected between each electrical conductor in a power system, and the Earth. They prevent the flow of the normal power or signal currents to ground, but provide a path over which high-voltage lightning current flows, by passing the connected equipment. Their purpose is to limit the rise in voltage when a communications or power line is struck by lightning or is near to a lightning strike.

7.4 High Temperatures

Climate Risk: Losses in transmission efficiency due to gradual warming are relatively small compared with the physical and monetary damage to power transmission networks that can be caused by hot weather conditions. Transmission losses increase far beyond the level caused by the higher average temperatures. Expanding cables might trigger flashover to trees underneath, and extreme high temperatures can make lines and transformers overheat and trip off. Adaptation can include a mix of measures like enhancing system capacity, increasing the tension in the line to reduce sag and adding external coolers to transformer.

7.5 Flooding

Climate Risk: Flooding caused by heavy rains and storm, rerouting lines across less exposed regions is another option to consider. Increasing heavy rain may cause flashover faults across high voltage insulators and short circuits in high voltage circuit breakers. The intensity of the flash flood is enough to wash away the foundations of the collapsed tower.

Adaptation: Rerouting of line will increase line length and pile foundation cannot be avoided in the alternate route.

The improved design of insulators, careful siting and enhanced maintenance can mitigate vulnerability to these impacts. Surges would damage equipment at ground level. Improving insulator design, siting ground installations outside hazard zones and reinforcing supporting elements can help reduce these impacts.

Pile type foundations may be considered for towers in flood prone areas based on soil investigation reports and latest high flood data.

By Providing Proper Revetment and use of geo-synthetic material in foundation, concrete encasing and painting of stub in water logging areas etc. may also be considered, wherever required.

Coping of chimneys of tower foundation, wherever required, should be taken up to avoid rusting of stubs. The power transmission design of individual components has changed but the materials of construction remained virtually the same. Thus, by using steel and cast iron (bare, painted or galvanized), aluminum alloys and copper alloys. To enhance the corrosion resistance of these materials various treatments, coatings and inhibitors are applied which enhance the life of the transmission lines.

7.6 Drought

Climate Risk: Drought conditions are particularly risky when vegetation close to overhead lines dries out. The dry undergrowth can be ignited by flashover if it comes into contact with line conductors. Ionized air in the resulting smoke and combustion particles may turn into an electricity conductor that would cause multiple luminous electrical discharges (arcs) on the overhead line.

Forest or bush fire caused by drought can also damage overhead lines directly by damaging conductors and insulators and by burning wood poles.

Adaptation: Trimming back vegetation to a safe distance within and along the borders of transmission corridors is the most obvious way to reduce vulnerability to this type of weather hazard. Depending on regional circumstances, routing transmission lines to areas without high growing flora may also need to be considered.

7.7 Landslides

Climate Risk: The failure of towers might have been caused by the landslides triggered by continuous rain for few weeks. The landslide might have caused the complete sliding away of the supporting soil which might have caused the deformation in tower.

Adaptation: To explore the possibility of Proper Drainage and protection work / retaining wall for foundation of towers in hilly terrain to avoid such incidences.

7.8 Earthquakes

Based on international journal reference, the behaviour of steel transmission tower at the action of seismic load and wind load is studied by conducting large deformation and elasto-plastic analysis.

For the analysis, the earthquake parameters taken. Based on the analysis, it is reported that the maximum displacement of the tower in seismic analysis and there will be no buckling in the main leg members while compared to that of the wind response analysis.

Analysed the behaviour of transmission line towers through the non-linear time history analysis of transmission towers on sloped ground has been carried out for different height, bracing system and also with the provision of base isolators using SAP2000(software).

From this analysis report it has been found out that the ability of tower to withstand the earthquake forces could be increased with the provision of non-linear rubber isolator and the provision of eccentric bracing system has greater effect than other two X & V bracings.

However, concluded that this kind of transmission tower would be safer even in severe earthquake (zone 5) which satisfies both serviceability and collapse criteria.

Earthquake factor has been considered in Tower loading for foundation design.

8 STAKEHOLDER & PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

Carry out meaningful consultation with Project-affected people and other stakeholders and facilitate their informed participation in the consultations. Meaningful consultation is an interactive process to provide information and facilitate informed decision-making that: (a) begins early in the preparation stage of the Project to provide accurate information on the proposed Project, minimize misinformation and unsupported expectations, and obtain initial views on the Project;

(b) Is carried out on an ongoing basis throughout the implementation and life cycle of the Project;

(c) Is designed so that all relevant parties have a voice in consultation, including national and subnational governments, the private sector, nongovernmental organizations and people affected by the Project, including, as applicable, Indigenous Peoples;

(d) Provides additional support as needed so that women, elderly, young, disabled, minorities and other vulnerable groups participate;

(e) provides timely disclosure of relevant and adequate information, including availability of the Project's GRMs and of the PPM or other Bank-approved IAM, which is understandable and readily accessible to the people affected by the Project and other relevant stakeholders; (f) is undertaken in an atmosphere free of intimidation or coercion; (g) is gender sensitive, inclusive, accessible, responsive and tailored to the needs of vulnerable groups; and (h) enables the consideration of relevant views of people affected by the Project and other concerned stakeholders in decision-making. Continue consultation with Project-affected people throughout Project implementation as necessary on issues related to environment.

8.1 Public Consultation

The community consultations are carried out in all the villages along the transmission line corridor with local habitants where Sixty one (61) participants were participated in the of 220KV D/C line from Samaguri to Mariani Transmission line at Jakhalabandha S/s like economically weak communities, women, vulnerable groups and other local community leaders nearby the proposed transmission line on 10th April 2025, 11th April 2025, 14th May 2025, 15th May 2025, 18th July 2025, 19th July 2025 and 22nd July 2025. The detail of the same is provided in **Table 8.3** below.

The transcript of these discussions will help AEGCL and EPC contractor for proper needs assessment to ensure the issues raised by people are addressed appropriately. Consultation will be carried out on an ongoing basis throughout the sub-project cycle.

Community welcomed the construction of proposed Transmission Lines. No major environmental and social issues were raised during the consultation process. Most of the project affected families asked about the payment procedure of tower footing area, access road and RoW by the PAF. Further, the PAF has shown their interest on unskilled works on temporary basis when the civil works are initiated.

Local people are waiting eagerly for the implementation to start, so they could receive their compensation amount and hoped for some employment generation.

Attendance sheet of consultation with public and some photographs are provided in **Appendix -4A & 4B**. Keeping in mind the nature of the project and its setting, the key stakeholders' groups have been identified and listed in the table given below.

Table 8.1: Stakeholder Group Categorization

Category	Primary Stakeholder	Secondary Stakeholder
Community	<ul style="list-style-type: none"> • Project Affected Families/Land Owners of the transmission line • Local Community like Women’s self-help groups (SHGs) active in villages • Vulnerable group including female headed households/ Indigenous Peoples/People below poverty line/Handicapped/Youth/Orphanns/ Landless laborers, etc, 	<ul style="list-style-type: none"> • Opinion holders & • Community Leaders
Government Bodies/ Institutional Stakeholders	<ul style="list-style-type: none"> • Local Gaon Panchayats • Regulatory Authority like Circle Office/Agriculture/Horticulture /Forest deptts etc. • District Administration i.e. Deputy Commissioner 	<ul style="list-style-type: none"> • State Administration
Other Groups	Contractors and sub-contractors <ul style="list-style-type: none"> • Labours/ Workers • Civil Society Organisation • Non-Government Organisations 	

The Focus Group Discussions with local organization, women’s groups, including Self-Help Groups in the villages of the affected area, were conducted on 22nd July, 2025. Sample photographs are provided below for reference, and the attendance sheet is included in **Appendix- 4C**.



Table – 8.2: Summary of Public Consultation

Issues Discussed	People’s views and perceptions
General Perception	Majority communities (including women) were aware of the construction of LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S. Some have heard it but not sure about the details of the proposed Transmission line work. All the people were positive and supportive towards the construction of proposed Transmission Line.

Issues Discussed	People's views and perceptions
Support of local people for the construction of Transmission line to to Jakhalabandha GIS	Most of the communities expressed their support during implementation of the construction of proposed Transmission line to Jakhalabandha GIS. They are happy for contribution of Government of India's effort towards construction of proposed Transmission line to Jakhalabandha GIS. Most of the communities expressed that there should be no adverse impact due to the construction of proposed Transmission line.
Critical issue and concern by the local people for the proposed Transmission Line to Jakhalabandha GIS substation locations.	Most of the communities expressed that there were no critical issues regarding the construction of proposed Transmission line to Jakhalabandha GIS.
Project site selection criteria (Proposed Transmission lines)	The community held the view that the project should avoid/minimize harm to vegetation's and places of community importance such as structure/CPR or community gathering places etc. Some of them suggested that necessary precautions must be taken to ensure safety of people during construction of construction of proposed Transmission line to Jakhalabandha GIS.
Employment potential in the construction of proposed Transmission line to Jakhalabandha GIS.	The community felt that, during construction/operation of the proposed Transmission line to Jakhalabandha GIS, there may opportunities to local unemployed people for self-supporting business activity like establishment of small hotel/tea stall/ grocery shop etc. Some of them requested that they should be involved not only in unskilled labour job but also in the supervisory work. They complained that the construction work is generally handed over to contractors who would bring their own labour force from outside. Some others felt that construction of Transmission lines under the project will ensure proper and better power connection/ households' electricity as a result small and medium scale business can be started in the area.
Socio economic standing: land use, cropping pattern	The major sources of livelihood for the communities are agriculture, wage labour and small business. Most of the communities practiced one time cropping in a year, mainly paddy and vegetable cultivation.
Source of drinking water	The main sources of drinking water are hand pump and tube well. The other sources of drinking water are ring well and tube well. Few people complained about the taste of the drinking water due to iron content in the water and thus they are using simple sand filter for portable use of water. Moreover, the availability of water is good as the water table remained high except in winter season.
Negative impact on food grain, availability /land use	In general, the communities did not see any adverse impact on food/grain availability, as the constructions of proposed Transmission line to Jakhalabandha GIS will be within the RoW of 35mts for both the LILO 220 kV TL. The compensation for using the land in tower footing and RoW will be paid by AEGCL to private land owners.
Will project cause widespread imbalance by	The tress falling under the RoW of the Transmission lines will either cut or trim in the proposed Transmission line to Jakhalabandha GIS, the communities will be paid for the same as per government approved rate.

Issues Discussed	People's views and perceptions
cutting fruit and commercial trees in the locality	
Will project cause health and safety issues	Most of the communities did not foresee any health or safety issues from the construction of proposed Transmission line to Jakhalabandha GIS. Some of them suggested that necessary precautions must be taken to ensure safety of people during construction of proposed Transmission line to Jakhalabandha GIS.
Protected areas	No protected area envisaged in the vicinity of the proposed Transmission line.
Will project setting change migration pattern of animals	The communities consulted were conscious of the presence of migrant birds or animals in their localities and nearby proposed Transmission line. They therefore anticipated that no any major impacts on animals, birds or their habitats from the construction of proposed Transmission line to Jakhalabandha GIS.
Migration pattern	Majority of the communities reported outward migration of young generation especially the boys to big cities in search of work. The popular destinations of migration were Guwahati, Hojai, Nagaon and Sonitpur for job as well as for factory jobs. There are very few cases of migration to capital cities of north eastern states in search of work.
Perceived benefits from project	Majority of them viewed that the construction of proposed Transmission line to Jakhalabandha GIS would contribute to minimize the prevailing energy crisis such as load shedding, and low voltage in the region. The people hoped that project will address the problems of low voltage, and irregular power supply to the households. For some it will increase the rate of rural electrification and provide impetus to open small and medium business units in the area.
Perceived loss	It will be temporary in nature due to loss of crops, trees and structure and can be compensated by AEGCL.

8.2 Continuous Consultation and Participation

AEGCL with PMC will carry out meaningful consultation as per requirement (Monthly consultation with local people nearby the Transmission lines passing through different villages by PMU, PIU and PMC along with EPC Contractor) with project affected families and other concerned stakeholders, including civil society and facilitate their informed participation. Consultation process undertaken under the directions of the PMU (i) will begin in the sub-project preparation stage and will be carried out on an on-going basis throughout the sub-project cycle (ii) will provide timely disclosure of relevant information that is understandable and readily accessible to groups and individuals, and specially women; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) will be gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) shall enable the incorporation of all relevant views of affected people and other stakeholders into decision making, such as subproject design, mitigation measures, the sharing of development benefits and opportunities and implementation issues. Consultation will be carried out in a manner commensurate with the impacts on affected communities. The consultation process and its results will be documented and reflected in the environmental and social monitoring report. Feedback about project should be obtained time to time from PAFs during consultation. PAFs may approach GRC if any grievances arise.

8.3 Public Consultation Information Disclosure

AEGCL will submit to AIIB the following documents for disclosure on AIIB's website: (i) the final ESIA; (ii) a new or updated ESIA and corrective action plan prepared during sub-project implementation, if any; and (iii) the environmental and social monitoring reports.

AEGCL will provide relevant environmental information, including information from the above documents in a timely manner, in an accessible place and in a form and local language(s) understandable to affected people and other stakeholders in accordance with the AIIB's ESP 2019.

ESIA results will also be communicated to the local community before commencement of construction through posting on the website of AEGCL and other suitable means as well as providing a mechanism for the receipt of comments.

The information disclosure mechanisms adapted during consultation process are to identifying stakeholders who may be affected by the transmission line project. This includes:

- Local communities and residents along the transmission corridor.
- Landowners and people whose land or properties might be impacted.
- Indigenous groups or communities with specific land use and cultural practices in the area.
- Government agencies responsible for regulating environmental, land use, and energy sectors.
- Environmental and social organizations monitoring the impacts on natural resources and communities.
- General public in areas that might experience indirect impacts, such as noise or visual disruption.

The Public Consultation is organized at community level where the transmission lines are passing, typically at key point's area along the route. Public meetings allow the project team to present the project, answer questions, and gather feedback and Focus Group Discussions with smaller, targeted discussions with specific groups (e.g., women, indigenous groups, and farmers) are held to understand their unique concerns and needs.

ESIA - ESMP will be disclosed online on the website of AIIB and AEGCL. The executive summary of ESIA – ESMP shall be translated in local language (Assamese) and the same will be disclosed on the website of AIIB and AEGCL. Their hardcopies in English and executive summary in Assamese language are shall be available at the following locations.

1. PMU: Project Director,
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.coc.in
2. PIU: Project Manager
Address: AGM, 220/132 kV Samaguri GSS, AEGCL
Email: agm.samaguri@aegcl.co.in

ESMPF is disclosed in AEGCL website: <https://www.aegcl.co.in/aiib-project-details/>

Stakeholder Consultations undertaken as Part of the ESIA Process

As part of the ESIA for the project, the following consultations were undertaken.

Table 8.3: Consultations undertaken for the Project

Sl. No	Date	Stakeholder Details	Location	No. of Participation	Issues discussed
1.	10 th April, 2025	Discussion with local community at 220kV Samaguri- Mariani transmission line	Seconee pathar	7 nos.	<ul style="list-style-type: none"> ● Discuss with the local community about details of the project and understanding the project, the construction of proposed Transmission lines works to Jakhalabandha substation. ● Payment procedure of land compensation, Trees and crop compensation process to the landowners. ● Other impacts associated with transmission lines and approach to minimizing the impact. ● The documents required to be submitted from the landowners for disbursement of Compensation for tower footing, RoW and zirat compensation, etc. ● Discuss regarding the common property resources such as cemetery, school, community hall, hospitals, Mandir, Masjid, habitation areas etc. shall be completely avoided while finalizing the route of lines/check survey. If any utilities is found during the check survey measures will be taken to avoid public utilities (diverting the lines). ● Also informed the
2.	11 th April, 2025	Discussion with local community at 220kV Samaguri- Mariani transmission line	Borholagaon	3 nos.	
3.	14 th May, 2025	Discussion with local community at 220kV Samaguri- Mariani transmission line	Borholagaon	6 nos.	
4.	15 th May, 2025	Discussion with local community at 220kV Samaguri- Mariani	Seconee Pathar	6 nos.	
5.	18 th July 2025	Discussion with local community at 220kV Samaguri- Mariani transmission line	Borholagaon	11 nos	
6.	19 th July, 2025	Discussion with local community at 220kV Samaguri- Mariani transmission line	Seconee Pathar	15 nos.	
7.	22 nd July, 2025	Discussion with local community at 220kV Samaguri- Mariani transmission line	Seconee Pathar	5 nos.	
			Borholagaon	8 nos	

					community that Grievance Redressal Committee is formed for the project, the local community may directly approach the Grievance Redressal Committee if any grievances arise at site.
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As part of these consultations an attempt was made to develop an understanding of the stakeholder group's key concerns and expectations from the project, the stakeholder group's perception of the project and to triangulate the secondary information available on the area.

9 GRIEVANCE REDRESS MECHANISM

General overview of the Grievance Redress

Mechanism Assam Intra-State Transmission System Enhancement Project

9.1 Objectives

The Assam Intra-State Transmission System Enhancement Project (the Project) aims to strengthen Assam's electricity transmission system. As the Project is funded by the Asian Infrastructure Investment Bank (AIIB), it complies with the Environmental and Social Framework and the Policy on the Project affected People's Mechanism of the AIIB. The Environmental and Social Management and Planning Framework (ESMPF) of the Project provides for the establishment of a Grievance Redress Mechanism (GRM). The GRM is a free system that registers and attempts to resolve concerns or complaints by Project-affected people (PAPs) or construction workers. This process aims to quickly resolve disputes and avoid litigation, thus ensuring the smooth implementation of the project activities.

At all levels of the project Grievance Redress Mechanism, the Grievance Redress Committee members should uphold the objectives of the GRM and strive to achieve them. The primary objectives of GRM are: Provide an accessible, transparent, efficient and predictable mechanism for resolution of grievances to all projects by:

- Popularizing the GRM and how it can be accessed for free.
- Receiving grievances in various possible forms (Written, Verbal, Electronic, Email, Social Media, Telephone, Fax, Suggestion Box)
- Establishing clear procedures for redress that covers:
- Registration in the GRM logs all grievances (including minor and verbal).
- Acknowledgement to the complainant, explaining expected duration for resolution.
- Investigation of the grievance, proposing a solution to the complainant and if acceptable closure of the complaint. OR
- Escalation of the grievance to Tier II which should be communicated to the complaint.
- Investigation of the grievance, proposing a solution to the complainant
- Provision of feedback and closure of the grievance in the GRM Log.
- Complaint should be made aware that:
- There is no retribution or intimidation for complainants.
- Access of the GRM is free for the complainants.
- The GRM does not replace the judicial system
- .Observe for any repeated complaints and inform PMU of such for their systemic resolution.
- Providing an environment that fosters free and honest exchange of information, views, and ideas.

9.2 Stakeholders with Grievances

It is likely the following categories of stakeholders may have grievances and file the grievances for redressal. They are

- Individuals, both men and women
- Communities/ Groups of individuals
- Project workers – local and migrant
- Community Based Organizations or Common Interest Groups

- Firms, Companies, Enterprises, Service Providers, and other businesses
- National/ International Non-Government Organization (NGOs)

Table 9.1: Roles and Responsibilities of GRC Member

PMU/ PIU GRC Members	Community GRC Member
<ul style="list-style-type: none"> ● Receives grievance from complainant and record them in a logbook. ● Acknowledge receipt of complaints with a written record. ● Arrange for GRC meetings to consider the grievances. ● Work closely with the GRC members to develop and implementing actions to resolve grievances. ● Prepare minutes of GRC meetings and record solutions. ● Provide feedback information on the status of resolution to the complainant within assigned timeline. ● Review grievance response and submit to Contractor/PIU/PMU for approval or implementation. ● Submit proposed solutions to the complainant within assigned timeline. ● Ensure proper logging, escalation, tracking, reporting, and following up on all project specific grievances. ● Swiftly escalate any grievances that cannot be resolved at the project level or may pose a big reputational risk to the project. This includes any complaints related to the health, safety, dignity, and wellbeing of any person (both men and women). ● Notify PMU within 12 hours of any grievances that require investigation or intervention by the police or other relevant authorities. ● Provide monthly update to a member of the PMU who will track grievances and always include a section on grievance management in the monthly progress report. 	<ul style="list-style-type: none"> ● Popularize the existence, functions, and accessibility of the GRM among all project affected people, both men and women. ● Encourage key community members to facilitate submission of complaints, if needed. ● Attend regularly and actively participate in GRM meetings to review and provide solutions to project related grievances. ● Facilitate and immediate resolution of grievance. ● Accept and record grievances from community members. ● Facilitate the communication of the response of the GRC to complainants/ aggrieved. ● Keep communicating project related matters to GRC/ PIU.

Table 9.2: Most Common Grievances and Redressal

Common Grievance Categories	Issues and Likely Solutions
Technical/ Engineering	<ul style="list-style-type: none"> ● Design related – Suit the design to the site. Restrict the width according to the available land and modify the design accordingly;

Common Grievance Categories	Issues and Likely Solutions
	<ul style="list-style-type: none"> ● Alignment related – Always use GPS coordinates. In case of problem contact Revenue department to correct the alignment; ● Quality related – Get the materials and finished product tested at reputed laboratories and publicize the results.
Environmental	<ul style="list-style-type: none"> ● Storm water – Do not obstruct or divert natural drainage. Provide for culverts or bridges where necessary ☑ Stone blasting – Take precautions as per law and inform the communities accordingly ● Dust – Keep watering as required so that dust doesn't spread or rise. ● Noise – Use barriers at sensitive receptors and take up work at appropriate timings. ● Uncovered borrow areas – Dig borrow pits as per specifications. ● Waste Disposal – Dispose of waste at designated places only.
Social	<ul style="list-style-type: none"> ● Disruption of other existing public services e.g. hospitals, schools, Water and electricity supply – Consult communities and minimize the disruption of service. Provide alternative supplies. ● Historical and Cultural sites – Follow the government guidelines on this. Do not deface any historical or cultural sites. ● HIV/AIDS issues – Follow the government SoP for these. Conduct awareness campaigns among the communities and workers. ● Child labour – Avoid child labour. No children below 18 years on work. No children below 18 years on hazardous work. Further, the children between the ages of 16 and 18 may be engaged in the project only after conducting a risk assessment and ensuring that their health, safety, and morals are safeguarded. Sexual Exploitation and Abuse /sexual harassment and Gender-Based Violence – Conduct awareness camps among workers and community. Have a code of conduct. Set up Internal Complaints Committees to redress gender related grievances.
Land, Compensation and Resettlement	<ul style="list-style-type: none"> ● Non-payment of compensation money – Do not take possession of land before paying full compensation. ● Underpayment of compensation money – All compensation valuation has to be done as per the LA Act 2013 and verified before payments. ● Disputes of land ownership – Refer to Revenue Department for measurement and survey to decide on the ownership. ● Injurious affections such as cracks in buildings, damages to properties – Do take care not to cause damage to houses. Repair all damages and bring them back to original status. ● Boundary queries between PAPs – Do not get involved in this. Leave these matters to PAPs to decide themselves.
Road Safety	<ul style="list-style-type: none"> ● Accidents – Report immediately to PIU/ PMU. ● Humps – Do not erect humps without the permission of PIU. The hump has to be as per the design. No private person can built humps. ● Signage – All signage has to be fixed by PIU/ Contractor.

Common Grievance Categories	Issues and Likely Solutions
	<ul style="list-style-type: none"> ● Cutting of pavement by utility companies – No utility company can cut the pavement without the permission ● Overloaded vehicles/ Road littering – Such incidents to be reported to PIU for action.
Occupational Health and Safety	<ul style="list-style-type: none"> ● Protective gear – The workers must wear protective gear at all times during the work. ● HIV/AIDS services – The workers and communities must be educated about these. They should follow the SoP.
Governance	<ul style="list-style-type: none"> ● Procurement – To be transparent and all matters related to procurement to be disclosed. ● Contractor highhandedness – All contractors to be instructed not to deal with the communities directly. Always involve PIU in dialogue with communities. ● Corruption – Such cases to be sent to the respective agencies for enquiring and investigation.

Table 9.3: DOs and DON'Ts for GRC Members

DOs	DON'Ts
<ul style="list-style-type: none"> ● Respect complaints. ● Follow the established GRM procedures. ● Popularize the GRM's existence, accessibility, and free access. ● Establish accessible compliant receipt locations and channels for vulnerable groups considering their constraints. ● Maintain logbooks. ● Establish clear timetables for resolving grievances. ● Assign each compliant a unique ID, track and report its resolution. ● Work with the complainant to find a resolution throughout the GRM. ● Keep complainant informed of resolution process. ● Seek feedback from the complainant to improve GRM functionality. 	<ul style="list-style-type: none"> ● Intimidate, threat, or harass complainants. ● Set unrealistic redress durations. ● Exclude vulnerable groups. ● Create constraints in filing grievances. ● Create barriers or compound the procedures for grievance filing receipt. ● Disclose aggrieved identity to others. ● Make false promises to the complainant. ● Be biased in redressal. ● Expect or seek any compensation or benefits from complainants.

General overview of the Grievance Redress Mechanism
Assam Intra-State Transmission System Enhancement Project

Project Introduction: The Assam Intra-State Transmission System Enhancement Project (the Project) aims to strengthen Assam's electricity transmission system. The Project will facilitate connection of remote areas, enhance the capacity and reliability of the system, improve voltage profile, and reduce losses and ultimately enhance satisfaction for all categories of consumers. As the Project is funded by the Asian Infrastructure Investment Bank (AIIB), it complies with the Environmental and Social Framework and the Policy on the Project-affected People's Mechanism of the AIIB.

The construction activities under the Project may cause some minor disturbances to the physical environment and communities. These are typical of civil works, such as generating dust, noise, air pollution, and construction debris, influx of construction workers and limited need to acquire permanently or temporary land. Thus, a multi-tiered Grievance Redressal Committee (GRC) will be applicable to the project in its entirety. To honor the GRM, Assam Electrical Grid Corporation Limited (AEGCL) will adopt the practice to resolve any major/ minor grievances, where AEGCL shall accept, review and address issues or problems raised by Project Affected Persons (PAPs), local people and project workers related to project works. GRC will review grievances involving all resettlement benefits, compensation, relocation, replacement cost, other additional assistance for vulnerable groups including Indigenous Peoples (IPs) and grievances related to environmental issues (if any).

The Environmental and Social Management and Planning Framework (ESMPF) provide guidelines how to reduce potential risks and mitigate impacts. Site-specific Environmental and Social Management Plans (ESMP) gives specific measures for specific locations.

Overview of the Grievance Redress Mechanism

The Project provides for the establishment of a Grievance Redress Mechanism (GRM). **The GRM is a free system that registers and attempts to resolve concerns or complaints by Project-affected people (PAPs) or workers/employees arising from project activities.** This process aims to quick resolve of disputes and avoid litigation, thus ensuring the smooth implementation of the project activities. Every person, man, woman, or construction worker employed in Project activities, who feels that they have been adversely affected by the Project, can file their concerns for free to the GRM. **The Project guarantees that there will be no reprisals or retributions for raising grievances.** The GRM process does not prevent project affected people to seek their rights through the judicial system but provides an additional and free way to resolve problems. Anonymous grievances are acceptable, but it will be impossible to inform the complainant of the outcome. In this case, the grievance and the proposed resolution will be publicized on site.

Complaint which may be arises during the project implementation period (Pre-Construction, During Construction and Post Construction) will be handled according to the following procedure:

1. Project-affected person approaches a member of the CGRC (Tier-1) in person or via the phone/WhatsApp. (Dedicated phone number will be assigned).
2. The Circle level GRC (Tier 1) member receives the grievances and records the details in the GRM logbook.
3. The CGRC (Tier-1) acknowledges the receipt of the grievance and provides a dated proof (official slip, text or WhatsApp message).

4. The CGRC (Tier-1) gathers information, visits site and interviews people to evaluate if they can find a resolution of the grievance within 10 working days.
5. The CGRC (Tier-1) informs grieved party of the proposed resolution in writing. a. Grieved party can accept the proposed solution, which is duly recorded. b. Grieved party may not accept the proposed solution, which is duly recorded.
6. If the CGRC (Tier-1) is unable to find a solution, or if the grieved party does not accept the proposition, the CGRC can automatically escalate the issue to the Tier -2 GRC, if grieved party agrees.
7. The Tier-2 GRC acknowledges the receipt of the grievance and provides a dated proof (official slip, text or WhatsApp message).
8. The Tier 2 GRC gathers information, visits site and interviews people to evaluate if they can find a resolution of the grievance within 20 working days.
9. The Tier 2 GRC informs grieved party of the proposed resolution in writing. a. Grieved party can accept the proposed solution, which is duly recorded. b. Grieved party may not accept the proposed solution, which is duly recorded.
10. The grieved party may seek their rights in the court of law.

Table 9.4: The members of the Tier-1 GRC and their communication details in the project Districts

Sl No.	Officials	Name of the Official presently holding the post	Contact No.	Designation in the committee
1.	Deputy General Manager, Tezpur T&T Circle (Project Authority)	Sri Lohit Krishna Borah	9435188931	Chairman
2.	Circle Officer, Kalaibor Revenue Circle	Sri Nitish Borah	8638975629	Deputy Chairman
3.	Assistant General Manager, 220kv Samaguri GSS AEGCL, (Project Manager)	Sri Bikram Bordoloi	9435558545	Member
4.	Chief Councilor, Kalaibor Anchalick Panchayat	Sri Jatindra Nath Borah	9101560600	Member
5.	President Jakhalabandha Gaon Panchayat	Sri Trishna Saikia	9854447307	Member
6.	Vice President, Bhotai Pathari Gp.	Sri Bhupen Bora	9706947821	Member
7.	Women Representative Of Village	Sri Minali Bora	9127220113	Member
8.	Member, All Assam Gorkha Student Union (AAGSU), Central Committee	Sri Lekhnath Sharma	9706480065	Member
9.	General Secretary, All Assam Student Union, Kaliabor Kendriya Satra Sanstha	Sri Plaban Borah	7002200839	Member
10.	Ngo Workers	Sri Puspa Paul Baruah	9957995023	Member
11.	Environment & Social Specialist PMU.	Sri Dibya Jyoti Baruah	9854339228	Member
12.	Resident Engineer AEGCL	Sri Bikram Bordoloi	9435558545	Member

13.	Representative Of EPC Contractor	Sri Basudev Das	8761816618	Member
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Table 9.5: The members of the Tier-2 GRC and their communication details in the corporate level

Sl no.	Designation	Position in the Committee	Communication Address		Website & Email id
1.	Chief General Manager (PP&D), AEGCL cum	Chairman	Assam Electricity Grid Corporation Ltd, (AEGCL) First Floor, Bijuli Bhawan Guwahati - 781001	Contact No.: 0361-2739520	Website: www.aegcl.co.in Mail Id: eap.cell@aegcl.co.in
2.	Project Director (EAP) Projects, AEGCL.			Contact No.: 0361-2739520	
3.	Dy. General Manager (EAP), PMU, AEGCL	Deputy Chairman		es.aegcl.pmu@gmail.com	
4.	E & S Safeguard Specialist, PMU, AEGCL	Member		eap.cell@aegcl.co.in	
5.	Project Related AGMs (EAP), AEGCL	Member			
6.	Joint Secretary (Power, Electricity), GoA	Member	GoA, Power (Electricity Dept.), Assam Secretariat, Dispur, Guwahati-781006 Contact No.: 0361-2237260		dy.secy.powe@gmail.com
7.	Team Leader, Environment Expert and Social Expert, PMC	Member	House No 1, Saniram Bora Road, Near Bora service Petrol Pump, Guwahati, Assam 781007		aegcl.pmc@feedbackinfra.com

If any unwanted situation like danger, sexual harassment and other life threatening, the victim person may reach to the concerned officials who belong to the Tier-1 and Tier-2 committee and may contact for further needful action or the matter should be informed to AIIB immediately.

Grievance Register

Grievance Register	
Date of Grievance Recorded	* The mobilization of EPC is awaiting and once EPC starts their work in the S/S as well as in T/L, then the grievances may arise if any, the record will be maintained accordingly
Grievance Recorder	
Grievance submitted through	
Name of Complainant	
Complainant Preferred Contact	
Complainant Address	
Type of Grievance	
Describe Grievance	
Date of Grievance Occurrence	
Date of Acknowledgement	
Mode of Acknowledgement	
Brief Outline of Proposed Resolution	
Action Taken	
Action Taken on	
Outcome	
Outcome communicated to PAH on	
Status Update	
Mode of Complainant Update	
Acknowledged by	
Date Closed	
Days to Close Grievance	
Date of Grievance Received to Tier 2	
Date of GRC meeting (2nd Tier)	
Estimated Time for Resolution Action	
Taken Action	
Taken on	
Outcome	
Outcome communicated to PAH on	
Status Update	
Mode of Complainant Update	
Acknowledged by	
Date Closed	
Days to Close Grievance	

10 Environmental and Social Management Plan

10.1 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) WITH SPECIFIC POTENTIAL E&S IMPACTS

This chapter outlined the ESMP for identified impacts and the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored. The detailed Management Plan is outlined as under.

10.2 Physical Environment

Table 10.1: Detailed Management Plan (Physical Environment)

Activity	Potential Impacts	Mitigation measures	Location or footprint applicable	Responsibility	Reporting
Planning and Construction Phase					
Land use and Land Cover	<ul style="list-style-type: none"> No major anthropogenic activities are observed in the area except agricultural activities and crop. The project will result in change of the land use within the land parcels where the transmission towers are located. Besides this the land falling under the RoW of transmission line will also have limited change in land use in terms of restriction of activities to be undertaken on this area. 	The land requirement for the tower base has been considered as per the IS Codes.	Footprint tower foundation and RoW of transmission line	PMC / AEGCL	-
Soil Environment	<ul style="list-style-type: none"> Digging of foundation pits for the towers may affect the soil quality. Foundations shall be dug up to a depth of 3-3.5 m depending upon the tower type and soil characteristics. At the tower sites, all vegetation within the footprint of the tower base and additional surrounding area shall be cleared for ground vegetation. Foundation pits shall be backfilled by the excavated soils; Compaction of soil during excavation, transportation of construction material & tower components, foundation work, 	<ul style="list-style-type: none"> Vegetation clearance and excavation to be done in the marked excavation and construction area only; The excavated soil to be stored on site for back filling; Any top soil that is to be removed for construction of tower footings / foundations to be temporarily stored /stack atleast at a lead of 2 meters away from the edge of the pit and then be used as a (soil) top cover after construction activities are complete; 	Footprint tower foundation and RoW of transmission line	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	<p>backfilling, tower erection and stringing lead to temporary effects on natural infiltration of rainwater, but these impacts are temporary, localized and marginal;</p> <ul style="list-style-type: none"> ● Soil contamination at tower locations shall be from result of leaks and spills of oil, lubricants, or fuel from construction equipment. ● General construction waste generated onsite comprised of waste concrete, wooden pallets, steel cuttings / filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminium cans and waste paper shall be generated by the construction workforce and labour camp site. A small proportion of the waste generated during construction phase shall be hazardous and include used oil, grease and waste oil containing rags. ● During foundation activities at tower locations, excess excavated material shall be generated. 	<ul style="list-style-type: none"> ● After completion of construction activities, site will be cleared for any excess excavated material and leftover construction material. Disposal areas for same will be identified in consultation with the concerned department; ● Spill management kit will be provided and immediately clean-up of any spillages; ● Provision of waste collection bin and disposal of domestic waste will be provided at labour camp site; ● Tower components and materials shall be stored at an elevated level using wooden sleeper to raise the tower parts above the ground level near the construction site. It is to be noted that the tower parts are taken to erection site on daily basis for erection from the EPC store, thereby reducing disturbance to surrounding standing crop and vegetation; ● The existing roads to be used for approaching tower locations. 			
Ambient Air Quality	<p>Ambient air quality will be largely impacted from the following sources during the construction phase:</p> <ul style="list-style-type: none"> ● Fugitive dust emissions from transportation of material, excavation, drilling, back filling, 	<ul style="list-style-type: none"> ● All vehicles shall be maintained as bi-annually and as per the Government procedure. It is mandatory that all vehicle to be check for pollution control in every six months. Excavation 	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	<p>emission due to movements of vehicles, plying of heavy construction machinery etc.;</p> <ul style="list-style-type: none"> Emissions from diesel generator for construction activities. The nearest receptor for dust emissions located within 500 m distance from transmission line route. No ecological sensitivities located in the RoW of transmission line route. 	<p>activities to be avoided during windy weather conditions;</p> <ul style="list-style-type: none"> The unpaved access roads shall be sprinkled with water as necessary to reduce dust, especially during April to September. 			
Ambient Noise Level	<ul style="list-style-type: none"> The foundation activities at transmission tower locations have effect on the noise level due to operation of concrete mixer, DG set, vehicular movement for transportation of materials. During erection of tower and stringing there can be some disturbance from noise due to vehicular movement for transportation of tower components, strings, and communications during erection and stringing. Also, during stringing there will be continuous operation of tractors carrying the strings from one tower to other. As mentioned above, there are habitations present within 500 m distance from the Transmission line route. No ecological sensitivities located in the RoW of transmission line route. 	<ul style="list-style-type: none"> Construction activities are to be carried out during the daytime (6:00 am- 6:00 pm) on 6 days a week. One paid holiday is given to workers. Avoid unnecessary honking of horns. 	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Water Resources and Quality	<ul style="list-style-type: none"> The transmission line generally requires about 50 m³ of water for casting of foundations for each tower, which shall be sourced from local sources through tankers. The transmission line passes through River and nallah. Impact on local water resources. 	<ul style="list-style-type: none"> Location of storage area to be avoided on agricultural land and in close proximity to water bodies wherever possible. Excess excavated material not to be dumped in Nallah / water course / drainages, Clean water storage facility with PVC tank provided near the camp site for clean bathing / washing water to be made at labour camps; Wash room, sanitary toilet with septic tank and soak pit provide to the labours/camps to maintain hygiene of the areas. Approved water supply resource to be used for water requirements for concreting and curing during foundation activities; Wastewater generated at labour camp will have proper disposal arrangements such as septic tank and soak-pits. 	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly
Drainage	<ul style="list-style-type: none"> The study area has natural drainage pattern. The transmission line passes through River and nallah. Impact on local water resources. 	Drainage system should not be blocked by the construction activity.	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly
Occupational Health and Safety	<ul style="list-style-type: none"> The erection of transmission towers, stringing of line will require working at heights. The commissioning of the transmission line will also involve live power lines. 	<ul style="list-style-type: none"> Trained workers will be involved in the specific work activities such as tower erection and stringing; 	Construction site and its associated facility location	EPC Contractor / PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	<ul style="list-style-type: none"> ● The working at height has the risks of falling from the height and working on live wires carrying power has dangers of electric shock and electrocution. ● Besides this, there could be slip and trip hazards especially during monsoon season. ● The area experiences heavy rainfall. Working during very heavy rain could cause health hazards; ● During tower erection and stringing activities, about 40 workers will be engaged for the LILO Transmission lines. 	<ul style="list-style-type: none"> ● Prior to start of work, workers will be informed about the related safety risks and precautions to be taken; ● Stop work in monsoon season. The monsoon seasons star from April to September. ● During summer and rainy days season with high temperature, work shall be started early in morning with no work during peak temperature in afternoon and rainy days. Generally, during hot days works start from 7 am to 11 am and in the afternoon 2.30 to 6.30 pm. ● Construction areas to be marked and cordoned off; ● Manual lifting by adult men to be less than 55kg and for women it should be less than 30kg; ● Eye protection for welding, cutting or similar operations which may cause hazard to eyes. ● All persons performing construction work to wear safety shoes and helmets confirming to national standard; ● Every worker engaged in handling sharp objects which may cause injury to hand shall be provided with suitable hand gloves; 			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		<ul style="list-style-type: none"> ● A construction worker handling cement and concrete to wear close fitting clothing, gloves, helmet / hard hat, proper foot wear, masks etc. and will take all precaution to keep the cement and concrete away from his skin; ● Moving parts of the hoists, grouting equipment used for concrete work are securely fenced to avoid any injury or unsafe condition; ● The mixing of the concrete is done in such a way that minimum of dust escapes into the air; ● Erection of steel structures and working at heights should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc.; ● EPC contractor to ensure a First-aid Box is available at construction site; ● EPC contractor to ensure that health and safety procedures under the CESMP are in place and training on same are provided to the workers prior to construction; ● Once the stringing is complete, notices (danger sign boards) and anti-climbing devices to be put on all the faces of the tower; 			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		<ul style="list-style-type: none"> ● Emergency contact numbers and route to nearest hospital shall be displayed at construction site. ● For hazardous activities such as erection and stringing, the local or host community shall be kept at a safe distance from the construction site. This shall be ensured through the installation of 'No Entry' signage at the site approach, proper barricading of the construction area, and deployment of security personnel to prevent unauthorized entry of the public. Additional safety measures may be implemented as per site-specific requirements. ● During transmission line activities, appropriate health and safety measures—such as periodic health check-ups of workers, provision of proper personal protective equipment (PPE), issuance of height passes, (a “height pass” generally refers to a medical and safety certification that confirms a worker is fit to work at heights), daily toolbox briefings, and safety inductions—will be strictly implemented. The Contractor’s Safety Officer will be primarily responsible for ensuring these HSE measures at site, 			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		<p>with additional supervision and monitoring by the PMC Site Engineer and AEGCL officials.</p> <ul style="list-style-type: none"> ● For working at height: ● The contractor shall prepare and implement concise working instructions defining <i>working at heights</i> and associated risks. ● Mandatory use of appropriate PPE (safety harness, helmet with chin strap, safety shoes, etc.) shall be ensured at all times while working at heights. ● Clear guidance shall be provided on how and when to use each type of PPE. ● All PPE, including fall arrestors, shall be inspected before use. Inspection shall be carried out by a competent and designated safety officer/supervisor. ● Regular monitoring and inspection of fall arrestor equipment shall be undertaken, and records of inspections maintained. ● Unsafe, damaged, or expired PPE and fall protection equipment shall be immediately removed from use and replaced. ● The contractor shall conduct periodic <i>refresher trainings</i> for all workers engaged in working at heights to 			

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
		reinforce safe practices and correct use of PPE/fall arrest systems.			
Sensitive Receptors	There are 4 places of worship, 2 Schools and 1 market place coming within a radius of 500 m from the proposed LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S. During construction phase insignificant impact may occur to the above sensitive receptors.	Periodical EQMT for Noise Level at 1 location for LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S (within 100 m from the center line of the T/L) will be carried out nearby that sensitive receptors during construction phase and all possible measures will be taken to minimize pollution level.	Sensitive Receptors (1 location)	EPC Contractor / PMC / AEGCL	Monthly
Operation Phase					
Soil Environment	Any spillage of Aluminium oxide paint during operation and maintenance of the transmission line towers may impact soil quality.	Preventive maintenance plan will be prepared for transmission line.	Project foot print	AEGCL	Monthly
Noise Level	The likely noise impacts from operation of the transmission line will be due to: <ul style="list-style-type: none"> • Maintenance and repair activities; • ‘Corona discharge’ from the overhead lines; • Once operational, noise from energised overhead lines along the transmission line route can be produced by a phenomenon known as ‘Corona Discharge’ (a limited electrical breakdown of the air). Conductors are designed and constructed to minimise corona effects, although, under certain conditions this can be audible as a ‘hissing’ sound, sometimes accompanied by a low frequency hum. Conductors designed and 	The project design specifications include the measures to reduce the noise generated along transmission line.	Project foot print	AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	<p>constructed to minimise corona effects will be chosen for transmission. It is highly unlikely that the corona discharge noise will exceed the normal background noise levels in the area and furthermore, such noises are mostly restricted to rainy weather conditions.</p> <ul style="list-style-type: none"> ● The nearest receptor for noise emissions located within 500 m distance from transmission line route. ● No ecological sensitivities located in the RoW of transmission line route. 				
Visual Impacts	<p>The project footprint comprises approximately 0.144 hectares of land that will undergo a permanent change in land use. Additionally, transmission line of 2.592 km in length will be constructed, supported by a total of 13 towers. The transmission line route passes through agriculture / crops, trees / vegetation and built up area. The vertical forms of the transmission towers would be prominently visible from the road and nearby settlements. Besides this, the farmers in the field would have clear view of these towers. It is to be noted that the study area already had other existing transmission towers and the new transmission line will be easily absorbed in the existing landscape. The visual impacts will be perceived by two types of receptors, namely:</p>	The route alignment had avoided settlement areas during project planning.	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	<ul style="list-style-type: none"> Receptors located at a fix point, i.e. habitations within the project foot print and area of influence; and Receptors who will temporarily come into contact with the transmission line such as passing motorists in the area. 				
Electro Magnetic Fields (EMPs)	The power evacuation through the transmission line during operation phase will result in development of electromagnetic fields. There have been some concerns about possible health risk from exposure to electromagnetic radiation from overhead transmission line. People working in the vicinity of transmission line are potentially prone to exposure to EMF. However, while the evidence of adverse health risks is low, it is still sufficient to warrant limited concern.	The minimum distance clearance had been provided in the project as per Electricity Act, 2003. The electrical clearance to protect from electromagnetic affect minimum 7 m is maintained for EHV lines.	Project foot print	PMC / AEGCL	Monthly
Occupational Health and Safety	<p>The project will have two transmission of 220 kV power through the transmission line during operation phase. AEGCL will be responsible for O&M of the Transmission line.</p> <ul style="list-style-type: none"> There is a possibility of line or towers / tower members falling to the ground, and safety risks during maintenance activities at towers, during the operational phase, contact with the transmission line can result in electrocution. Ignorant people trying to tap electricity from high tension wire can lead to fatal accidents. 	<ul style="list-style-type: none"> Risks to general public during operation will be reduced by public awareness and education and physical measures by attaching an appropriate warning sign on all faces of the tower; Once the stringing work is complete, notices and permanent anti climbing devices will be installed on the tower. The operational start date for electricity transmission and safety implications will be publicised locally in advance. The SOP for preventive maintenance and repairing of fault will be defined and followed. 	Project foot print	PMC / AEGCL	Monthly

10.3 Biological Environment

Table 10.2: Detailed Management Plan (Biological Environment)

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Planning and Construction Phase					
Impacts due to Vegetation Clearance	<p>The RoW of transmission line required 145 numbers of trees including fruit & non fruit bearing, bamboos etc. to be cut.</p> <p>Vegetation clearance is the first step in the establishment of access / internal roads and excavation for the erection of tower footing and transmission tower foundations and ancillary facilities. Impact of vegetation clearance could happen at the time of line stringing at few places.</p> <p>Within the transmission line corridor floral and faunal species are commonly found. Ground clearance will be maintained from the lowest cable and any object that is grounded (tree etc.).</p> <p>Clearing of vegetation from agriculture / crops, trees / vegetation, built up and range land reduces options for nesting habitat for birds, shelter from predators, foraging resources, shade, perching habitat and breeding sites. The loss of vegetation can also have a negative effect on soil quality and hamper survival of neighbouring floral species, burrowing faunal species and foraging resources for herbivores in the area.</p>	<p>In tower foundation location and transmission line corridor no mature fruiting tree or any other tree that is important for community will be felled. The tower locations will be adjusted to avoid mature trees that are important for the community. In case it is absolutely necessary, chopping and trimming of the branches will be undertaken.</p>	Construction site and its associated facility location	EPC contractors /PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
Impacts due to Construction Activities	<p>Construction activities include excavation, movement of machineries, increased anthropogenic movement (men and transport) in the project study area. These activities are assessed with respect to disturbance of habitats and species. Excavation for the construction of the foundations for transmission towers and ancillary facilities has direct impact on burrowing fauna, mammalian fauna and an indirect impact on flora / fauna through the changing of soil properties. This type of impact could happen for each tower footing area. Anthropogenic movement will result in increased stress placed on fauna in the area that remain alert for an extended period of time and may prevent proper breeding, nesting, mating, socializing and foraging. Noise from anthropogenic movement (men and transport) from the construction activities shall cause disturbance to fauna in the nearby areas. This type of impact could happen during footprint and tower foundation, stringing activities of the transmission line.</p>	In-house training provided to the labour force and supervisory staff for situations dealing with wildlife encounters.	Construction site and its associated facility location	EPC contractors /PMC / AEGCL	Monthly
Operation Phase					
Collision and Electrical hazards for avifaunal species	<p>Birds species identified during the ecological study were found roosting on wires and poles in the area. Some birds also utilize the transmission towers for nesting by placing the nests across wires or using holes in the tower itself. Collision of birds can happen with transmission line due to specific behaviours like courtship displays, aerial hunting as</p>	<p>The following mitigation measures will reduce the impact significance on avifaunal species:</p> <ul style="list-style-type: none"> • Installing perch rejecter on the cross arms. • In order to mitigate and minimize collision of birds, power line markers 	Project foot print	PMC / AEGCL	Monthly

Activity	Potential Impacts	Mitigation measures	Location or foot print applicable	Responsibility	Reporting
	<p>they may distract the birds from the presence of the power lines.</p> <p>Collision may happen for birds that make regular and repeated flights between roosting and feeding areas in proximity to power lines.</p> <p>Avian Power Line Interaction Committee (APLIC). 2012. Reducing Avian Collisions with Power Lines: The State of the Art in 2012. Edison Electric Institute and APLIC. Washington, D.C.</p> <p>Collision and electrocution hazard may happen at the transmission line.</p>	<p>should be used specifically areas that are more vulnerable to avifauna, which reduce the risk by increasing the visibility of overhead lines to birds (Sporer et al. 2013).</p> <ul style="list-style-type: none"> • A specific monitoring requirement in the form of wildlife monitoring checklist for LILO operator to regularly monitor/observe and record bird collisions and deaths along the transmission line ROW. The bird/wildlife monitoring is to be regularly reported to the PMU and the AIB. Checklist provided in Appendix – 7. 			

10.4 Social Environment

This section outlines the potential impacts, mitigation measures, monitoring and management responsibilities during construction and operation phases of the Transmission lines. In order to minimize adverse impacts during different phases of project lifecycle, mitigation measures, monitoring plan and responsibilities for its implementation.

Mitigation measures are provided for the construction activities and operation and maintenance activities.

The ESMP for the proposed transmission line construction works labour camps, tower foundation, erection and stringing activities and related health and safety measures will prepare as a priority.

In addition to the ESMP, an Abbreviated/Resettlement Action Plan report will be prepared before commencement of works. The purpose of the A/RAP is to ensure the restoration of livelihoods of the impacted PAFs. Grievance Redressal Mechanism has been formulated for the project. This GRM shall be applicable through the project lifecycle.

Table 10.3: Detailed Management Plan (Social Environment)

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
Construction phase					
Social	Health and safety risks	<ul style="list-style-type: none"> • EPC contractor should follow General Health and Safety measures as per contract agreement. Some of the key provisions relevant for the EPC contractor are mentioned below: • Adopt an H&S Policy for construction workers; • Eye protection for welding, cutting or similar operations which may cause hazard to eyes; • All persons performing construction work to wear safety shoes and helmets conforming to national standard; • Every worker engaged in handling sharp objects which may cause injury to hand shall be provided suitable hand gloves; • Erection of steel structure is considered as a hazardous work. Workers engaged in erection of transmission tower to follow safety measures. The work should be carried out by experienced workers and they should use safety harness, lifelines, catchment etc. • The First-aid Box will be available at construction site which shall be ensured by EPC contractor • EPC contractor shall ensure that health and safety procedures are in place and training on same will be provided to the workers prior to construction; • EPC contractor shall ensure that adequate PPEs and safety measures are used during stringing activity. Once the stringing is complete, notices (danger sign boards) and anti-climbing devices to be put on all the faces of the tower; • Emergency contact numbers and route to nearest hospital shall be displayed at construction site. 	All Tower locations and RoW of Transmission line	EPC Contractor	Monthly Report to AEGCL

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
		<ul style="list-style-type: none"> The local / host community shall be kept at safe distance from construction site. 			
	Impact on land and livelihood due to transmission line	<ul style="list-style-type: none"> Entitlement in keeping with the Abbreviated Resettlement Action Plan for the transmission line. Payment of compensation for tower base area and RoW of transmission line in keeping with the Ministry of Power 2015 notification and Assam Government notification, 2017 and new guideline of Ministry of Power, Govt. of India (Ref No. 3/4/2016-Trans-Part (4) dated 14.06.2024) & Government of Assam Power Department Dispur, Guwahati-6 Notification dated Dispur the 04-11-2024. Ensure access of the local community to a Grievance Redressal Mechanism 	Transmission Lines	PMU / PMC	Reporting to AEGCL after payment of compensation.
Operation Phase					
Occupational Health and Safety	Health and Safety Risks; Electrical hazards	<ul style="list-style-type: none"> The Lock Out-Tag Out system will be followed during maintenance/ repair activities at transmission line; Records of incident/ accidents shall be maintained; Root cause analysis shall be carried out for any incident/ accident. 	All Tower Locations of transmission lines	AEGCL	Annual Report to AEGCL
Social	Loss of any crop or agricultural field during stringing or maintenance- Economic impact due to loss of crop/ agricultural field	<ul style="list-style-type: none"> Have provision to compensate adequately any kind of damage to the assets/crops/other properties of the local incurred due to project maintenance. Ensure access of the local community to the GRM formulated for the project. 	All Tower Locations of transmission lines	AEGCL	Regular reporting at time of maintenance Activities.
	Economic Displacement- Loss of income	<ul style="list-style-type: none"> Provide priority to the local community for any contractual opportunities during the operations phase; Undertake skill training activities as part of the Abbreviated RAP 	All Tower locations of transmission	AEGCL	Monthly progress reports

Activity	Potential Impacts	Mitigation Measures	Location or foot print applicable	Responsibility	Reporting to AEGCL
	sources	for the project which would allow the community to undertake income generation activities outside the project as well.	lines		
	Risk to Community health and Safety	<ul style="list-style-type: none"> • Undertake health awareness programmes among the local community, • Implement GBV code of conduct for workers. • Ensure access to the local community to the GRM for the project and that GRM can receive gender-based violence related grievances. 	All Tower locations transmission lines	AEGCL	Annual reports

10.5 ENVIRONMENTAL AND SOCIAL MONITORING PLAN (ESMOP)

This chapter outlined the Environmental and Social Monitoring program for the project.

Table 10.4: Environmental and Social Monitoring Plan

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ⁴	Standards	Implementation	Supervision
Regulatory Compliance	Pre-construction, Construction and operation Stage	Availability of required regulatory permissions, Compliance to applicable environmental and labour laws.	-	Monthly	-	EPC Contractor	AEGCL / PMC
Labour Camp Monitoring	Construction Stage	Location of labour accommodation in relation to local village settlement, Availability of adequate potable water in labour camp and at construction site, Appropriate toilet and bathing facilities and their maintenance, Appropriate waste water disposal system, Source of cooking fuel, Appropriate lighting and ventilation in labour camp, Emergency response plan with emergency contact details displayed in the camp, Adequacy of first aid kit with required first aid medicine filled, Key Health (Malaria / dengue	Labour Camp	Weekly/ As per requirement	IFC benchmark standards for workers accommodation	EPC Contractor	AEGCL / PMC

⁴Here the frequency means the frequency for the monitoring report. The ground data collection frequency should refer to those in the ESMP.

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
		/ fever / any other) issues reported during the last month. Refer IFC Benchmark Standards for Workers Accommodation as Appendix-5					
Tower foundation, erection and stringing	Construction Stage	Use of PPEs at site, Toolbox talks prior to start of work, Availability of emergency contact numbers, Disposal of waste materials, Preparation and Implementation of Site Emergency Response Plan, Water consumption.	Transmission line	Monthly	As per specification and norms	EPC Contractor	AEGCL / PMC
Air Quality Monitoring	A. Pre-Construction Stage	PM10, PM2.5, along with Meteorological data- temperature Humidity, wind speed, wind direction.	Near sensitive receptor sites (1 location within 100 m from the center line of the T/L)	One time	National Air quality standards of CPCB	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	B. Construction Stage	PM10, PM2.5, 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	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	C. Operation Stage	PM10, PM2.5, along with Meteorological data- temperature Humidity, wind speed, wind	Same location as selected during pre-	One time	National Air quality standards of CPCB	EPC contractor by CPCB approved laboratory (Defect	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
		direction.	construction period			Liability Stage)	
Noise Level Monitoring	A. Pre-Construction Stage	Noise level (dB level) On hourly basis for 24 hours	Near sensitive receptor sites (1 location within 100 m from the center line of the T/L)	One Time	CPCB standards for Noise and vibrations	EPC contractor by CPCB approved laboratory	AEGCL / 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/ noise assessment by demand	CPCB standards for Noise and vibrations	EPC contractor by CPCB approved laboratory	AEGCL / 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	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
Water Quality Monitoring	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 Turbidity, Total hardness, (as CaCO ₃), corrosivity, Taste).	Near sensitive receptor sites (1 location within 100 m from the center line of the T/L)	One time	National water quality standards of CPCB	EPC contractor by CPCB approved laboratory	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
	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}.	Same location as selected during pre-construction period	Twice a year	National water quality standards of CPCB	EP EPC contractor C by CPCB approved laboratory	AEGCL / 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).	Same location as selected during pre-construction period	One Time	National water quality standards of CPCB	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
Soil Quality Monitoring	A. Pre-Construction Stage	PH, Sulphate (SO ₃), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content.	Near sensitive receptor sites (1 location within 100 m from the center line of the T/L)	One time	Technical specifications	EPC contractor by CPCB approved laboratory	AEGCL / PMC
	B. Construction Stage	PH, Sulphate (SO ₃), Chloride, ORP, water Soluble	Same location as	Twice a year	Technical specifications	EPC contractor by CPCB	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
		salts EC, Organic Matter, Moisture Content.	selected during pre-construction period			approved laboratory	
	C. Operation Stage	PH, Sulphate (SO3), Chloride, ORP, water Soluble salts EC, Organic Matter, Moisture Content.	Same location as selected during pre-construction period	One Time	Technical specifications	EPC contractor by CPCB approved laboratory (Defect Liability Stage)	AEGCL / PMC
EMF	A. Pre-Construction Stage	Design specification	-	Once during final design approval	National Electrical Safety Code, American National Standard Institute, C2	Contractor (designing), PMC and PMU (design review)	AEGCL / 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 / 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 / PMC
Carcass	A. Pre-Construction Stage	Visual inspection for transmission line locations	Transmission line routes	Continuous activity	Identification of carcass (animals/birds)	Surveyor	AEGCL / PMC
	B. Construction Stage	Visual Physical Inspection for transmission line locations.	Transmission line routes	Continuous activity	to be reported to concerned forest/wildlife authority for	Contractor	AEGCL / PMC
	C. Operation Stage	Visual Physical Inspection for transmission line locations	Transmission line routes	Continuous activity	identification of species. Record to be maintained for number of carcasses	AEGCL – Field Staff	AEGCL / PMC
Traffic	A. Pre-Construction Stage	Number & type of vehicles being used to access substation site.	Transmission line routes	Continuous activity	Record maintenance for being used for survey and	Surveyor	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
					increased traffic load in localities		
	B. Construction Stage	Number & type of vehicle being used for material transportation by EPC contractor.	Transmission line routes	Continuous activity	Maintenance of Logbook for in-out time of vehicle on site (substation).	Contractor	AEGCL / PMC
	C. Operation Stage	Number & Type of vehicles being used for maintenance activity.	Transmission line routes	Continuous activity	Maintenance of Logbook for in-out time of vehicle on site (substation)	AEGCL – O&M staff	AEGCL / PMC
Tree cutting	A. Pre-Construction Stage	Enumeration of trees after finalization of layout plan of selected transmission line route.	Transmission line routes	Once during detailed survey and layout design development	Documentary evidence to be maintained by surveyor for counting of trees.	Surveyor	AEGCL / PMC
	B. Construction Stage	Development of inventory of trees before initiating the transmission line construction.	Transmission line routes	During the construction phase	Marking of trees by revenue authority in presence of Contractor and AEGCL officials Obtaining applicable clearance from forest department.	Contractor / Revenue Department / AEGCL	AEGCL / PMC
	C. Operation Stage	Pruning/cutting of trees after getting prior permission from the competent authority for maintenance activity.	Transmission line routes	During the operation phase	Maintenance of record	AEGCL	AEGCL / PMC
Stakeholder Engagement	A. Pre-Construction Stage	Mapping of stakeholders	Transmission line routes	Continuous activity	Keep record of the Consultation with mapped stakeholders (Keep minutes of Consultation and attendance sheet)	Survey Consultant/ Concerned revenue circle	AEGCL / PMC
	B. Construction Stage	Listing of identified stakeholders (administrative	Transmission line routes	Continuous activity	Keep record of the Consultation	Contractor/PMC /AEGCL/ Concerned	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
		and project affected people)			with mapped stakeholders and PAPs (Keep the record MOM of Consultation and attendance sheet)	revenue circle	
	C. Operation Stage	Identification of stakeholders	Transmission line routes	Continuous activity	Consultation with identified stakeholders has to be kept and the copy of minutes of Consultation and attendance sheet also to be kept.	Contractor (Defect Liability Stage)/ AEGCL – Field Officers	AEGCL / PMC
Grievance Mechanism	A. Pre-Construction Stage	Identification of officials, NGO, stakeholders to be part Grievance redressal committee.	Transmission line routes	Continuous activity	Development of Grievance redresses mechanism as per provisions Notification of formulation of GRM and GRC.	AEGCL - PMU	AEGCL / PMC
	B. Construction Stage	Working files of GRC and GRM records.	Transmission line routes	Continuous activity	Notification of formulation of GRM and GRC and display of GRM procedure in project locations (in local language) keep records for GRM (if any)	Contractor, PMC, AEGCL – PMU, Revenue Concerned PIU, AEGCL – Field staff	GRC
	C. Operation Stage	Working files of GRC and GRM records.	Transmission line routes	Continuous	Notification of formulation of GRM and GRC and display of GRM procedure in project locations. Working records for GRM.	Concerned field staff, concerned PIU	AEGCL / PMC
Compensation	A. Pre-Construction Stage	Identification of project affected people	Transmission line	During identification of land parcel for	Compensation is to be paid as per RAP.	-	-

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
			routes	tower base area and ROW of TL			
	B. Construction Stage	Mapping and listing of projects affected people (crop damage (if any area m ²), zirat damage (marking of trees & development of inventory), Restricted use of land (area m ²) –if applicable.	Transmission line routes	of impact		-	-
	C. Operation Stage	Marking of trees (enumeration) to where pruning/cutting is required to maintain clearance between trees and conductor after obtaining prior permission from the competent authority Damage to crop (area m ² and Listing of the types of crop during Stringing of line.	Transmission line routes	-		-	-
Livelihood	A. Pre-Construction Stage	Identification of any impact on livelihood due to Restricted use of land, crop damage and zirat damage.	Transmission line routes	Once during identification of land parcel for tower base area and ROW of TL	Compensation is to be paid as per RAP	Revenue Department & AEGCL - concerned divisional officer, PMC, EPC Contractor	AEGCL / PMC
	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	Transmission line routes	Once – before commencing construction work		Revenue Department & AEGCL - concerned divisional officer, PMC, EPC Contractor	AEGCL / PMC

Activity / Issue	Project stage	Parameters to be monitored	Location	Frequency ^A	Standards	Implementation	Supervision
		development).					
	C. Operation Stage	Identification of any impact on livelihood due to Restricted use of land, crop damage and zirat damage (inventory development).	Transmission line routes	Continuous activity		Revenue Department & AEGCL - concerned divisional officer, EPC Contractor (Defect Liability Stage)	AEGCL / PMC
Restoration	A. Pre-Construction Stage	Identification of any damage to public utilities and public/private property to be envisaged during construction phase.	Transmission line routes	Once during identification of land Parcel for tower base area and ROW of TL	Compensation is to be paid as per RAP.	Revenue Department & AEGCL - concerned divisional officer, PMC, EPC Contractor	AEGCL / PMC
	B. Construction Stage	Marking and listing of damage to public utilities / shifting of public utilities and public / private property.	Transmission line routes	Continuous activity		Revenue Department & AEGCL - concerned divisional officer, PMC	AEGCL / PMC
	C. Operation Stage (Defect Liability Stage)	Marking and listing of damage to public utilities / shifting of public utilities and public / private property.	Transmission line routes	Continuous activity		Revenue Department & AEGCL - concerned divisional officer	AEGCL / PMC

External Reporting and Communication

Project head is responsible for ensuring that communication with government agencies and stakeholders are maintained as per the requirement for obtaining various permission from line departments like-

- Communication to all concern Circle Office for approval of land scheduling report/compensation details of Tower footing and RoW.

10.6 BUDGET FOR IMPLEMENTATION OF ESMP SPECIFIC FOR ACTIVITIES COVERED BY THE ESIA – ESMP

The project will have its own budget for implementation of ESMP and RAP. As mentioned earlier, currently some construction activities are going on for tower foundation, hence budget heads for planning and construction stage are provided for remaining construction activities.

The budget heads for Construction and O&M stage will include cost towards

- Wastewater treatment;
- Personal protective equipment;

- Health & Safety; and
- Hazardous material transportation & disposal

ESMP cost to implement the key environmental & social measures and environmental & social monitoring plan which a part of Engineering Procurement Construction (EPC) Contractor's good Engineering practice. An indicative budgetary allocation of **INR 8.10 Lakhs** for ESMP implementation during Construction and O& M stage will be required for all the three LILO lines is provided in table below.

Table 10.5: Indicative Budgetary allocation for EMP Implementation

Sl. No.	Particulars	Capital Cost (Lump sum INR in Lakhs)	Recurring Cost (Lump sum INR in Lakhs) per Annum	Remarks
A. Construction Phase				
1.	Waste Management	0.80	0.40	Considered as part of EPC contractor work under Good Engineering Practice
2.	Environment, health and safety and Contractor's Environmental and Social Management Plan (CESMP) Implementation	2.00	1.00	
3.	EQMT	2.0	1.0	EQMT will be done for Air, water, Noise Level and soil by EPC Contractor.
4.	Management Plan (Biological environment) and Perch rejecter and power line markers	0.80 Lakhs Lump sum	-	Considered as part of EPC contractor work under Good Engineering Practice for construction period under supervision of PMC and monitoring by AEGCL. AEGCL will take necessary measures during Operation period
6.	Compensatory afforestation	The cost for compensatory plantation, as determined during the process, will be deposited into the account of the competent authority upon their demand		During the assessment of zirat (immovable asset) value along the Right of Way (RoW) for transmission lines (T/Ls), the competent authority will conduct tree enumeration.
7.	Resources			
	PMU Two numbers Environmental Safeguard Specialist Two numbers Social Safeguard Specialist	-	-	Experts are on board from AEGCL fund.

Sl. No.	Particulars	Capital Cost (Lump sum INR in Lakhs)	Recurring Cost (Lump sum INR in Lakhs) per Annum	Remarks
	PMC One number Senior Environmental Safeguard Expert One number Senior Social Safeguard Expert Three numbers Environmental Investigation Officers Three numbers Social Investigation Officers	-	-	Experts are on board as part of PMC contract.
	EPC One Environment, Health, Safety and Social Officer One Community Consultation Officer	-	-	Experts are on board as part of EPC contract.
	Sub – Total A	5.60	2.40	
B. Operation and Maintenance Phase				
1.	Waste Management	0.50	0.25	
2.	Environment, health and safety and EMP Implementation	1.00	0.50	
3.	Facility Management for Housekeeping	1.00	0.50	
	Sub – Total B	2.50	1.25	
	Total (Sub – Total A + Sub – Total B)	8.10	3.65	
	Social			
	Compensation for Livelihood restoration and CSR	As per RAP for the project		

Note: The above cost does not include cost of manpower needed for the EMP implementation.

10.7 INSTITUTIONAL ARRANGEMENT FOR MONITORING AND REPORTING

The Assam Intra-State Transmission System Enhancement Project (AISTSEP) is implemented by Assam Electricity Grid Corporation Limited (AEGCL) under the financial assistance from the Asian Infrastructure Investment Bank (AIIB). A Project Management Unit (PMU), established within the AEGCL, headed by a Project Director cum CGM (PP&D). The Project Director is accountable for overall supervision, coordination and responsibility of the project planning, implementation of the ESMP. The PMU will be supported by Project Implementation Units (PIUs) established at all divisional level. The PMC for the project will monitor the environmental and social aspects 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.

10.8 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, labour 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 officers. The PMU's E&S officers 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);
- Feedback, troubles hooting 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.

10.9 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.

10.10 Reporting Line (from contractor to AIIB), report type and templates

The Environmental and Social (E&S) staff is dedicated to projects funded by the Asian Infrastructure Investment Bank (AIIB) to streamline decision-making and provide greater autonomy for project execution

and delivery. The Environmental and Social staff of the AISTSE project under AEGCL is part of the Project Management Unit (PMU), which is headed by the Project Director. At the divisional level, the responsibility of the E&S Officer is assigned to the concerned Assistant General Manager (AGM). The AGMs will also act as Project Managers for individual subprojects and will work under the supervision of the Deputy General Manager (DGM) at the circle level.

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. Contractors are required to submit monthly progress report (**template in Appendix 6A**) on the implementation of ESMP measures to PMC/PMU. ESMP implementation will be evaluated internally by the PMU/PIU itself and the PMC E&S Expert and through field level officials, who will be regularly monitoring ESMP implementation.

Project Management Consultant (PMC) to keep everything on track and carryout evaluation on the ESMP implementation. The PMC will submit monthly progress report (**template in Appendix 6B**) to update the Project Management Unit (PMU) on the ESMP implementation activities. The E&S Experts of PMC will submit semi-annual environmental and social monitoring report (**template in Appendix 6C**) on progress and compliance issues of ESMP implementation. 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 time frames for doing so, along with their associated costs.

The E&S Experts of PMU, AEGCL will ensure that the semi-annual monitoring report submitted by PMC is in the line with the requirement of AIIB and submit the environmental and social monitoring to AIIB.

The illustration of reporting line is provided in figure below.

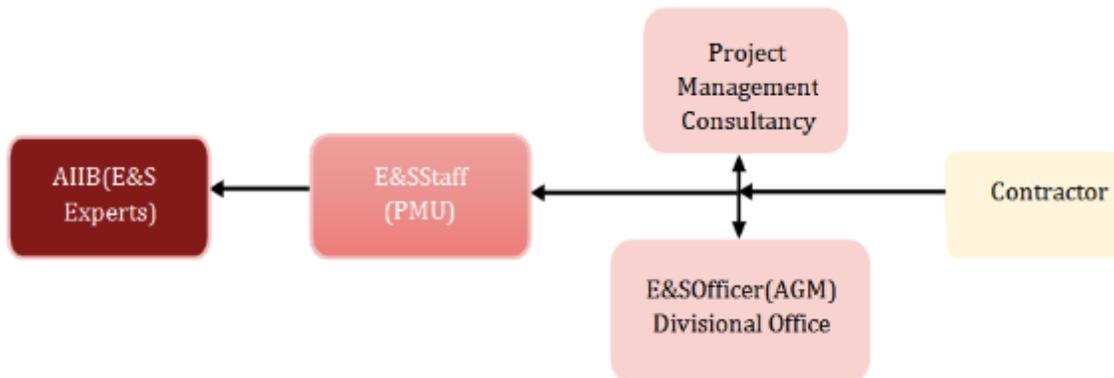


Figure-10.1: Illustration of Reporting Line

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 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.

10.11 Capacity building needs for this project

The AEGCL has Environmental & Social project staffs, who have knowledge of environmental safeguards, and experience of AIIB environmental safeguard policies and their implementation of AISTSEP. It is hence understood that they have required familiarity with AIIB environmental safeguard policies and its implementation. Designated PMU officials, and PIUs staffs and engineers will be trained by PMC safeguards experts on safeguards issues related to the project. The capacity building program which included modules on: (i) introduction and sensitization to AIIB environmental and social policy and requirements; (ii) project related requirements as provided in the ESMP; (iii) improved coordination within line departments; (iv) monitoring and reporting system; and (v) project GRM. Briefings on safeguards principles, GRM etc. will also be conducted to the contractors and PIU safeguard officers supported by PMC.

Training and capacity building programme are being conducted by PMC as per the requirement and PMC contract provision.

Apart from these, training and capacity building programme are being conducted by E&S team of AIIB to ensure implementation of E&S requirement.

11 SUMMARY, RECOMMENDATIONS AND CONCLUSION

Power transmission projects including the construction of substation and associated transmission line 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). However, project associated activity like quarry operation (if any) for the project may require prior Environmental Clearance. Clearance from the Forest Department is required only in cases where a project is constructed on forest land or requires cutting of forest trees. Clearance from the State Wildlife Board (SBWL) / National Wildlife Board (NWBL) is required only in cases where a project is constructed on Notified Wildlife area or within the Eco-sensitive Zone of Wildlife area. Clearance from the Wetland authority is required only in cases where a project is constructed on Notified Wetland or within the Eco-sensitive Zone of Wetland. Based on the screening, forest, wildlife and wetland clearances are not applicable for Transmission Lines.

As the Project is funded through the AIB, the Bank's Environmental and Social Policy (ESP) applies. The Project has been assigned to "Category B" as per the ESP, as the Transmission lines are not located in sensitive areas.

ESS 1 is applicable to the project as civil works may cause a limited number of potentially adverse environmental and social impacts. These impacts are not unprecedented and are limited to the project area.

ESS 2 is applicable and accordingly Abbreviated Resettlement Action Plan/Resettlement Action Plan (ARAP/RAP) will be prepared, finalized and disclosed before commencement of works.

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. **ESS 3** is not applicable for the LIL0 of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S transmission line project. Although four individuals from the ST Plains community affected in Jakhlabandha Transmission line, they do not possess distinct cultural, linguistic, or institutional characteristics of Indigenous Peoples. Moreover, the area is not covered under the Sixth Schedule of the Indian Constitution. Hence, **ESS 3** is not triggered.

The various environmental and social attributes were identified through primary field study and secondary information's.

Various alternatives have been considered for selection of most optimal route of transmission lines.

The Environmental and Social Impact Assessment (ESIA) for the transmission line system has evaluated the likely environmental and social impacts during both construction and operation phases. The assessment concludes that the impacts are generally limited in nature, few in number, site-specific, and largely reversible. Furthermore, these impacts can be effectively mitigated with appropriate measures.

Importantly, the ESIA emphasizes that forested and ecologically sensitive areas, such as National Parks and Wildlife Sanctuaries, have been avoided through careful route selection, adhering to the principle of

minimizing harm. The check survey for the Transmission line is completed; however, approval of the land scheduling report from concerned Revenue Circle is awaited.

Remedial measures for climate risks have been adapted for Transmission Line at design stage.

The community consultations are carried out in all the villages along the transmission line corridor with local habitants where Sixty-one participants were participated in the LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S in Nagaon district such as economically weak communities, women, vulnerable groups and other local community leaders nearby the proposed transmission line. Consultation will be continued during implementation of the project.

For unwanted situation like danger, sexual harassment and other life threatening, the victim person may reach to the concerned officials who belong to the Tier-1 and Tier-2 committee and may contact for further needful action or the matter should be informed to AIIB immediately.

ESMP for identified impacts and the administrative aspects of ensuring that mitigative measures are implemented and their effectiveness monitored and Environmental and Social Monitoring program has been detailed in the main report.

ESMP cost to implement the key environmental & social measures and environmental & social monitoring plan which a part of Engineering Procurement Construction (EPC) Contractor's good Engineering practice. An amount of **INR 8.10 Lakhs** is estimated to be required for implementation of ESMP.

Institutional Arrangement for Monitoring and Reporting Assam Intra-State Transmission System Enhancement Project (AISTSEP) including Reporting Line (from contractor to AIIB) is in place and detailed in the main report.

Capacity building programmes are being conducted by PMC as per the requirement and PMC contract provision. Apart from these, training and capacity building programme are being conducted by E&S team of AIIB to ensure implementation of E&S requirement.

In summary, the ESMP provides a structured approach to ensuring that the temporary impacts during construction are minimized, while also maximizing the positive benefits, such as local employment opportunities, through effective management and monitoring.

It is recommended to implement all the mitigation measures outlined in Environmental and Social Management Plan, monitor Environmental and Social Monitoring Plan, continuous public consultation and maintaining GRM.

In conclusion, the potential impacts identified in the ESIA study are manageable and can be mitigated effectively through compensation, preventive measures, and careful planning during the construction phase.

SOME SITE PHOTOGRAPHS OF THE TRANSMISSION LINE ROUTES DURING SITE VISIT

LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhlabandha S/S



AP-1



AP-2A



AP- 4



AP-6



AP- 8



AP- 10

Source: Site Visit

APPENDIX 1- TECHNICAL DETAILS



ASSAM ELECTRICITY GRID CORPORATION LIMITED
OFFICE OF THE MANAGING DIRECTOR
Regd Office (1st FLOOR), BIJULEE BHAWAN, PALTANBAZAR, GUWAHATI - 781001
CIN: U40101AS2003SOC007238 GSTIN: 18AAFGA4973J9Z3
PHONE: 0361-2739520 Web: www.aegcl.co.in, E-mail id: pd.aiib@aegcl.co.in

No: AEGCL/MD/AIIB/Reports Drawings Design/Pkg-A/Part-XI/2024/72 Date: 27/02/25

To,
M/S NECCON POWER & INFRA LIMITED,
A.T. Road, Seuni Ak, Jorhat-785001
E-mail Address: necon@neconpower.com

Sub: Approval of profile drawing, tower schedule and LILO arrangement drawing of 220 kV LILO at Jakhlabandha from Samaguri-Mariani TL (Ex T-84 to GSS Gantry; AP-1 to Ex T-85) - Construction of 220/33 kV, 2 X 100 MVA GIS at two locations (Bihpuria & Jakhlabandha) and associated Transmission Lines (Package-A) on turnkey basis under AIIB Loan No-L0302A

Ref: 1. Bid Identification No: AEGCL/MD/AIIB/PACKAGE-A/2020/02-A
2. Contract No: AEGCL/MD/AIIB/PACKAGE-A/2021/CON-1 Dated: 26th July 2021
3. Your Letter No: NECCON/CGM (PP&D)/AEGCL/AIIB/ JKB/TL/R-2/24-25/MIS-2/A061 Dated 14.02.2025

Dear Sir,
With reference to the above, this is to inform you that the revised profile drawing, tower schedule and LILO arrangement drawing of 220 kV LILO at Jakhlabandha from Samaguri-Mariani TL (Ex-84 to GSS Gantry, AP-1 to Ex T-85) against Package-A have been reviewed and found to be generally in order, hence approved.

Further, the proposed foundations shall be as per site conditions and shall be submitted to Civil Wing of AEGCL in consultation with concerned field officials.

Also, the documents shall be verified at field with the concerned field officials.

This is for your kind information and necessary action.

Enclose: as above

Thanking you,

Yours sincerely

Chief General Manager (PP&D), AEGCL

Memo No: AEGCL/MD/AIIB/Reports Drawings Design/Pkg-A/Part-XI/2024/72 (a) Date: 27/02/25

Copy to:

1. PS to the Hon'ble Managing Director, AEGCL, Bijulee Bhawan, Paltan Bazar, Guwahati-01 for kind appraisal of the Managing Director, AEGCL.
2. The General Manager (P&D), AEGCL, Narengi, Guwahati-26 for information.
3. The Deputy General Manager (Project Authority), Tezpur T&T Circle, AEGCL, Tezpur for information.
4. The Assistant General Manager (Project Manager), 220/132 kV, AEGCL, Samaguri for information and necessary action.
5. Team Leader, PT Feedback Infra Ltd. Indonesia, Jakarta 10220 for necessary information.

Chief General Manager (PP&D), AEGCL

APPENDIX 2A- TECHNICAL DETAILS

SKIPPER LIMITED		Doc No : SK-2022-AEGL-GODREJ-220kV-TSD-01 R4								
TOWER SPOTTING DATA										
• 220 kV Double-Circuit • WZ- 5 • Single AAAC Zebra Conductor • 85°C Max. Conductor Temperature •										
Sr. No.	Tower >>>	DA (0°-2°)	DB (0°-15°)	DC (15°-30°)	DD (30°-60°)					
	marked as	DA	DB	DC	DD					
1 Vertical Load limitation on weight span (For both OPGW & conductor)										
1A	WITHOUT Aviation Warning Sphere	Down- ward	Upward	Down- ward	Upward	Down- ward	Upward	Down- ward	Upward	
	a) On both spans(m) OPGW/Conductor	525	200	525	0	525	0	525	0	
	b) On One Span (m) OPGW/Conductor	315	100	315	-200	315	-200	315	-200	
1B	WITH Aviation Warning Sphere	Down- ward	Upward	Down- ward	Upward	Down- ward	Upward	Down- ward	Upward	
	a) On both spans(m) OPGW/Conductor	495	170	495	0	495	0	495	0	
	b) On One Span (m) OPGW/Conductor	297	100	297	-200	297	-200	297	-200	
2.a	Tower Checked for Line / Slack Side					DEAD END				
	Angle of Deviation					0°-15°		0°-30°		
	Wind Span Limits					175 m		60 m		
	Total Wind Span					235 m				
2.b	Tower Designation	SUSPENSION		TENSION		TENSION		TENSION		
	Angle of Deviation	0° - 2°		0° - 15°		0°-30°		30° - 60°		
3	Permissible sum of adjacent spans in meters for various deviation angles. (subject to availability of minimum specified live metal clearances available) Permissible one span for various deviation angles should not exceed 60% of the value shown for sum of adjacent span.	Devi. Angle	Span	Devi. Angle	Span	Devi. Angle	Span	Devi. Angle	Span	
		3A. FOR SECTIONS WITHOUT AVIATION WARNING SPHERE								
		2°	700 m	15°	700 m	30°	700 m	60°	700 m	
		1°	725 m	14°	745 m	29°	744 m	59°	740 m	
		0°	750 m	13°	791 m	28°	789 m	58°	780 m	
				12°	838 m	27°	834 m	57°	821 m	
				11°	884 m	26°	879 m	56°	862 m	
				10°	885 m	25°	885 m	55°	903 m	
				& below		& below		54°	935 m	
								& below		
		3B. FOR SECTIONS WITH AVIATION WARNING SPHERE								
		2°	670 m	15°	670 m	30°	670 m	60°	670 m	
		1°	695 m	14°	715 m	29°	714 m	59°	710 m	
		0°	720 m	13°	761 m	28°	759 m	58°	750 m	
				12°	778 m	27°	774 m	57°	761 m	
		11°	824 m	26°	819 m	56°	802 m			
		10°	825 m	25°	825 m	55°	843 m			
						54°	875 m			
						& below				
For Sections where Aviation Warning Spheres are installed, All spans (Normal/Basic Span, Wind Span and Maximum Weight Spans) shall be reduced as mentioned in this table. Refer sample supporting calculation in Annexure - A included in this document.										
4	Permissible sum of adjacent spans in m. for various deviation angles furnished in 3 above are applicable for conductor & OPGW									
5	Normal Span :	WITHOUT Aviation Warning Sphere		350 M						
		WITH Aviation Warning Sphere		332 M						
		Wind span	WITHOUT Aviation Warning Sphere		Condition	DA	DB	DC	DD	
			WITH Aviation Warning Sphere		Normal	350	350	350	350	
			WITH Aviation Warning Sphere		BWC	210	210	210	210	
	WITH Aviation Warning Sphere		Normal	332	332	332	332			
	WITH Aviation Warning Sphere		BWC	199	199	199	199			
6	Tower Type	To be used as								
	DA	0°- 2° Suspension Tower								
	DB	0° - 15° Angle Tower with tension string / 0° Section Tower								
	DC	15° - 30° Angle Tower with tension string / 0° Section Tower								
	DD / DD-DE	30° - 60° Angle tower with tension string / 0° to 15° Complete Dead End / Dead end with 0° to 15° deviation on line side and 0° to 30° deviation on substation side								
7	For Electrical Clearances and Statutory requirements please refer Next Sheet.									

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General Manager (P&D)
AEGCL



SKIPPER LIMITED	Doc No : SK-2022-AEGCL-GODREJ-220KV-TSD-01					
R4						
TOWER SPOTTING DATA						
GENERAL DETAILS:						
A) ELECTRICAL CLEARANCE FOR RAILWAY CROSSING						
<ul style="list-style-type: none"> • Prior approval of Railway Authority is to be obtained. • Minimum Clearance between lowest point of line Conductor and Rail level shall be as per Column-2 of Table-1 below under maximum sag condition.. However approval of railway crossing from railway authority has to be obtained in each case. • Minimum Clearance to be maintained between highest traction conductor and lowest transmission line crossing Conductor should be... <ul style="list-style-type: none"> •• As per Column-3 of Table-1 At structure as per clause 61 CEA, if nearest OHE structure /fixed structure is within 6000 mm from overhead conductor under maximum sag condition, else it should be as per column-4 of table-1. •• As per Column-4, At Mid Span as per clause 69 CEA. 						
Table-1						
Voltage Level	Minimum Clearance between lowest point of line Conductor and Rail level	Minimum clearance to be maintained between lowest transmission line crossing conductor and railway structure as per clause 61 CEA (At structure)	Minimum clearance to be maintained between highest traction conductor and lowest transmission line crossing conductor as per clause 69 CEA (At Mid Span)			
(1)	(2)	(3)	(4)			
66 KV	16960	4000	2440			
132 KV	17560	4600	3050			
220 KV	18460	5500	4580			
400 KV	20260	7300	5490			
500 KV HVDC	21160	8200	7940			
765 KV	23860	10900	7940			
800 KV HVDC	23860	10900	7940			
<ul style="list-style-type: none"> • The crossing span shall be limited to 300 M. • The crossing shall normally be at right angle to the railway track. • Crossing should be done with "D" type tower. • The minimum distance of crossing tower shall be at least equal to the height of tower plus 6.0 m away measured from center of the nearest railway track. 						
B) MINIMUM CLEARANCE FOR POWER LINE CROSSING EACH OTHER						
Table-2						
Voltage Level	66 KV (mm)	132 KV (mm)	220 KV (mm)	400 KV (mm)	765 KV (mm)	500 KV HVDC (mm)
66 KV	2440	3050	4580	5490	7940	6790
132 KV	3050	3050	4580	5490	7940	6790
220 KV	4580	4580	4580	5490	7940	6790
400 KV	5490	5490	5490	5490	7940	6790
500 KV HVDC	6790	6790	6790	6790	7940	6790
765 KV	7940	7940	7940	7940	7940	7940
800 KV HVDC	9040	9040	9040	9040	9040	9040
1200 KV	10440	10440	10440	10440	10440	10440



SKIPPER LIMITED		Doc No : SK-2022-AEGCL-GODREJ-220KV-TSD-01					
R4							
TOWER SPOTTING DATA							
GENERAL DETAILS:							
C) <u>TELE-COMMUNICATION LINE CROSSING</u>							
<ul style="list-style-type: none"> Minimum clearance between Power conductor & telecommunication lines with respect to Voltage Level shall be as per Table-3 with maximum conductor sag. 							
Table-3							
Voltage Level	66 KV	132 KV	220 KV	400 KV	765 KV		
Minimum clearance between Power conductor crossing (mm)	2440	2750	3050	4480	7900		
<ul style="list-style-type: none"> The angle of tele-communication line crossing shall be as near to 90° as possible. However, deviation to the extent of 60° may be permitted under exceptionally difficult situations. When, the angle of crossing has to be below 60°; the matter will be referred to the authority in charge of the telecommunication system. On a request from the contractor the permission of the telecommunication authority may be obtained by the Owner. In the crossing span, power line support will be as near the telecommunication line as possible, to obtain increased vertical clearance between the wires. 							
D) The number of consecutive spans between the section points shall not exceed 15 or 5 km. In plain terrain and 10 spans or 3 km. in hilly terrain.							
E) A section point shall comprise of tension point with "B" type or "C" type or "D" type towers as applicable.							
F) Minimum ground clearance required for respective voltage level shall be as per Table-4 .							
Table-4							
Voltage Level	66 KV	132 KV	220 KV	400 KV	765 KV	500 KV HVDC	800 KV HVDC
Minimum Ground Clearance (mm)	6100	6100	7015	8840	18000	12500	18000
G) Sag Error : 150 mm. Add Sag Error to Ground Clearance.							
H) At all important road crossings, tension tower to be used.							
For all national highway crossing, tension tower is to be used and the crossing span is not to exceed 250 meters.							
I) Maximum span of adjacent spans for various angles of deviation are subject to the condition that minimum specified live Metal Clearance & minimum Ground Clearance are available.							
J) Maximum deviation of line for dead end tower (D) shall be 15° on line side and 30° sub-station side (slack span side)							



SKIPPER LIMITED		Doc No : SK-2022-AEGCL-GODREJ-220KV-TSD-01	
		R4	
TOWER SPOTTING DATA			
GENERAL DETAILS:			
<p>K) The clearances from building, trees, Power line crossings should be made in accordance with latest version of Indian Electricity Rules and IS:5613.</p> <p>L) Vertical load of individual spans are acting downwards for suspension towers.</p> <p>M) Corridor requirement and Way leave clearance either side from the C.L. of the Transmission Line shall be as per the Table-5.</p>			
Table-5			
Voltage Level	Corridor requirement (m)	Way leave clearance on either side of C.L. of the TL (m)	
66 KV	18	9	
132 KV	27	13.5	
220 KV	35	17.5	
400 KV Single Circuit (Horizontal Configuration)	52	26	
400 KV Double Circuit / Single Circuit (Vertical Configuration)	46	23	
765 KV Single Circuit (Horizontal Configuration)	85	42.5	
765 KV Single Circuit (Delta Vertical Configuration)	64	32	
765 KV Double Circuit	67	33.5	
1200 KV	89	44.5	
500 KV HVDC	52	26	
800 KV HVDC	69	34.5	
<p>N) Minimum clearance for power conductor of respective Voltage level over the highest flood level (HFL) in case of non navigable rivers and navigable rivers is as per Table-6.</p>			
Table-6			
Voltage Level	Minimum clearance above HFL (mm)		
	Navigable Rivers (mm)	Non-navigable Rivers (mm)	
66 KV	19000	3650	
132 KV	19220	4300	
220 KV	20100	5100	
400 KV	21900	6400	
765 KV	25550	9400	
1200 KV	29900	11000	
500 KV HVDC	24030	6750	
800 KV HVDC	27700	11000	



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SKIPPER LIMITED		Design: AEGCL - GODREJ			
		Line: 220 kV D/C Line			
SAG TENSION CALCULATION					
220 kV D/C Single AAAC Zebra WZ-5 RL-1 TC-1					
Normal Span	m	350			
Wire		TOP CONDUCTOR	MIDDLE CONDUCTOR	BOTTOM CONDUCTOR	
Name		AAAC ZEBRA	AAAC ZEBRA	AAAC ZEBRA	
Make/Model No./ Stranding/etc.		37/4.00	37/4.00	37/4.00	
Overall Diameter	D cm	2.80	2.80	2.80	
Area	A cm ²	4.65	4.65	4.65	
Unit weight	Wt kg/m	1.281	1.281	1.281	
Ultimate strength	T kg	13907	13907	13907	
Young's modulus	E kg/cm ²	581400	581400	581400	
Coefficient of expansion	α /°C	0.000023	0.000023	0.000023	
Starting case					
Temperature	°C	32	32	32	
Wind Pressure	kg/m ²	0.0	0.0	0.0	
K calculation by FOS/Tension/SAG		FOS	FOS	FOS	
FOS/Tension/SAG Required		4.000	4.000	4.000	
				OPGW-1	
				OPGW	
				24F Godrej	
				8667.27847	
				1381957.19	
				0.000014	
				0	
				0	
				SAG	
				3.802	
VALUES FOR TOP CONDUCTOR		TOP CONDUCTOR - AAAC ZEBRA 37/4.00			
Case Description		32° • Nil (0) Wind	32° • Full (184.8) Wind	32° • 0.75 wind	0° • Nil wind
Wire Tension	kg N	3476.8 34095	7894.7 77423	6714.8 65852	4643.4 45538
% Use		25.00 %	56.77 %	48.28 %	33.39 %
Maximum % Use Allowed		25 %	70 %	70 %	70 %
Sag PARABOLA	m	5.642		4.224	8.789
					95° • Nil wind
					0° • 0.36 (66.528) Wind
					5736.5 56257
					21888
					16.05 %
					41.25 %
					70 %
VALUES FOR MIDDLE CONDUCTOR		MIDDLE CONDUCTOR - AAAC ZEBRA 37/4.00			
Case Description		32° • Nil (0) Wind	32° • Full (180.7) Wind	32° • 0.75 wind	0° • Nil wind
Wire Tension	kg N	3476.8 34096	7793.0 76426	6633.6 65056	4643.4 45538
% Use		25.00 %	56.04 %	47.70 %	33.39 %
Maximum % Use Allowed		25 %	70 %	70 %	70 %
Sag PARABOLA	m	5.642		4.224	8.789
					95° • Nil wind
					0° • 0.36 (65.052) Wind
					5699.6 55896
					21888
					16.05 %
					40.98 %
					70 %
VALUES FOR BOTTOM CONDUCTOR		BOTTOM CONDUCTOR - AAAC ZEBRA 37/4.00			
Case Description		32° • Nil (0) Wind	32° • Full (176.6) Wind	32° • 0.75 wind	0° • Nil wind
Wire Tension	kg N	3476.8 34095	7690.7 75420	6552.0 64253	4643.4 45537
% Use		25.00 %	55.30 %	47.11 %	33.39 %
Maximum % Use Allowed		25 %	70 %	70 %	70 %
Sag PARABOLA	m	5.642		4.224	8.789
					95° • Nil wind
					0° • 0.36 (63.576) Wind
					5662.9 55534
					21887
					16.05 %
					40.72 %
					70 %
CALCULATION FOR OPGW-1		OPGW 24F Godrej			
Case Description		32° • Nil (0) Wind	32° • Full (229.7) Wind	32° • 0.75 wind	0° • Nil wind
Wire Tension	kg N	1652.2 16203	3810.4 37367	3263.3 32002	1933.3 18959
% Use		19.1%	44.0%	37.7%	22.3%
Maximum % Use Allowed		25 %	50 %	50 %	50 %
Sag PARABOLA	m	4.449		3.802	4.939
% Sag of OPGW to Sag of Cor %		79%		90%	56%
					53° • Nil wind
					0° • 0.36 (82.692) Wind
					2538.2 24891
					14594
					17.2%
					29.3%
					50 %

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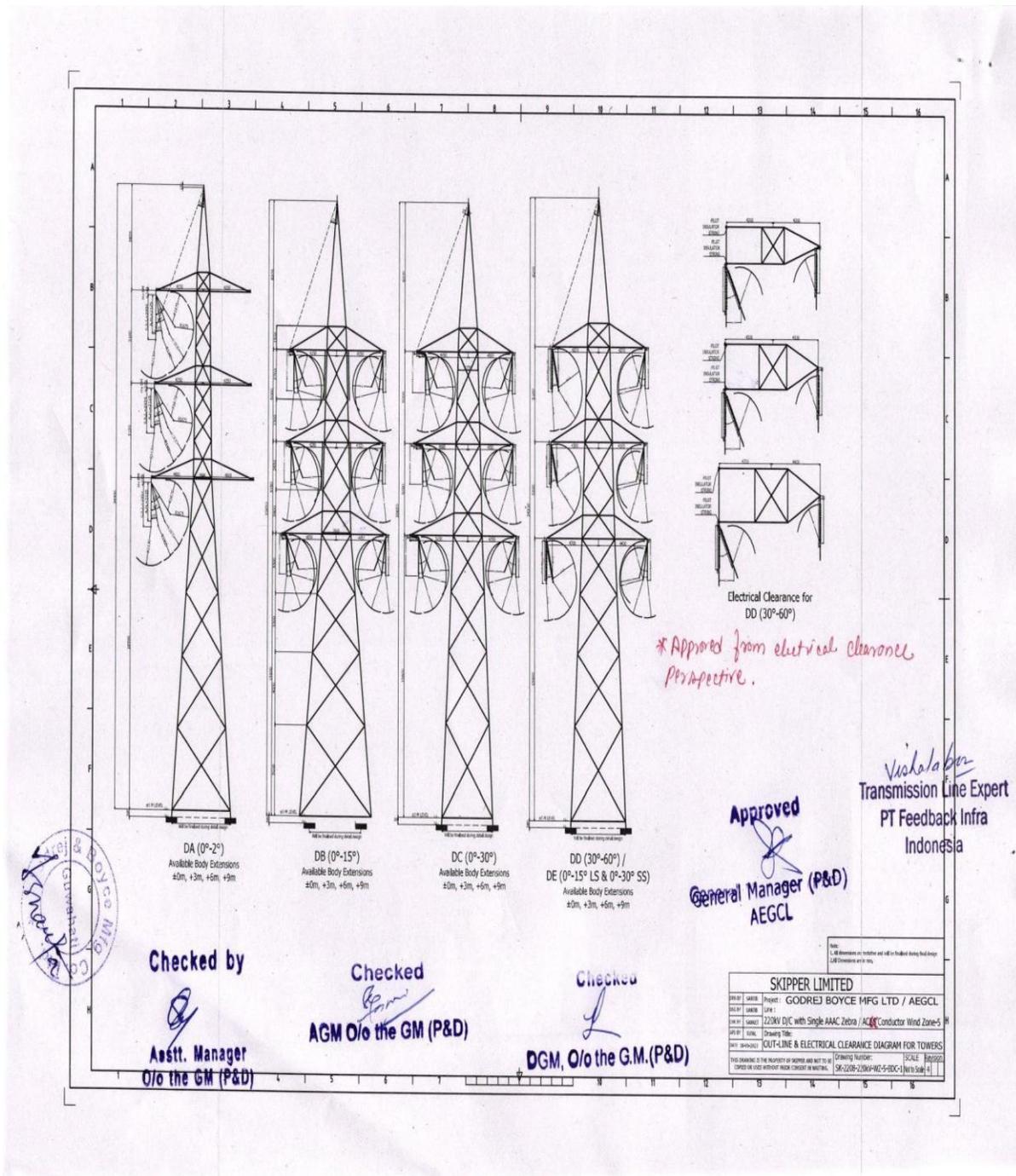
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APPENDIX 2B- DRAWING OF DA, DB, DC and DD TOWER TYPE



APPENDIX 3A- STANDARD OPERATING (WORK) PROCEDURE TOWER ERECTION

PURPOSE:

This document describes the step wise work procedure to carry out the Erection work of 11-132 / 220 / 400 / 765 kV D/C, 800 kV HVDC or other kind of Transmission Line work in planned and controlled manner with reference to the drawings, technical specification and standards.

SCOPE:

This includes Tower Erection for all Types of Towers substructure works as indicated on Technical Specification / Drawing. The work shall be carried out in accordance with the specification and corresponding approved drawings.

EQUIPMENT:

- Derrick Pole
- Poly Propylene Ropes - 12 to 32 mm dia. (Depending on the requirement)
- Winch and Tirfor
- Chain blocks, Single way Pulley, Hammer, Ring Spanner, D Spanner, Box Spanner, Drift Pins
- Safety Belts
- Helmets
- Crow Bar
- Portable Welding Machine
- Mobile Crane

CONSTRUCTION SEQUENCE:

The later stated construction sequence is followed for the complete erection of tower, for which certain checks are necessary which are as under stated.

- Material is to be sent to the sites of erection (as per tower schedule) from store with proper indent.
- Indent shall contain the following information –
- Type of tower
- No. of towers.
- Extension, if any
- Type of tower to be erected shall be identified from the Foundation check report / Tower schedule & the same to be sent to the required location.
- Site to be visited for checking the condition (accessibility of vehicles, water level, ROW issue, etc.)
- Forecast for weather conditions to be checked.
- Checking of foundation oldness with respect to the foundation report.

- Towers shall be erected after the concrete is at least 14 days old, but a gap of 28 days shall be preferred. (IS5613-3-2 14.1). Unless special procedures or technique are followed for early erection.

METHODS FOR ERECTION

Towers shall be erected by any suitable method in the sequence best adapted to the equipment, workers' experience and site conditions which will not overstress structure members.

Generally, there are three main methods of erection of steel transmission towers which are described as below:

- 1) Air Erection (Erection by Helicopter / Drone)
- 2) Erection thru Mobile Crane
- 3) Manual Erection with Gin pole / Derrick.

Manual Erection by Gin Pole

This method contains erection of tower by using a gin pole & then lifting the parts or panels accordingly. A gin pole is a boom of steel or aluminium pipe, wood pole or latticed truss secured at its base and usually inclined at a slight angle to the vertical. Generally, the lifting is done in any or combination of the two ways.

1) Built Up or Piece Meal Method

This method is most commonly used for the erection of 132 kV, 220 kV and 400 kV transmission line towers due to the following advantages:

- Tower materials can be supplied to site in knocked down condition, i.e., in pieces which facilitates easier and cheaper transportation.
- It does not require any heavy machinery such as cranes, etc.
- Tower erection activity can be done in any kind of terrain and throughout most of the year.
- Availability of workmen at cheaper rates.

This method consists of erecting the tower member by member.

The tower members are first set out and kept on the ground serially according to erection sequence to avoid time loss due to searching for them as and when required. In order to maintain speed and efficiency, a small assembly party can be sent ahead of the main erection gang for sorting out the tower members, keeping the members in correct position on the ground and assembling those panels on the ground which can be erected as a complete unit. The main corner leg members are prepared by fitting all cleats / plates for joints & bracings and step bolts.

The erection progresses from the bottom upwards. More than one leg section of each corner leg may be bolted together at the ground and erected in case they are short in length and light in weight. The main legs of the tower to be attached to the stub would be lifted by individual pieces and fixed with the stubs using the cleats, plates and bolts as per the drawing.

Since the legs are not self-supported at this stage, they would be anchored individually using guyed ropes diagonally. After erections of each leg ensure that the guy must be supported by 32mm crowbar & the angle of guy must be 30°-45° degree from horizontal. After this the lattices & bracings are lifted and joint with each other. This completes erection of base structure (leg extension or body extension).

Then the gin pole is to be attached to a suitable corner. With the help of hook provided on gin pole's base the leg & pole are fixed together on a support strut. Proper care shall be taken to provide soft/cushioning material between the pole & leg member to avoid abrading of galvanizing due to friction & pressure.

The top of a single gin pole is kept in the centre of the structure by suspending it from the leg members at any elevation using guys & temporary ground anchors. Two wire-guys about 60° to 90° apart in the plan view are attached to the top of the gin pole to resist or support the load to be lifted.

For safety, a third, and preferably a fourth guy, is installed in front to prevent the pole from falling over backward in the event of an unexpected impact or the sudden release of load. It is recommended to use 10t capacity turn buckle at the guying support. For smaller base towers / vertical configuration towers, one derrick / gin pole is used. For wide based towers and if one assembled section / panel of the tower is to be erected, then two derricks / gin poles are placed, one each on the top of diagonally opposite corner legs.

A rope is passed thru the pulley block attached to the top end of the gin pole & other end from the pulley block affixed to the bottom of stub. The free end at bottom of stub is tied to the winch for pulling & the other end is left free for clamping to the members to be lifted.

First, the leg members of the second section are hoisted and assembled. The temporary rope guys are shifted to the legs of the second section when they are being raised for erection. The legs of the second section / storey are kept in position by fixing the temporary rope guys. The bracings of the second section are then hoisted and assembled.

The derrick is then shifted to the corner leg member on the top of the second section to raise the parts of third section of the tower in position for assembly. Derrick(s) / Gin pole(s) and the temporary rope guys for the leg members are thus moved up as the tower is built up. This process is continued till the complete tower is erected.

Cross - arms are assembled on the ground. The bird guards and hangers for suspension towers are fitted on the cross - arms. A rope is passed through a pulley fixed on the tower peak. The cross - arms are raised up with this rope and fixed to the main body of the tower.

For heavier towers, a small boom is rigged on one of the tower legs for hoisting purposes, the members / sections can be hoisted either manually or by pulling with a winch machine operated from the ground

2) SECTION METHOD

The major sections of the tower are assembled on the ground and the same are erected as units. The derrick / gin pole used is approximately 10m long and is held in place by means of guys on the side of the tower to be erected.

The two opposite sides of the tower section of the tower are assembled on the ground. Each assembled side is then lifted clear of the ground with the derrick / gin pole and is lowered into position on bolts to stubs or anchor bolts. One side is held in place with props or rope guys while the other side is being erected. The two opposite sides are then laced together with cross members and bracings / diagonals, and the assembled section is lined up and made square to the line.

After completing the first section, the derrick / gin pole is set on the top of the first section. The derrick / gin pole is made to rest on a strut of the tower immediately below the leg joint. The derrick / gin pole has then to be properly guyed into position.

The first face of the second section is raised. To raise the second face of this section, it is necessary to shift the foot of the derrick / gin pole on the strut of the opposite side of the tower. After the two opposite faces are raised, the bracings on the other two sides are fitted and bolted up. The last lift raises the top of the towers. After the tower top is placed and all side bracings have been bolted up, all the guy are removed except the one which is to be used to lower the derrick / gin pole.

Sometimes, one whole face of the tower is assembled on the ground, hoisted and supported in position. The opposite face is similarly assembled and hoisted and then the bracing angles connecting these two faces are fitted.

The cross - arms are assembled and erected in the manner given above.

TIGHTENING AND PUNCHING OF BOLTS AND NUTS:

Once the entire tower is installed, the next would be to set out a team for the tightening of all the bolts and also, to ensure that all the members are in place.

All empty holes are to be filled in with nut and bolt of appropriate size and a spring washer.

All nuts shall be tightened properly using correct size spanners.

Before tightening it should be seen that filler washers and plates are placed in relevant gaps between members, bolts of proper size and length are inserted, and one spring washer has been inserted under each nut. In case of step bolts, spring washer shall be placed under the outer nut.

The tightening shall progressively be carried on from the top downwards, care being taken that all bolts at every level are tightened simultaneously.

It may be better to employ four persons, each covering one leg and the face to his left.

The threads of bolts projecting outside nuts shall be punched at three positions on the diameter to ensure that the nuts are not loosened in course of time & on the treads of the bolts deep enough not to give room of loosening under any circumstances.

Suitable punches to create three impressions must be used. This will be implemented till the bottom belt level.

If during tightening a nut is found to be slipping or running over the bolt threads, the bolt together with the nuts shall be changed outright.

FINAL INSPECTION

Even after the full completion of the erection of tower, implement a process of checking the same, section wise before the tacking welding works to ensure that the tower is in perfect condition for taking the loads during the stringing operations.

APPENDIX 3B- STANDARD OPERATING (WORK) PROCEDURE STRINGING

PURPOSE:

This document describes the step wise work procedure to carry out the stringing work of 132 / 220 / 400 / 765 kV D/C, 800 kV HVDC or other kind of Transmission Line work in planned and controlled manner with reference to the drawings, technical specification and standards.

SCOPE:

This includes Tower Erection for all Types of Towers substructure works as indicated on Technical Specification / Drawing. The work shall be carried out in accordance with the specification and corresponding approved drawings.

EQUIPMENT:

- Tensioner & Puller
- Rollers
- Traveler
- Reel Stand
- Pilot Line Winder
- Swivel
- Running Board
- Theodolite
- Crimper
- Discharge rods
- And any other equipment / accessories required for safe handling & work purpose

PROCEDURE:

INSULATOR HOISTING:

- Ensure complete and apposite assembly of insulator with accessories as per the approved drawing on the ground before lifting.
- Ensure that the assembly is done on clean and dry surface
- Ensure that no damaged insulator is taken for assembly.
- Ensure insulator handling as per recommended by the OEM (Original Equipment Manufacturer)

- Clean each insulator before hoisting, in such a manner that it will not scratch damage or spoil the surface of the insulator, but in no case, oil should be used for cleaning.
- The corona rings shall be fully installed on their respective hardware before such hardware or insulator assembly is installed on the structure as per requirement.
- The insulator assembly shall be attached to the structure as indicated on the applicable drawing.
- Once it reaches its position it should be firmly fitted as per drawing.
- An insulator consisting of multiple insulator units, which shall be supported and protected during installation to prevent damage.

PRE-REQUISITE ACTIVITIES

Site Selection –

- Sites are to be selected keeping in view the accessibility of site for pullers, tensioners etc.
- Choose equipment location such that the sub structures shall not be overloaded.
- Drum length for conductor/OPGW/Earth wire should be considered before selection of the stringing section.
- Splicing position is to be considered depending up on the drum length, position of tower & tower access.
- A detailed patrolling of the site is to be done to know the condition of soil especially during rainy season.
- Clear all the area from obstacles.

Government Clearance–

- Ensure that a proper application is given to the section in-charge of electricity distribution division to obtain
- A shutdown where stringing work encounters live lines.
- After obtaining this, it should be sent to the corresponding substation for obtaining the shutdown.

Route Clearing–

- Trees and tall scrubs shall be cleared on either side of the center line of the route as per ROW clearance based on the voltage level.
- In addition, tall trees outside the area, of such height that they could fall within three meters of conductors shall be cut down after obtaining necessary permission. Before commencement of any tree cutting operation proper approval from authorized department has to be taken.

Resources Accumulation–

- Ensure that every tool and tackle that is required to carry out the work is available and in good working condition.
- Ensure the equipment (puller, tensioner etc.) are in good condition and with a valid test certificate.
- Ensure skilled manpower is available.
- Ensuring the proper drum schedule so that unnecessary mobilization of conductor drums / earth wire drums may be avoided to minimize the damage risk factor.
- Ensure availability of stringing material (conductor, crimper, traveler etc.)

Reinforcement of End Support–

- Double stays are provided on all cross arms and single stay is provided on the peak(s) of the angle / section towers.
- Anchor spikes/blocks have to be positioned adequately away from tower base, so that it is not exceeding 45° with horizontal (ground) as far as the topography permits the same.
- Earth anchors of sufficient capacity to be used for providing back stay for the towers.
- Steel stay wires are fixed on the cross arms / peaks using D – shackles and pulled up to the stay pit. They are connected to the stay lead from the pit through a turnbuckle using bulldog clamps.
- The turnbuckle is then tightened to a tension sufficient to balance the load which will be imposed on the cross arms / peak(s) when stringing is carried out on the other side of the tower.

INSTALLATION OF TRAVELER/ROLLER/RUNNING BLOCKS

- Install rollers (single/triple sheave) directly to the insulator in case of suspension tower for single conductor.
- Rollers are to be connected directly to yoke plate for V Strings.
- For bundle conductors travelers must be installed to the end of the insulator (suspension).
- For angle towers travelers are to be installed with a string attached to the cross arm. If substantial line angles are involved, two rollers in tandem may be required to reduce the bending radius of the conductor or the load on each traveler, or both. The running blocks shall be suspended in a manner to suit the design of the cross-arm.
- All running blocks especially those eat the tensioning and, will be fitted on the cross-arms with jute cloth wrapped over the steel work and under the slings to avoid damage to the slings as well as to the protective surface finish of the steel work. The rollers/travelers shall be having a groove to accommodate a semicircular section of conductor and larger than the diameter of the conductor/earth wire with enough space for free movement of the conductor wire inside it, so that it does not slip over or rub against the sides.
- The rollers/traveler's groove shall be lined with hard rubber or neoprene to avoid damage to conductor and shall be mounted on properly lubricated bearings.

STRINGING OF CONDUCTOR

Usually there are 2 methods used for stringing the conductors and ground wires as stated below.

- a) Slack or Layout Stringing (Installation by Pulling Lines).
- b) Tension Stringing.

Slack or Layout Stringing (Installation by Pulling Lines)–

In this method, the conductor reel is carried along the line on a vehicle and the conductor is deposited on the ground. The conductor reels are positioned on reel stands mounted on a transporting vehicle at the start of stringing section.

The conductor is unreeled from the shipping reel & dragged along the ground by means of a vehicle or pulling device. Braking device is normally provided to prevent overrunning and backlash. When the conductor reel is carried past a supporting structure, pulling is stopped and the conductor is placed in the travelers attached to the structure before proceeding to the next structure.

The conductor is then reattached to the pulling equipment and pull is continued till the next structure. This method is generally not recommended due to the damage to the conductor surface from dragging over ground, though it can be used where pulling equipment (tensioner, puller etc.) can't be moved on the site with permission from the customer.

Tension Stringing–

This method is generally used preferred for all type of transmission line stringing work. Using this method, the conductor is kept off the ground thus minimizing the damage caused by friction. The following steps are to be considered for this type of stringing.

Equipment/Material Transportation & Storage:

- The material along with the equipment (like conductor drums, conductor bits, pullet, tensioner, pulling ropes, pilot wire etc.) shall be transported & stored with care.
- Planning to be done in advance so that the material & equipment are available at site before starting the work.
- For handling and installation of equipment the handling or user manual from manufacturer must be referred.
- Once the pull sections are identified the placement of the puller, tensioner, reel stand etc. can be done. The drum is placed at the selected site (with the space required for its location) so that the cable outlet is on the upper part and aligned with the planned laying direction.
- The drum must be located at a suitable distance from the tensioner to allow enough fleet angles for the conductor leaving the reel and entering the bull wheel of the tensioner, so that no damage or scuffing of the conductor can occur.
- The lifting components usually used are hydraulic jacks and a bar with the suitable dimensions inserted in the central opening of the drum. The drum must be located at a sufficient height from the ground for free rolling movement. Level of the surface should be such that while rolling movement of the drum due to conductor pull is done it should not be unbalanced. Care shall be taken to insure that the conductors from the reels carry no dirt. Reels shall be properly cleaned before starting stringing operations for any line section. Before placing the drum reconfirm the length.
- Either the puller & the tensioner must be placed at a minimum distance from the tower equal to or more than twice the tower's height at respective positions. The tensioner as well as the puller should be placed aligned with the conductors. Tensioner machine will be anchored using spikes driven in the ground to counter the pull force. Care will be taken to ensure the Tensioner is positioned on almost level ground level and also at minimum off-set from center line as far as possible.
- Care has to be taken to minimize the angle of pull line with a maximum limitation of thirty degree from center line axis of stringing section.
- All the tools & tackles i.e. Pulleys, Anti-Twisting devices, swivel, pulling grip, clamps & suitable pulling ropes used must be placed near to the working area.
- Temporary electrical grounds shall be placed at both ends of the section and at intervals along the line, which is under construction. The grounding sets installed at both ends of the section shall

remain in place until the completion of the work and shall be removed as the last phase of the clean-up. Hot stick shall be used for installing and removing the grounding sets.

- All temporary grounds installed for protection shall be clearly visible for inspection and shall be flagged by use of a red cloth placed at the point of grounding.
- All pulling and tensioning equipment shall be bonded and effectively grounded with approved type driven grounds securely attached to the equipment. At least two driven grounds shall be used at both the pulling and tensioning setup. All conductive parts of the tensioning setup and equipment shall be operated from grounded or insulated platform.
- All existing lines, which are de-energized for crossing, shall be short circuited and grounded at each side of the crossing. Use of discharge rod is necessary at both the ends of a line crossing.
- All grounds, except those placed at both ends of the section, and red flags shall be removed when they are no longer needed for protection. Guy wire or temporary guy wire shall not be used for grounding.
- The pulley block on each tower must be earthed and grounding roller to be used on drum side to ensure grounding of any induction current developed during installation.
- Communication will be established between winch and tensioner area and at designated points along pulling section by walkie-talkies. It is recommended to provide Green / Red flag in each & every tower of the stringing section.
- For stringing of bundled conductors with running board, it will be desirable to observe the running board as it passes through each traveler so in case of any blockage the observer can communicate to the puller & tensioner end. A back up communication system must be available during actual stringing, in case if one of it fails during the work.

Paving Out of Conductor

A pilot wire is first paved out by passing through the rollers / travelers fixed on the cross arms. The Supervisor will confirm if all pilot wires are positioned in the rollers and that the connector is properly secured. Pilot wires are pulled in under tension. The pilot wire is connected to a single conductor through swivel link, or to bundle conductors through swivel links thru woven grip and a running board, sometimes pilot lines are used to pull a heavier pulling line which in turn is used to pull the conductors.

The conductors shall be run out of the drums from the top in order to avoid any damage due to chafing. On confirmation of above, pulling will be started, slowly but steadily by synchronizing the operation of Puller and Tensioner, through radio communication. Conductor and earth wire will be kept off the ground and other obstructions by controlled tension at any time of the operation.

The spinning of the conductors and ground wires shall be prevented during stringing. The conductor shall be continuously observed for loose or broken strands or any other damage. The maximum tension imposed on a conductor during stringing operations shall not exceed than that necessary to clear obstructions on the ground.

In general stringing tension of about one-half of sagging tension is a good criterion. The sequence of running out shall be from top to downwards, that is, the earth wire shall be run out first, followed by the conductors in succession. Unbalances of loads on towers shall be avoided as far as possible.

Outer phases of line conductor shall be strung before the stringing of the middle phase is taken up. Adequate steps shall be taken to prevent clashing of sub-conductors from paving out to the installations of the spacers/spacer dampers.

Care shall be taken that both sub-conductors of a bundle are from the same conductor supplier and preferably from the same batch. When approaching end of a drum length at least three coils shall be left then the stringing operations are to be stopped. These coils are to be removed carefully, and, if another length is required to be run out, a joint shall be made as per the recommendations of the conductor manufacturers. It is recommended that the pulling to be continued until the conductor end is approximately 5 meters through winch tower, in order to facilitate sagging and tying in with tower cross arm.

It is recommended that the speeds of 3 – 4 km / hour should be maintained so as to provide a smooth passage of the running board or connecting hardware, or both, over the travelers. Slower speeds may cause significant swinging of the traveler and insulator hardware assemblies. Higher speeds may create a potential hazard of greater damage in case of a malfunction.

Hold-down blocks or similar devices will be used to uplift locations. Full tension joints shall be pressed during paying out and covered with joint protectors which will be removed at the end of the pull before sagging.

Splicing/Joints

All the joints on the conductor and earth wire shall be of compression type, in accordance with the recommendations of the manufacturer for which all necessary tools and equipment like compressors dies process, etc., shall have to be arranged in advance.

Each part of the joint shall be cleaned by wire brush to make it free of rust or dirt, etc. and properly greased with anticorrosive compound before the final compression is done with the compressors. All joints or splices shall be made at least 30 meters away from the structures.

No joints or splices shall be made in spans crossing over main roads, railways, small rivers in tension spans. Not more than one joint per sub-conductor shall be allowed in one span. The compression type fitting used shall be of self-centering type or care shall be taken to mark the conductors to indicate when the fitting is centered properly.

During compression or splicing operation, the conductor shall be handled in such a manner as to prevent lateral or vertical bearing against the dies. After pressing the joint the aluminium sleeve shall have all corners rounded, burrs and sharp edges removed and smoothed.

Considerations on Crossings

Scaffoldings are to be used wherever there is road crossing, line crossing, railway lines etc. are to be crossed during the stringing operations. It is to be ensured that the other work (viz. road traffic flow, etc.) isn't affected due to stringing of the tower.

It is to be ensured that the scaffolding provided for the crossing is of adequate strength so as to bear the loads of stringing operation.

Ensure that the shutdown permission is obtained from the concerned authority in case of electric line crossing. The shutdown procedure as stated below shall be followed.

- Ensure that the DB is switched off with a person present at DB all time possessing communication equipment (two-way radios/mobile).
- Ensure that for each line conductor there are 2 discharge rods available for shutdown.
- Electrical rubber hand gloves with rod for discharging cable fitting should be present at the site/location.
- First grounding/earthing of the mild steel (MS) rod should be done as shown overleaf. Then the cable to be earthed to the earthing rod. Then one by one discharge cables to be tightened to the electrical lines/phases with the help of discharge rods.

All the shutdown procedure form/ Permit to work form should be submitted by the supervisor/Engineer.

Sagging

Sagging processes consist of sag matching with the sag details mentioned in sag chart. The following considerations are to be made before sagging.

- Regulating spans or sag sighting spans identified.
- Sag Section.

Sagging is generally carried out by Sagging winch and a 4 way + 4-way pulley arrangement.

One steel wire rope lead is passed through an equalizing pulley, of diameter equal to the sub-conductor spacing, and its ends are connected to both the come along clamps on the conductors. This is done so that the tension on both the conductors remains the same. The equalizing pulley is connected to one end of the pulley system. The other end of the pulley system is connected to the dynamometer. The double tension hardware is hoisted and anchored on the cross arm. The dynamometer is connected to the yoke plate of the double tension hardware.

The running blocks, when suspended from the transmission structure for sagging shall be so adjusted that the conductors on running blocks will be at the same height as the suspension clamp to which it is to be secured.

Two leads and two pulley systems, one for each conductor, can be used in place of equalizing pulley. Both the pulley systems are connected to the yoke plate of the double tension hardware and tensioned together one by one as shown in following figures. However, dynamometer is used only on one conductor and the sag on the other conductor is matched with the sag of the first conductor.

A come along clamp is fitted on each rough sagged conductor at a distance from the tower on which the final sagging is being carried out. The come along clamp is then connected to the pulley arrangement which is being used for final sagging through a steel wire rope which is generally referred to as "lead".

The length of this lead is such that, after final sag, the come along clamp remains far enough from the tower so that the loose portion of the conductor on the tower side can be pulled up to the cross arm for the purpose of measurement.

Now the tensioning is done in the wires so as to provide final sag, which is measured to complete the sagging of conductor/earth wire/OPGW. The conductors shall be pulled up to the desired sag and left in

running blocks for at least one hour after which the sag shall be rechecked and adjusted. If necessary, before transferring the conductors from the running blocks to be suspension clamps.

The conductors shall be clamped within 56 hours of sagging in. The sag will be checked in the first and the last span of the section in case of sections up to eight spans and in one intermediate span also for sections with more than eight spans. The sag shall also be checked when the conductors have been drawn up and transferred from running blocks to the insulator clamps.

Clipping In

Clipping of the conductors in position shall be done in accordance with the recommendations of the manufacturer. Conductor shall be fitted with armour rods where it is made to pass through suspension clamps.

The jumpers at the section and angle towers shall be formed to parabolic shape to ensure maximum clearance requirements. Pilot suspension insulator string shall be used, if found necessary, to restrict the jumper swings to the design values. The security clip shall be properly opened and sprung into position.

Fittings/Accessories Installation

Spacers, spacer dampers, vibration dampers and other conductor and earth wire accessories shall be installed as per the design requirements and respective manufacturer's instructions. Spacers shall be fitted within 24 hours of the conductor clamping.

While installing the conductor and earth wire accessories proper care shall be taken to ensure that the surfaces are clean and smooth and no damage shall occur to any part of the accessories. Fasteners in all fittings and accessories shall be secured in position using torque wrench. Spacing bicycle/ trolley may also be used for fixing conductor accessories.

Recommendations for Sagging of the OPGW Cables:

The specific recommendations for OPGW are as follows

At the time of sagging, the attachment fittings must also be installed to prevent damage to the OPGW cable. While holding of OPGW wire, exact size groove type clamp should be used for holding the rough sag load of the OPGW wire. Over sagging for OPGW wire should not be done, as per sag chart only load should be taken to avoid damage to the fibre inside & earth peak bend.

After completion of sagging and clipping, the surplus OPGW is to be laid temporary on the tower body in coil (Diameter of coil is approximately 1.0 - 1.5 m) and fixed on the tower. It is important that precautions must be taken to prevent any damage to OPGW.

While connecting the OPGW to down lead clamp bending radius should be maintained as mentioned above otherwise fibers inside OPGW may get damage. Sealing of both ends to be done properly of OPGW cable, if Splicing / jointing work is not under progress.

Ensure that the 15–20-meter extra cable should be kept at both ends in addition to the tower height. Surplus length of OPGW is necessary to lead down from the strain clamp on the top of tower to the joint box along with the arm and tower structures. The position of joint box is near the bottom cross-arm and

excess OPGW shall be coiled in such a way that the OPGW remains above the bottom cross- arm of the tower.

After splicing, each joint is to be optically verified using OTDR in order to ensure that the attenuation values are within the required margins.

Post Installation Tests/Checks

The conductor & OPGW is required to be tested for continuity, attenuation values etc. tests as required by client after completion of final sagging.

Conductor

- Continuity test are carried as per the client's requirement for ensuring that there is proper continuity and there is no breakage in the conductor.

OPGW

- The OPGW is verified optically using OTDR in order to ensure that the attenuation values are within the required margin. Also, the values are matched with the values obtained before installation & after installation.

TRANSPORT, LOADING, UNLOADING AND STORAGE:

The drums should always be transported in vertical position with the cable ends fixed to prevent cable from slackening. All of the staves and safe guards should be maintained until the drums are situated for immediate installation.

After the transport, the drums should be inspected to verify that they have not been damaged and that none of the staves and / or safeguards is broken.

The drums should never, in any case, be thrown from the lorry during unloading, or moved by uncontrolled rolling. Loading and unloading are performed so that the drum remains in vertical position and the sides of the drum are not damaged by using suitable method.

The direction of the drum turns should follow the instruction of the mark on the drum. In any case the drum should not be stored horizontally. The ends of the cable should be sealed to prevent water penetration.

The drums can be moved by rolling a short distance ensuring that there are no objects that may damage the staves. The direction in which the drum turns should be the same as that in which the cable is wound during manufacture. If available the handling and storage should be done as per the recommendations of the OEM.

The drum should not be stored on its side under any circumstances whatsoever. The ends of the cable should be sealed to prevent water penetration. The drums should be stored on flooring that is strong enough to prevent sinking. The drums should be stored to facilitate handling and loading. They should be located far from any activity that may damage them.

APPENDIX 4A: SAMPLE ATTENDANCE SHEET OF PUBLIC CONSULTATION



ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT
Attendance Sheet

Venue: Seconee

Purpose: Awareness for Transmission line among local public

Date: 10/4/2025

Sl. No.	Name	Occupation	Contact no.	Signature
1	Kulani Sahu	Farmer	88769-01250	[Signature]
2	Bipal Sahu	Pvt. Service	99560-15629	[Signature]
3	Nipon Sahu	Farmer	NO	[Signature]
4	Binod Ganju	wage worker	88223-41629	[Signature]
5	Imandare Ali	wage worker	NO	[Signature]
6	Mujafare Haque	Farmer	88226-47042	[Signature]
7	Nihal Sahu	Govt. Service	88762-45013	[Signature]



ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT
Attendance Sheet of Public Consultation with Tribal People



ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT
Attendance Sheet of Public Consultation with Tribal People

Venue: Borhola karbi gaon

Date: 18/07/2025

SL. No.	Name	Sex	Occupation	Signature
1	Homsina Timung	M	Farmer	<i>[Signature]</i>
2	Bimal Singh Timung	M	Farmer	<i>Bimal Singh Timung</i>
3	Malati Ingtipi	F	Homemaker	<i>maloti Ingtipi</i>
4	Ranjit Takbi	M	Farmer	<i>Ranjit Takbi</i>
5	Mintu Takbi	M	Skill wage worker	<i>Mintu Takbi</i>
6	Gudam Takbi	M	Skill wage worker	<i>Gudam Takbi</i>
7	Rumi Takbipi	F	Studying	<i>Rumi Takbipi</i>
8	Lakshi Terangpi	F	Homemaker	<i>Lakshi Terangpi</i>
9	Klindap Terangpi	F	Homemaker (weaver)	<i>Klindap Terangpi</i>
10	Sagar Kramsa	M	Farmer	<i>Sagar Kramsa</i>
11	Biren Kramsa	M	Farmer	<i>Biren Kramsa</i>

APPENDIX 4B: SOME PHOTOGRAPHS OF PUBLIC CONSULTATION



Photo Plate 1: Public consultation at Seconee Pathar.



Photo Plate 2: Public consultation at Borhola Village.



Photo Plate 3: Public consultation at Borhola village.



Photo Plate 4: Public consultation with Tribal community at Borhola village.

APPENDIX 4C: SAMPLE ATTENDANCE SHEET OF STACKHOLDER CONSULTATION



ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet of Public Consultation with Tribal People

Venue: *Seconee*

Date: *19/07/2025*

SL. No.	Name	Sex	Occupation	Signature
1	Pomita Tomte	F	Homemaker	<i>P. Tomte</i>
2	Karan Tanti	M	Govt Employee	<i>Karan</i>
3	Pritesh Ganjoo	M	Wage Worker	<i>Pritesh</i>
4	Nihal Tanti	M	Privat Employee	<i>Nihal</i>
5	Mayuri Tanti	F	Govt Employee	<i>Mayuri</i>
6	Bornali Tanti	F	Homemaker	<i>Bornali</i>
7	Rina Ganju	F	Govt Employee	<i>Rina</i>
8	Sumon Baishnab	F	Homemaker	<i>Sumon</i>
9	Renuka Tanti	F	Homemaker	<i>Renuka</i>
10	Nurjahan Begum	F	Govt. Employee	<i>Nurjahan B.</i>
11.	Hitlal Tanti	M	Privat Employee	<i>H. T.</i>
12.	Ranit Tanti	M	Farmer	<i>Ranit</i>
14.	Kunal Tanti	M	wage worker	<i>Kunal</i>
15.	Bijoy Ganjoo	M	Farmer	<i>Bijoy Ganjoo</i>

APPENDIX 5: IFC BENCHMARK STANDARDS FOR WORKERS ACCOMMODATION

August 2009

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PART II: STANDARDS FOR AND MANAGEMENT OF WORKERS' ACCOMMODATION**I. Standards for workers' accommodation**

This section looks at the principles and standards applicable to the location and construction of workers' accommodation, including the transport systems provided, the general living facilities, rooms/dormitories facilities, sanitary facilities, canteen and cooking facilities, food safety, medical facilities and leisure/social facilities.

A. National/local standards

The key standards that need to be taken into consideration, as a baseline, are those contained in national/local regulations. Although it is quite unusual to find regulations specifically covering workers' accommodation, there may well be general construction standards which will be relevant. These may include the following standards:

- **Building construction:** for example, quality of material, construction methods, resistance to earthquakes.
- **Housing and public housing:** in some countries regulations for housing and public housing contain requirements on issues such as the basic amenities, and standards of repair.
- **General health, safety and security:** requirements on health and safety are often an important part of building standards and might include provisions on occupation density, minimal air volumes, ventilation, the quality of the flooring (slip-resistant) or security against intrusion.
- **Fire safety:** requirements on fire safety are common and are likely to apply to housing facilities of any type. This can include provision on fire extinguishers, fire alarms, number and size of staircases and emergency exits, restrictions on the use of certain building materials.
- **Electricity, plumbing, water and sanitation:** national design and construction standards often include very detailed provisions on electricity or plumbing fixtures/fittings, water and sanitation connection/equipment.

Benchmark

1. The relevant national and local regulations have been identified and implemented.

B. General living facilities

Ensuring good standards in living facilities is important in order to avoid safety hazards and to protect workers from diseases and/or illness resulting from humidity, bad/stagnant water (or lack of water), cold, spread of fungus, proliferation of insects or rodents, as well as to maintain a good level of morale. The location of the facilities is important to prevent exposure to wind, fire, flood and other natural hazards. It is also important that workers' accommodation is unaffected by the environmental or operational impacts of the worksite (for example noise, emissions or dust) but is sufficiently close that workers do not have to spend undue amounts of time travelling from their accommodation to the worksite. Living facilities should be built using adequate materials and should always be kept in good repair, clean and free from rubbish and other refuse.

Benchmarks

1. Living facilities are located to avoid flooding and other natural hazards.
2. Where possible, living facilities are located within a reasonable distance from the worksite.
3. Transport from the living facilities to worksite is safe and free.
4. The living facilities are built with adequate materials, kept in good repair and kept clean and free from rubbish and other refuse.

Drainage

The presence of stagnant water is a factor of proliferation of potential disease vectors such as mosquitoes, flies and others, and must be avoided.

Benchmarks

1. The building site is adequately drained to avoid the accumulation of stagnant water.

Heating, air conditioning, ventilation and light

Heating, air-conditioning and ventilation should be appropriate for the climatic conditions and provide workers with a comfortable and healthy environment to rest and spend their spare time.

Benchmarks

1. For facilities located in cold weather zones, the temperature is kept at a level of around 20 degrees Celsius notwithstanding the need for adequate ventilation.
2. For facilities located in hot weather zones, adequate ventilation and/or air conditioning systems are provided.
3. Both natural and artificial lighting are provided and maintained in living facilities. It is best practice that the window area represents not less than 5% to 10% of the floor area. Emergency lighting is provided.

Water

Special attention to water quality and quantity is absolutely essential. To prevent dehydration, water poisoning and diseases resulting from lack of hygiene, workers should always have easy access to a source of clean water. An adequate supply of potable water must be available in the same buildings where bedrooms or dormitories are provided. Drinking water must meet local or WHO drinking water standards⁷ and water quality must be monitored regularly. Depending on the local context, it could either be produced by dedicated catchment and treatment facilities or tapped from existing municipal facilities if their capacity and quality are adequate.

Benchmarks

1. Access to an adequate and convenient supply of free potable water is always available to workers. Depending on climate, weather conditions and accommodation standards, 80 to 180 litres per person per day are available.
2. Drinking water meets national/local or WHO drinking water standards.⁸
3. All tanks used for the storage of drinking water are constructed and covered as to prevent water stored therein from becoming polluted or contaminated.

7. www.who.int/water_sanitation_health/dwq/en/
8. *ibid*

4. Drinking water quality is regularly monitored.

Wastewater and solid waste

Wastewater treatment and effluent discharge as well as solid waste treatment and disposal must comply with local or World Bank effluent discharge standards⁹ and be adequately designed to prevent contamination of any water body, to ensure hygiene and to avoid the spread of infections and diseases, the proliferation of mosquitoes, flies, rodents, and other pest vectors. Depending on the local context, treatment and disposal services can be either provided by dedicated or existing municipal facilities.

Benchmarks

1. Wastewater, sewage, food and any other waste materials are adequately discharged, in compliance with local or World Bank standards – whichever is more stringent – and without causing any significant impacts on camp residents, the biophysical environment or surrounding communities.
2. Specific containers for rubbish collection are provided and emptied on a regular basis. Standards range from providing an adequate number of rubbish containers to providing leak proof, non-absorbent, rust and corrosion-resistant containers protected from insects and rodents. In addition it is best practice to locate rubbish containers 30 metres from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to be determined based on temperatures and volumes generated) to avoid unpleasant odours associated with decaying organic materials.
3. Pest extermination, vector control and disinfection are carried out throughout the living facilities in compliance with local requirements and/or good practice. Where warranted, pest and vector monitoring should be performed on a regular basis.

9. As per the "Pollution Prevention and Abatement Handbook", World Bank Group, July 1998, available from www.worldbank.org

C. Room/dormitory facilities

The standards of the rooms or dormitory facilities are important to allow workers to rest properly and to maintain good standards of hygiene. Overcrowding should be avoided particularly. This also has an impact on workers' productivity and reduces work-related accidents. It is generally acknowledged that rooms/dormitories should be kept clean and in a good condition. Exposure to noise and odour should be minimised. In addition, room/dormitory design and equipment should strive to offer workers a maximum of privacy. Resorting to dormitories should be minimised and single or double rooms are preferred. Dormitories and rooms must be single-sex.

Benchmarks

1. Rooms/dormitories are kept in good condition.
2. Rooms/dormitories are aired and cleaned at regular intervals.
3. Rooms/dormitories are built with easily cleanable flooring material.
4. Sanitary facilities are located within the same buildings and provided separately for men and women.
5. Density standards are expressed either in terms of minimal volume per resident or of minimal floor space. Usual standards range from 10 to 12.5 cubic metres (volume) or 4 to 5.5 square metres (surface).
6. A minimum ceiling height of 2.10 metres is provided.
7. In collective rooms, which are minimised, in order to provide workers with some privacy, only a reasonable number of workers are allowed to share the same room. Standards range from 2 to 8 workers.
8. All doors and windows should be lockable, and provided with mosquito screens where conditions warrant.
9. There should be mobile partitions or curtains to ensure privacy.
10. Every resident is provided with adequate furniture such as a table, a chair, a mirror and a bedside light.
11. Separate sleeping areas are provided for men and women, except in family accommodation.

Additional issue

Irrespective of whether workers are supposed to keep their facilities clean, it is the responsibility of the accommodation manager to ensure that rooms/dormitories and sanitary facilities are in good condition.

Bed arrangements and storage facilities

The provision of an adequate numbers of beds of an appropriate size is essential to provide workers with decent, safe and hygienic conditions to rest and sleep. Here again, particular attention should be paid to privacy. Consideration should be given to local customs so beds could be replaced by hammocks or sleeping mats for instance.

Benchmarks

1. A separate bed for each worker is provided. The practice of "hot-bedding" should be avoided.
2. There is a minimum space between beds of 1 metre.
3. Double deck bunks are not advisable for fire safety and hygiene reasons, and their use is minimised. Where they are used, there must be enough clear space between the lower and upper bunk of the bed. Standards range from to 0.7 to 1.10 metres.
4. Triple deck bunks are prohibited.
5. Each worker is provided with a comfortable mattress, pillow, cover and clean bedding.
6. Bed linen is washed frequently and applied with repellents and disinfectants where conditions warrant (malaria).
7. Facilities for the storage of personal belongings for workers are provided. Standards vary from providing an individual cupboard for each worker to providing 475-litre big lockers and 1 metre of shelf unit.
8. Separate storage for work boots and other personal protection equipment, as well as drying/airing areas may need to be provided depending on conditions.

D. Sanitary and toilet facilities

It is essential to allow workers to maintain a good standard of personal hygiene but also to prevent contamination and the spread of diseases which result from inadequate sanitary facilities. Sanitary and toilet facilities will always include all of the following: toilets, urinals, washbasins and showers. Sanitary and toilet facilities should be kept in a clean and fully working condition. Facilities should also be constructed of materials that are easily cleanable and ensure privacy. Sanitary and toilet facilities are never shared between male and female residents, except in family accommodation. Where necessary, specific additional sanitary facilities are provided for women.

Benchmarks

1. Sanitary and toilet facilities are constructed of materials that are easily cleanable.
2. Sanitary and toilet facilities are cleaned frequently and kept in working condition.
3. Sanitary and toilet facilities are designed to provide workers with adequate privacy, including ceiling to floor partitions and lockable doors.
4. Sanitary and toilet facilities are not shared between men and women, except in family accommodation.

Toilet facilities

Toilet arrangements are essential to avoid any contamination and prevent the spread of infectious disease.

Benchmarks

1. An adequate number of toilets is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons. For urinals, usual standards are 1 unit to 15 persons.
2. Toilet facilities are conveniently located and easily accessible. Standards range from 30 to 60 metres from rooms/dormitories. Toilet rooms shall be located so as to be accessible without any individual passing through any sleeping room. In addition, all toilet rooms should be well-lit, have good ventilation or external windows, have sufficient hand wash basins and be conveniently located. Toilets and other sanitary facilities should be ("must be" in cold climates) in the same building as rooms and dormitories.

Showers/bathrooms and other sanitary facilities

Hand wash basins and showers should be provided in conjunction with rooms/dormitories. These facilities must be kept in good working condition and cleaned frequently. The flooring for shower facilities should be of hard washable materials, damp-proof and properly drained. Adequate space must be provided for hanging, drying and airing clothes. Suitable light, ventilation and soap should be provided. Lastly, hand washing, shower and other sanitary facilities should be located within a reasonable distance from other facilities and from sleeping facilities in particular.

Benchmarks

1. Shower/bathroom flooring is made of anti-slip hard washable materials.
2. An adequate number of handwash facilities is provided to workers. Standards range from 1 unit to each 15 persons to 1 unit per 6 workers. Handwash facilities should consist of a tap and a basin, soap and hygienic means of drying hands.
3. An adequate number of shower/bathroom facilities is provided to workers. Standards range from 1 unit to 15 persons to 1 unit per 6 persons.
4. Showers/bathrooms are conveniently located.
5. Shower/bathroom facilities are provided with an adequate supply of cold and hot running water.

E. Canteen, cooking and laundry facilities

Good standards of hygiene in canteen/dining halls and cooking facilities are crucial. Adequate canteen, cooking and laundry facilities and equipments should also be provided. When caterers are contracted to manage kitchens and canteens, special attention should be paid to ensure that contractors take into account and implement the benchmarks below, and that adequate reporting and monitoring mechanisms are in place. When workers can individually cook their meals, they should be provided with a space separate from the sleeping areas. Facilities must be kept in a clean and sanitary condition. In addition, canteen, kitchen, cooking and laundry floors, ceilings and walls should be made of easily cleanable materials.

Benchmarks

1. Canteen, cooking and laundry facilities are built in adequate and easy to clean materials.
2. Canteen, cooking and laundry facilities are kept in a clean and sanitary condition.
3. If workers can cook their own meals, kitchen space is provided separate from sleeping areas.

Laundry facilities

Providing facilities for workers to wash both work and non-work related clothes is essential for personal hygiene. The alternative is for the employer to provide a free laundry service.

Benchmarks

1. Adequate facilities for washing and drying clothes are provided. Standards range from providing sinks or tubs with hot and cold water, cleaning soap and drying lines to providing washing machines and dryers.
2. When work clothes are used in contact with dangerous substance (for example, application of pesticide), special laundry facilities (washing machines) should be provided.

Additional issue

When workers are provided with facilities allowing them to individually do their laundry or cooking, it should be the responsibility of each worker to keep the facilities in a clean and sanitary condition. Nonetheless, it is the responsibility of the accommodation manager to make sure the standards are respected and to provide an adequate cleaning, disinfection and pest/vector control service when necessary.

Additional issue

When the employer provides family accommodation, it is best practice to provide each family with a private kitchen or the necessary cooking equipment to allow the family to cook on their own.

Canteen and cooking facilities

Canteen and cooking facilities should provide sufficient space for preparing food and eating, as well as conform to hygiene and safety requirements.

Benchmarks

1. Canteens have a reasonable amount of space per worker. Standards range from 1 square metre to 1.5 square metres.
2. Canteens are adequately furnished. Standards range from providing tables, benches, individual drinking cups and plates to providing special drinking fountains.
3. Places for food preparation are designed to permit good food hygiene practices, including protection against contamination between and during food preparation.
4. Kitchens are provided with facilities to maintain adequate personal hygiene including a sufficient number of washbasins designated for cleaning hands with clean, running water and materials for hygienic drying.
5. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are also equipped with a smooth durable washable surface. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures and all walls and ceilings have a smooth durable washable surface.
6. All kitchen floors, ceiling and wall surfaces adjacent to or above food preparation and cooking areas are built using durable, non-absorbent, easily cleanable, non-toxic materials.
7. Wall surfaces adjacent to cooking areas are made of fire-resistant materials. Food preparation tables are equipped with a smooth, durable, easily cleanable, non-corrosive surface made of non-toxic materials. Lastly, in order to enable easy cleaning, it is good practice that stoves are not sealed against a wall, benches and fixtures are not built into the floor, and all cupboards and other fixtures have a smooth, durable and washable surface.
8. Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment are provided.
9. Food waste and other refuse are to be adequately deposited in sealable containers and removed from the kitchen frequently to avoid accumulation.

F. Standards for nutrition and food safety

When cooking for a number of workers, hygiene and food safety are absolutely critical. In addition to providing safe food, providing nutritious food is important as it has a very direct impact on workers' productivity and well-being. An ILO study demonstrates that good nutrition at work leads to gains in productivity and worker morale, prevention of accidents and premature deaths and reductions in health care costs.¹⁰

Benchmarks

1. The WHO 5 keys to safer food or an equivalent process is implemented (see Box 6 below).
2. Food provided to workers contains an appropriate level of nutritional value and takes into account religious/cultural backgrounds; different choices of food are served if workers have different cultural/religious backgrounds.
3. Food is prepared by cooks. It is also best practice that meals are planned by a trained nutritionist.

Box 6 - Five keys to safer food

Keep clean

Wash your hands before handling food and often during food preparation.
 Wash your hands after going to the toilet.
 Wash and sanitise all surfaces and equipment used for food preparation.
 Protect kitchen areas and food from insects, pests and other animals.

While most micro organisms do not cause disease, dangerous micro organisms are widely found in soil, water, animals and people. These micro organisms are carried on hands, wiping cloths and utensils, especially cutting boards and the slightest contact can transfer them to food and cause food borne diseases.

Separate raw and cooked

Separate raw meat, poultry and seafood from other foods.
 Use separate equipment and utensils such as knives and cutting boards for handling raw foods.
 Store food in containers to avoid contact between raw and prepared foods.

Raw food, especially meat, poultry and seafood, and their juices, can contain dangerous micro organisms which may be transferred onto other foods during food preparation and storage.

Cook thoroughly

Cook food thoroughly, especially meat, poultry, eggs and seafood.
 Bring foods like soups and stews to boiling to make sure that they have reached 70°C. For meat and poultry, make sure that juices are clear, not pink. Ideally, use a thermometer.
 Reheat cooked food thoroughly.

Proper cooking kills almost all dangerous micro organisms. Studies have shown that cooking food to a temperature of 70°C can help ensure it is safe for consumption. Foods that require special attention include minced meats, rolled roasts, large joints of meat and whole poultry.

Keep food at safe temperatures

Do not leave cooked food at room temperature for more than 2 hours.
 Refrigerate promptly all cooked and perishable food (preferably below 5°C).
 Keep cooked food piping hot (more than 60°C) prior to serving.
 Do not store food too long even in the refrigerator.
 Do not thaw frozen food at room temperature.

Micro organisms can multiply very quickly if food is stored at room temperature. By holding at temperatures below 5°C or above 60°C, the growth of micro organisms is slowed down or stopped. Some dangerous micro organisms still grow below 5°C.

Use safe water and raw materials

Use safe water or treat it to make it safe.
 Select fresh and wholesome foods.
 Choose foods processed for safety, such as pasteurised milk.
 Wash fruits and vegetables, especially if eaten raw.
 Do not use food beyond its expiry date.

Raw materials, including water and ice, may be contaminated with dangerous micro organisms and chemicals. Toxic chemicals may be formed in damaged and mouldy foods. Take care in selection of raw materials and implement simple measures such as washing.

Source: World Health Organization, Food Safety
www.who.int/foodsafety/publications/consumer/en/5keys_en.pdf

10. C. Wanjek (2005), "Food at Work - Workplace solutions for malnutrition, obesity and chronic disease", International Labour Organization, Geneva.

G. Medical facilities

Access to adequate medical facilities is important to maintain workers' health and to provide adequate responses in case of health emergency situations. The availability or level of medical facilities provided in workers' accommodation is likely to depend on the number of workers living on site, the medical facilities already existing in the neighbouring communities and the availability of transport. However, first aid must always be available on site.

First aid facilities

Providing adequate first aid training and facilities can save lives and prevent minor injuries becoming major ones.

Other medical facilities

Depending on the number of workers living on site and the medical services offered in the surrounding communities, it is important to provide workers with additional medical facilities. Special facilities for sick workers and medical services such as dental care, surgery, a dedicated emergency room can, for instance, be provided.

Benchmarks

1. A number of first aid kits adequate to the number of residents are available.
2. First aid kits are adequately stocked. Where possible a 24/7 first aid service/facility is available.
3. An adequate number of staff/workers is trained to provide first aid.
4. Where possible and depending on the medical infrastructures existing in the community, other medical facilities are provided (nurse rooms, dental care, minor surgery).

Box 7 - UK/HSE First Aid facilities

What should be in a first aid kit?

There is no standard list and it very much depends on the assessment of the needs in a particular workplace:

- a leaflet giving general guidance on first aid, for example HSE leaflet *Basic advice on first aid at work*
- individually wrapped sterile adhesive dressings (assorted sizes)
- two sterile eye pads
- four individually wrapped triangular bandages (preferably sterile)
- six safety pins
- six medium-sized (approximately 12 cm x 12 cm) individually wrapped sterile unmedicated wound dressings
- two large (approximately 18 cm x 18 cm) sterile individually wrapped unmedicated wound dressings
- one pair of disposable gloves.

What should be kept in the first aid room?

The room should contain essential first aid facilities and equipment. Typical examples of these are:

- a sink with hot and cold running water
- drinking water and disposable cups
- soap and paper towels
- a store for first aid materials
- foot-operated refuse containers, lined with disposable yellow clinical waste bags or a container for the safe disposal of clinical waste
- a couch with waterproof protection, clean pillows and blankets
- a chair
- a telephone or other communication equipment
- a record book for recording incidents where first aid has been given.

Source: UK Health and Safety Executive

H. Leisure, social and telecommunication facilities

Basic leisure and social facilities are important for workers to rest and also to socialise during their free time. This is particularly true where workers' accommodation is located in remote areas far from any communities. Where workers' accommodation is located in the vicinity of a village or a town, existing leisure or social facilities can be used so long as this does not cause disruption to the access and enjoyment of local community members. But in any case, social spaces should also be provided on site. Exercise and recreational facilities will increase workers' welfare and reduce the impact of the presence of workers in the surrounding communities. In addition it is also important to provide workers with adequate means to communicate with the outside world, especially when workers' accommodation is located in a remote location or where workers live on site without their family or are migrants. Consideration of cultural attitudes is important. Provision of space for religious observance needs to be considered, taking account of the local context and potential conflicts in certain situations.

Benchmarks

1. Basic collective social/rest spaces are provided to workers. Standards range from providing workers multi-purpose halls to providing designated areas for radio, TV, cinema.
2. Recreational facilities are provided. Standards range from providing exercise equipment to providing a library, swimming pool, tennis courts, table tennis, educational facilities.
3. Workers are provided with dedicated places for religious observance if the context warrants.
4. Workers have access to public phones at affordable/public prices (that is, not inflated).
5. Internet facilities can also be provided, particularly where large numbers of expatriates/Third Country Nationals (TCNs) are accommodated.

Box 8 - Examples of social/leisure facilities

In Qatar there is a newly built 170-hectare complex which accommodates contractors and more than 35,000 workers for a project run by a major oil company. At the heart of this complex, the recreation area includes extensive sport facilities, a safety-training centre, an outdoor cinema and a park. The purpose of those facilities goes beyond providing adequate accommodation to the large numbers of contractors and workers on this project but is designed to provide the same level of services as a small town. The accommodation complex has a mayor, as well as a dedicated welfare team which is responsible for the workers' welfare, cultural festivals and also acts as the community's advocates.

II. Managing workers' accommodation

Once the living facilities have been constructed and are operational, effective ongoing management of living facilities is essential. This encompasses issues such as the physical maintenance of buildings, security and consultation with residents and neighbouring communities in order to ensure the implementation of the housing standards in the long term.

A. Management and staff

Worker camps and housing facilities should have a written management plan, including management policies or plans on health and safety, security, living conditions, workers' rights and representation, relationships with the communities and grievance processes. Part of those policies and plans can take the form of codes of conduct. The quality of the staff managing and maintaining the accommodation facilities will have a decisive impact on the level of standards which are implemented and the well-being of workers (for instance on the food safety or overall hygiene standards). It is therefore important to ensure that managers are competent and other workers are adequately skilled. The manager will be responsible for overseeing staff, for ensuring the implementation of the accommodation standards and for the implementation of the management plans. It is important the accommodation manager has the corresponding authority to do so.

If the facility is being managed by a contractor, as is often the case, the expected housing and management standards should be specified in the relevant contract, and mechanisms to ensure that those standards are implemented should be set up. As part of this process, the accommodation manager (or contractor) should have a duty to monitor the application of the accommodation standards and to report frequently on their implementation to the client.

Benchmarks

1. There are management plans and policies especially in the field of health and safety (with emergency responses), security, workers' rights, relationships with the communities.
2. An appointed person with the adequate background and experience is in charge of managing the workers' accommodation.
3. If contractors are being used, there are clear contractual management responsibilities and monitoring and reporting requirements.
4. Depending on the size of the accommodation, there is a sufficient number of staff in charge of cleaning, cooking and of general maintenance.
5. Such staff are recruited from the local communities.
6. Staff have received basic health and safety training.
7. Persons in charge of the kitchen are trained in nutrition and food-handling and adequately supervised.

B. Charging fees for accommodation and services

Charging fees for the accommodation or the services provided to workers such as food or transport should be avoided where workers do not have the choice to live or eat anywhere else, or if deemed unavoidable, should take into account the specific nature of workers' accommodation. Any charges should be transparent, discussed during recruitment and specified in workers' contracts. Any such charges should still leave workers with sufficient income and should never lead to a worker becoming indebted to an employer.

Benchmarks

1. When fees are charged, workers are provided with clear information and a detailed description of all payments made such as rent, deposit and other fees.
2. When company housing is considered to be part of workers' wages, it is best practice that workers are provided with an employment contract clearly specifying housing arrangements and regulations, in particular rules concerning payments and fees, facilities and services offered and rules of notice.
3. When fees are charged, the renting arrangements are fair and do not cost the worker more than a small proportion of income and never include a speculative profit.
4. Food and other services are free or are reasonably priced, never above the local market price.
5. The provision of accommodation or other services by employers as a payment for work is prohibited.

Additional issue

To avoid that fair renting arrangements turn into unfair ones, any deposit of advance should be set at a reasonable level and it is best practice that renting prices include a fixed fee covering the water needed and the use of the energy required to the functioning of the heating/cooling/ventilation/cooking systems. However, in such cases it might be necessary to raise workers' awareness to ensure that workers will use the facilities responsibly, particularly in areas where water is scarce.

C. Health and safety on site

The company or body in charge of managing the workers' accommodation should have the prime responsibility for ensuring workers' physical well-being and integrity. This involves making sure that the facilities are kept in good condition (ensuring that sanitary standards or fire regulations are respected for instance) and that adequate health and safety plans and standards are designed and implemented.

Benchmarks

1. Health and safety management plans including electrical, mechanical, structural and food safety have been carefully designed and are implemented.
2. The person in charge of managing the accommodation has a specific duty to report to the health authorities the outbreak of any contagious diseases, food poisoning and other important casualties.
3. An adequate number of staff/workers is trained to provide first aid.
4. A specific fire safety plan is prepared, including training of fire wardens, periodic testing and monitoring of fire safety equipment and periodic drills.
5. Guidance on the detrimental effects of the abuse of alcohol and drugs and other potentially harmful substances and the risk and concerns relating to HIV/AIDS and of other health risk-related activities is provided to workers. It is best practice to develop a clear policy on this issue.
6. Workers have access to adequate preventive measures such as contraception (condoms in particular) and mosquito nets.
7. Workers have easy access to medical facilities and medical staff. Where possible, female doctors/nurses should be available for female workers.
8. Emergency plans on health and fire safety are prepared. Depending on the local context, additional emergency plans are prepared as needed to handle specific occurrences (earthquakes, floods, tornadoes).

D. Security of workers' accommodation

Ensuring the security of workers and their property on the accommodation site is of key importance. To this end, a security plan must be carefully designed including appropriate measures to protect workers against theft and attacks. Policies regarding the use of force (force can only be used for preventive and defensive purposes in proportion to the nature and the extent of the threat) should also be

carefully designed. To implement those plans, it may be necessary to contract security services or to recruit one or several staff whose main responsibility is to provide security to safeguard workers and property. Before making any security arrangements, it is necessary to assess the risks of such arrangements to those within and outside the workers' accommodation and to respect best international practices, including IFC PS4 and EBRD PR4 and applicable law.¹¹ Particular attention should be paid to the safety and security of women workers.

Benchmarks

1. A security plan including clear measures to protect workers against theft and attack is implemented.
2. A security plan including clear policies on the use of force has been carefully designed and is implemented.
3. Security staff have been checked to ensure that they have not been implicated in any previous crimes or abuses. Where appropriate, security staff from both genders are recruited.
4. Security staff have a clear mandate and have received clear instruction about their duties and responsibilities, in particular their duties not to harass, intimidate, discipline or discriminate against workers.
5. Security staff have received adequate training in dealing with domestic violence and the use of force.
6. Security staff have a good understanding about the importance of respecting workers' rights and the rights of the communities.
7. Body searches are only allowed in specific circumstances and are performed by specially trained security staff using the least-intrusive means possible. Pat down searches on female workers can only be performed by female security staff.
8. Security staff adopt an appropriate conduct towards workers and communities.
9. Workers and members of the surrounding communities have specific means to raise concerns about security arrangement and staff.

11. See for instance the Voluntary Principles on Security and Human Rights, www.voluntaryprinciples.org/principles

E. Workers' rights, rules and regulations on workers' accommodation

Freedoms and human rights of workers should be recognised and respected within their living quarters just as within the working environment. House rules and regulations should be reasonable and non discriminatory. It is best practice that workers' representatives are consulted about those rules. House rules and regulations should not prevent workers from exercising their basic rights. In particular, workers' freedom of movement needs to be preserved if they are not to become effectively "trapped". To this end it is good practice to provide workers with 24/7 access to the accommodation and free transport services to and from the surrounding communities. Any restriction to this freedom of movement should be limited and duly justified. Penalties for breaking the rules should be proportional and implemented through a proper procedure allowing workers to defend themselves and to challenge the decision taken. The relationship between continuing employment and compliance with the rules of the workers' accommodation should be clear and particular attention should be paid to ensure that housing rules do not create indirect limitation of the right to freedom of association. Best practice might include a code of conduct relating to the accommodation to be signed together with the contract of employment.

Box 9 - Dole housing plantation regulation in Costa Rica

In every plantation there is an internal accommodation regulation that every worker is required to sign together with his/her employment contract. That document describes the behaviour which is expected from workers at all times and basic rules such as the prohibition of alcohol and the interdiction to make noise after a certain time at night. In case there is any problem concerning the application of those internal rules, a set of disciplinary procedures which have been designed with the workers' representatives can be enforced. Workers are absolutely free to enter or leave the site and do not have any restrictions in relation to accessing their living quarters. Families are not allowed in the living quarters unless they have been registered for a visit.

Benchmarks

1. Restriction of workers' freedom of movement to and from the site is limited and duly justified. It is good practice to provide workers 24/7 access to the accommodation site. Any restrictions based on security reasons should be balanced by the necessity to respect workers' freedom of movement.
2. Where possible, an adequate transport system to surrounding communities is provided. It is good practice to provide workers with free transportation to and from local communities.
3. Withholding workers' ID papers is prohibited.
4. Freedom of association is expressly respected. Provisions restricting workers' rights on site should take into account the direct and indirect effect on workers' freedom of association. It is best practice to provide trade union representatives access to workers in the accommodation site.
5. Workers' gender and religious, cultural and social backgrounds are respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances.
6. Workers are made aware of their rights and obligations and are provided with a copy of the internal workers' accommodation rules, procedures and sanction mechanisms in a language or through a media which they understand.
7. Housing regulations, including those relating to allocation of housing, should be non-discriminatory. Any justifiable discriminatory rules – for example all-male dormitories – should be strictly limited to the rules which are necessary to ensure the smooth running of the worker camp and to maintain a good relationship with the surrounding communities.
8. Where possible, visitor access should be allowed.
9. Decisions should be made on whether to prohibit alcohol, tobacco and third party access or not from the camp and the relevant rules should be clearly communicated to all residents and workers.
10. A fair and non-discriminatory procedure exists to implement disciplinary procedures including the right of workers to defend themselves (see also next section).

APPENDIX 6A: CONTRACTOR’S MONTHLY PROGRESS REPORT TEMPLATE

**Monthly Progress Report for EPC
Assam Intra State Transmission System Enhancement Project
AIIB funded under AEGCL.
Govt. of Assam
Name of Month and Year**

1. Project Details:

Sl. No.	Package	EPC Agency	Substations
Sl. No.	Package	EPC	Transmission Lines

2. Status of land details of GSS:

Sl. No.	GSS	Type of Land	Area (Hectare)	Status	References

3. Status of ESIA-ESMP

Sl. No.	GSS	ESIA-ESMP	CESMP

4. Legal Compliances Checklist:

Sl. No.	Indicators	Sub-station/Transmission Line Name-
1	Labour License	
2	BOCW License	
3	Water quality Testing from NABL Lab as per Standards	
4	Air Quality Testing from NABL Lab as per Standards	
5	Noise level testing from NABL Lab as per Standards	
6	Soil testing from NABL Lab as per Standards	
7	Ground water consent from CGBB, Assam	
8	DG Consent from PCB, Assam	
9	EHS Plan approval	
10	Grievance Redressed Register	
11	Labour camp facilities at site with signage	

Sl. No.	Indicators	Sub-station/Transmission Line Name-
12	Drinking water facilities at site and labour camp with signage	
13	Sanitation Facilities at sites and labour camp with signage	
14	Hygiene Facilities (Hand washing with Soap) at sites & labour Camp	
15	Safety Signage at the site	
16	Covid behaviour change communication signage	
17	Signage at main entry gate	
18	Use of PPE by the labour	
19	First aid kit for preliminary prevention & treatment	
20	Lightening Arrestor	
21	Chemical soak pit associated with Transformer for hazardous waste Management	
22	Rainwater Harvesting	
23	Solid Waste Management	

5. Detailed status of CTO/CTE, PUC etc.

Name of the documents	Site Name-
ESIA-ESMP approval	
CESMP approval	
Labour Licence	
Workmen Compensation Policy	
Erection all Risk policy	
Tree Cutting permission	
Ground water Extraction	
Borrow earth permission (EC)	
Permission for bricks (EC)	
Permission for sand (EC)	
Permission for Stone / Boulder (EC)	
CTE – Crusher	
CTO – Crusher	
Challan – Borrow Earth	

6. Present Status of Transmission Line of Package-

Present Status of Joint verification of landowner identification for Transmission Line under Assam Intra State Transmission System Enhancement Project (AIIB)									
Sl.No.	Name of the proposed substation under AIIB project	Name of the proposed Associated Transmission lines under AIIB project	Name of the Circle & Division	Name of the Revenue Circle	Name of the Deputy Commissioner Office/District	Letter communicated to Circle Office for Joint verification of landowner identification with date	Reasons of delay for joint verification of landowner identification	Row Status	Remarks
1									
2									

7. Status of CPTD

Sr. No.	Line Name	Line Length As per L O A	Anticipated line length	Location as per L O A	Anticipated locations	Check Survey Approved	Total Locations As per Check survey	Location as per L S D A approval	Locations Hold up due to forest	GM	Actual Locations for CPTD	Clear Front Locations for CPTD	Document collected till date	Document verified by C. O till date	Demand Note Submitted at JUSNL LOC	Locations Payment till date	Locations Payment Pending at JUSNL	Document pending till date	Locations pending for CPTD
1																			
2																			
Total for Pkg-																			

8. Accident Monitoring

Name of the Substation	No. of Injury	Description of the Injury	Treatment Given

9. Status of Grievance Received and their Redressal (Public)

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance /Complain	Timeline*	Remarks
1					
2					
3					

10. Status of Grievance Received and their Redressal (Labour)

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance /Complain	Timeline*	Remarks
1					
2					
3					
4					

11. Training–

12. Conclusion

Appendix (Photograph & Checklist)

APPENDIX 6B: PMC MONTHLY PROGRESS REPORT TEMPLATE

1. INTRODUCTION

2. DETAILS OF SUB-PROJECT

Circle	
Divisions	
Location (names of areas with GPS Coordinates)	
Total Geographical area	
Components of the package (detail all components)	
Contract start date	
Contract completion date	
Other details specific to the package	

3. COMPREHENSIVE DETAILS OF SITE VISITS CARRIED OUT IN PACKAGE- XX

Sl. No.	Sub-projects	No. of visits till date	Date of visits carried out in the month of XX	Total no of visit in the month of XX	Remarks
1					
2					

4. OBJECTIVE

5. MAJOR OBSERVATIONS AND RECOMMENDATIONS

Sl. No.	Date of site visit	Details of Officials Name	OBSERVATIONS	RECOMMENDATIONS

6. COMMUNITY CONSULTATION

Date	Total No. of Participants	Total No. of Female Participants	Issues raised by the community	Suggestions and Recommendations provided
---	---	---	---	---

7. GRIEVANCE REDRESSAL MECHANISM

8. GRIEVANCE REDRESSAL COMMITTEE

Sl. No.	Name and details	Designation	Status in the GRC (Convener/ Member)	Contact Details
1				
2				

9. DETAILS OF PUBLIC GRIEVANCES

Details of Grievance	Grievance raised by and medium	Date of Grievance received	Date of Grievance resolved	Steps taken to resolve the grievance	Remarks
---	---	---	---	---	---

10. DETAILS OF LABOUR GRIEVANCES

Details of Grievance	Grievance raised by and medium	Date of Grievance received	Date of Grievance resolved	Steps taken to resolve the grievance	Remarks
---	---	---	---	---	---

11. TRAININGS

Appendix-

APPENDIX 6C: SEMI ANNUAL MONITORING REPORT TEMPLATE

SEMI ANNUAL ENVIRONMENTAL AND SOCIAL MONITORING REPORT

ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

SUBMITTED TO

ASIAN INFRASTRUCTURE INVESTMENT BANK



SUBMITTED BY

ASSAM ELECTRICITY GRID CORPORATION LIMITED



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7.5 HIGHLIGHTED ACTIONS.....
8.0 IMPLEMENTATION OF GRIEVANCE REDRESSAL MECHANISM AND COMPLAINTS RECEIVED.....
9.0 CORRECTIVE ACTION PLAN.....
10.0 STATUS OF NON-COMPLIANCES FROM PREVIOUS MONITORING REPORT.....

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LIST OF ABBREVIATIONS

WEIGHTS AND MEASURES

EXECUTIVE SUMMARY

Following are the Key issue / gaps observed and suggested corrective action

Sl. No.	Key issue/ gaps observed	Suggested corrective action	Responsibility	Timeframe

1. INTRODUCTION

1.1 BRIEF PROJECT DESCRIPTION

Assam Intra-State Transmission System Enhancement Project

Figure –: Location map of Project

1.1.1 Details of Substations and Transmission Lines

Table –1: Details of Packages (Substations and Transmission Lines)

Package	Name of EPC Contractor	Scope of Work		Contract Award	Contract Effective Date	Location / Village / Town / Tehsil / District	Consignee / Concerned Division Official	Area as per Appendix-11 of ESMPF (in Hectare)	Area at present (In Hectare)	Slope/ Plain	Type of Land	Ownership
		S/S Details	Transmission line details in (km)									

1.1.2 Details of Transmission Lines

Table 2: Details of Transmission Lines

Line length (in km) as per ESMPF	Line length (in km) as per Survey Report	No. of Towers	Right of Way (ROW in mts)	No. of Affected Villages	Names of the Affected Village

1.2 PROJECT PROGRESS STATUS AND IMPLEMENTATION SCHEDULE

Table 3: Physical and Financial Progress Status of Project during the reporting period

Sl. No.	Pkg No.	Effective/ Schedule Completion date	Agency	Order Value (INR Cr.)	Sub Station/ Transmission Line Name	Overall Physical Progress till XX in %	Financial Progress till XX in %	Ongoing work status

1.3 BRIEF PROGRESS STATUS OF THE PROJECT

Table: Brief Progress status of the project

Project Component Stage	Progress Status {not yet started; on-going; completed}	Percent Completed	Remarks

2. COMPLIANCE WITH APPLICABLE REGULATIONS/STANDARDS

2.1 ESIA - ESMP documentation status of each package as per approved ESMPF

Table: ESIA - ESMP documentation status of each package as per approved ESMPF

Pkg. No	Location	Name of the EPC contractor	Status of ESIA-ESMP	Status of CESMP report package wise

Table: Status of E&S Semi Annual Monitoring Report

Sl. No.	Name of the report	Status of SAMR
		●

2.2 Mobilisation of E&S resources at each level i.e. PMU, PMC, and contractors

Table: Mobilisation of E&S resources at each level i.e. PMU, PMC, and contractors

Sl. No.	Name	Designation	Qualifications	Experience	Contact Details	Email ID
E&S staff of Project Management Unit (PMU)						
E&S staffs of Project Management Consultant (PMC)						
E&S staff of Engineering Procurement and Construction Contractors (as per CESMP)						
Package Name						

2.3 Compliance with Applicable Regulations/Standards

Table: Compliance with Applicable Regulations/Standards

Sl. No.	Regulations / Standards	Compliance Requirements under the Regulation	Compliance Status {complied; not complied; Not Arises (N/A) at the 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. COMPLIANCE WITH ENVIRONMENTAL AND SOCIAL COVENANTS FROM THE AIIB LOAN AGREEMENT

Table: Compliance with Environmental and Social Covenants from the AIIB Loan Agreement

Schedule #, Para. #	Covenant	Compliance Status	Remarks

4. COMPLIANCE WITH THE CIVIL WORK CONTRACT AGREEMENT

Table: Compliance with the Civil Work Contract Agreement

Schedule #, Para. #	Relevant EHS Clauses	Compliance Status	Remarks

5. COMPLIANCE WITH ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

Following are the Key issue/ gaps observed and suggested corrective action

Table: Key issue/ gaps observed and suggested corrective action

Sl. No.	Key issue/ gaps observed	Suggested corrective action	Responsibility	Timeframe
•				

Following are the key findings noted during the reporting period

Pkg	Location	Name of Contractor	Status of ESMP / CESMP implementation	Non-Compliance	Corrective Action Proposed	Photographs	Compliance against Corrective action Proposed

6. COMPLIANCE TO RESETTLEMENT ACTION PLAN AND TRIBAL PEOPLE'S PLAN (IF ANY)

Table: Compliance with Resettlement Action Plan and Tribal People's Plan

Sl. No.	Abbreviated Resettlement Action Plan (ARAP) and Tribal people's plan	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}

7. SUMMARY OF MONITORING RESULTS

7.1 ENVIRONMENTAL AND SOCIAL MONITORING

Table: Package-wise Ambient Noise Level Monitoring Results

Name of Package	Name of Monitoring Station	Sound Parameters (dBA)				CPCB Ambient Noise Standards [Limit in dB (A) Leq]		Remarks
		Results (Baseline data) Limits in dB(A)		Limits in dB(A) / (Data generated for pre- monsoon season 2024)		Day Time	Night Time	
		Day Time	Night Time	Day Time	Night Time			

7.2 Capacity Building Monitoring

Table: Details of Capacity building program

Sl. No.	Date	Topic of Training	Participant/ Organization	No. of Participant

7.3 Capacity Building on the safety inductions and meetings, including safety toolbox talks conducted during the reporting period

Table: Summary of the Capacity Building on the safety inductions and meeting including TBT

Sl. No.	Packages	Name of Substation	Numbers of Induction	Numbers of Toolbox Talk	Numbers of Training	Numbers of Mock Drill

7.4 Accident monitoring during the period of XXX

Table: Summary of the accident monitoring during the reporting period

Sl. No.	Packages	Name of Substation	Total numbers of accident occurred during XXX

7.5 Highlighted Actions

8. IMPLEMENTATION OF GRIEVANCE REDRESSAL MECHANISM AND COMPLAINTS RECEIVED

Table: Status of Grievance Received and their Redressal

Public Grievances

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance / Complain	Timeline*	Remarks	Sample Photographs

Labour Grievance

Sl. No.	Complain/s	Location/s and Date/s of Complain	Description of Grievance / Complain	Timeline*	Remarks	Sample Photographs

Summary table showing type and level of complaints (Labour Grievance)

Sl. No	Type of Grievance	Package wise grievance received	Total No	Level of Grievance

9. CORRECTIVE ACTION PLAN

Table: Key issues and Corrective Action Plan

Sl. No.	Key issues	Action Required	Responsibility	Target Date	Indicator of Compliance /Corrective actions plan

10. STATUS OF NON-COMPLIANCES FROM PREVIOUS MONITORING REPORT

Table –Status of the non-compliances and corrective actions proposed in the previous (XX) monitoring report.

Sl. No.	Key issues	Action Required	Responsibility	Compliance status on corrective actions of previous (x) monitoring report during the present reporting period.	Present Status

11. CONCLUSION AND RECOMMENDATIONS

Conclusion

Recommendations

Appendix

Package	Location	No. of Site visit	Date of Site Visit	Remarks

ESIA-ESMP implementation monitoring for Sub-station component

A. Site visit details for Substation

B. Site visit details for Transmission lines

Package	Location	No. of Site visit	Date of Site Visit	Purpose

C. Photographs of the Site visit

APPENDIX 7: WILDLIFE MONITORING CHECKLIST – OPERATIONAL PHASE (220 kV TRANSMISSION LINE)
TEMPLATE

1. Bird Electrocution & Collision

- Regular inspection of towers and conductors for evidence of bird electrocution (scorch marks, carcasses).
- Monitoring for bird flight paths, especially during migratory seasons.
- Check effectiveness of bird diverters or flight diverters (visibility enhancers).
- Inspection of nesting activity on towers or poles.
- Maintain a log of species affected, location, and dates of incidents.

2. Elephant Movement and Corridor Interaction

- Mapping and regular verification of elephant corridors intersected by the transmission line.
- Observation and recording of elephant crossings near line towers and RoW.
- Monitor tower stability in areas prone to elephant movement (elephant rubbing or pushing).
- Ensure barrier-free movement through elevated sections or alternative passages.
- Engagement with forest department and local communities for real-time elephant movement alerts.

3. Mammal and Reptile Interference

- Regular patrols along the RoW to observe signs of mammal and reptile activity.
- Report and document wildlife mortality incidents (due to electrocution, entanglement, etc.).
- Inspect fence lines (if any) to ensure they do not restrict wildlife movement.

4. Vegetation and Habitat Monitoring

- Periodic assessment of vegetation regrowth in RoW to avoid trimming that may disrupt habitats.
- Monitor for spread of invasive species after RoW clearing.
- Ensure that habitat restoration (if applicable) near towers is progressing as per plan.

5. Community and Stakeholder Feedback

- Establish a mechanism for local communities to report wildlife sightings or incidents.
- Coordinate with forest/wildlife officials to share monitoring reports and get inputs.

6. Emergency Response Readiness

- Maintain a wildlife rescue and response contact list.
- Have SOPs in place for wildlife accidents or electrocution events.

7. Documentation and Reporting

- Maintain a Wildlife Monitoring Register with GPS-tagged records.
- Prepare and submit periodic reports (monthly/quarterly) to relevant authorities.
- Photographic evidence of wildlife sighting and incidents.

APPENDIX 8: ENVIRONMENTAL MONITORING TEST REPORT

LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S

ENVIRONMENTAL QUALITY MONITORING
REPORT

Jakhalabandha Sub Station



Assam Electricity Grid Corporation Ltd

Date of Sampling 07/11/2024 & 08/11/2024

M/s Neccon Power & Infrastructure Ltd.
A.T. Road, Seuni Ali, Jorhat-785001

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
GUWAHATI, ASSAM-781028

AMBIENT AIR QUALITY MONITORING



Date of Sampling 06/11/2024 & 07/11/2024
N:26°34'22", E:92°59'48.6"

JAKHALABANDHA SUB STATION
ASSAM ELECTRICITY GRID CORPORATION LTD

Format No.: GEEC/FM/48

TEST REPORT

ULR Number: TC14361240000344F					
Test Report No.:	GEEC/FL/22/2024/11/06	Date:	26/11/2024		
Customer Name:	M/s Necon Power & Infrastructure Ltd. A.T. Road, Seuni Ali, Jorhat-785001	Lab. ID No.:	GEEC/AA/2024/11/06		
Sampling Location:	AEGCL Jakhalabandha Sub Station N:26°34'22", E:92°59'48.6"	Date of Sampling:	07/11/2024-08/11/2024		
Ambient Temperature:	Max.	Min.	Humidity in %	Max	Min
	29.4°C	19.1°C		96	54
Wind Speed in Kmph:	Max	Min	Wind Direction	10 Hrs	18 Hrs
	12	3		NE	N
Sampling Condition:	In GF/A, PTFE Filter Paper & Plastic Bottle		Date of Sample Receipt:	08/11/2024	
Monitored By:	Mr.Dilip Kr. Deka		Test Start Date:	11/11/2024	
Equipments Details:	Fine Dust Sampler:AAQM-510 MFC (Sl.No. 240665) RDS: APM-460 (Sl.No.2196 DTK 2017)		Test End Date:	12/11/2024	
AMBIENT AIR QUALITY					
Sampling and Analysis carried out as per GEEC/SOP/01					
Sl. No.	Parameters	Unit	Results	Limits	Test Method
1	Particulate Matter (PM ₁₀)	µg/m ³	58	100	IS 5182(23)
2	Particulate Matter (PM _{2.5})	µg/m ³	29	60	IS 5182(24)
***** End of Report*****					
Remark: .The parameters tested on the specific date are found to be within the NATIONAL AMBIENT AIR QUALITY STANDARDS, CPCB NOTIFICATION DATED 18TH NOVEMBER, 2009					
Checked by: <i>Belahon</i> Dr. Belinda Lahon Quality Manager		  		Reviewed by: <i>Pranjal Buragohain</i> Pranjal Buragohain Authorised Signatory	

* The results relate only to the item tested.
 * The test report shall not be reproduced except in full, without written approval of the laboratory.
 * The test report cannot be used as an evidence in a court of law without prior written approval of the laboratory.
 ***** End of Report*****
 Page 1 of 1

SOUND LEVEL MONITORING



Date of Sampling 07/11/2024-08/11/2024
N:26°34'22.4",E:92°59'45"

JAKHALABANDHA SUB STATION
ASSAM ELECTRICITY GRID CORPORATION LTD

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
GUWAHATI, ASSAM-781028

TEST REPORT

Format No:GEEC/FM/47A

ULR Number: TC143612400000346F					
Report No:GEEC/FL/22/NLM/2024/11/07			Date:	26/11/2024	
Name of the Industry	M/s Necon Power & Infrastructure Ltd.	Lab Id.:	GEEC/NLM/2024/11/07		
Address	A.T. Road, Seuni Ali, Jorhat-785001				
Noise Level Report					
Monitoring Location:	AEGCL Jakhalabandha Sub Station N:26°34'22.4",E:92°59'45"	Date of Monitoring:	07/11/2024-08/11/2024		
Weather/Wind:	Partially Cloudy	Sound Level Meter Model	SL 4033 SD		
Monitored By:	Mr.Dilip Kr. Deka	Sl.No.	Q699158		
Measurement Results (Day Time)					
Sl. No.	Parameters	Unit	Results	Method	CPCB Limit as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Leq (dBA)
1	Leq	dB(A)	58.6	Ambient Noise GEEC/SOP/AN/01 Issue date 27/05/2017	CPCB Limit for Commercial Area: Day Time Leq < 65 Night time Leq < 55
2	Lmin	dB(A)	45.1		
3	Lmax	dB(A)	65.6		
Remark: The parameters tested on the specific date are found to be within the CPCB Limit for Commercial Area					
Checked by <i>Belinda Lahon</i> Dr. Belinda Lahon Quality Manager		  		Reviewed by: <i>Pranjal Buragohain</i> Pranjal Buragohain Authorised Signatory	

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TEST REPORT

Format No:GEEC/FM/47A

ULR Number: TC143612400000346F					
Report No:GEEC/FL/22/NLM/2024/11/07			Date:	26/11/2024	
Name of the Industry		M/s Necon Power & Infrastructure Ltd.	Lab Id.:	GEEC/NLM/2024/11/07	
Address		A.T. Road, Seuni Ali, Jorhat-785001			
Noise Level Report					
Monitoring Location:		AEGCL Jakhalabandha Sub Station N:26°34'22.4",E:92°59'45'	Date of Monitoring:	07/11/2024-08/11/2024	
Weather/Wind:		Partially Cloudy	Sound Level Meter Model	SL 4033 SD	
Monitored By:		Mr.Dilip Kr. Deka	Sl.No.	Q699158	
Measurement Results (Night Time)					
Sl. No.	Parameters	Unit	Results	Method	CPCB Limit as per THE NOISE POLLUTION (REGULATION AND CONTROL) RULES, 2000 Leq (dBA)
1	Leq	dB(A)	42.5	Ambient Noise GEEC/SOP/AN/01 Issue date 27/05/2017	CPCB Limit for Commercial Area: Day Time Leq < 65 Night time Leq < 55
2	Lmin	dB(A)	37.1		
3	Lmax	dB(A)	50.4		
Remark: The parameters tested on the specific date are found to be within the CPCB Limit for Commercial Area					
Checked by <i>Belinda Lahon</i> Dr. Belinda Lahon Quality Manager		  		Reviewed by: <i>Pranjal Buragohain</i> Pranjal Buragohain Authorised Signatory	

The results relate only to the item tested.

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***** End of Report *****

SOIL TESTING



Date of Sampling 07/11/2024
N:26°34'22.6", E:92°59'47.5"

JAKHALABANDHA SUB STATION
ASSAM ELECTRICITY GRID CORPORATION LTD

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
GUWAHATI, ASSAM-781028

GEEC/FM/47/B

TEST REPORT

ULR Number: TC14361240000348F			
Ref. No.:	GEEC/FL/32/2024/11/01	Date of Reporting:	26/11/2024
Customer Name:	M/s Necon Power & Infrastructure Ltd.	Lab. ID No.:	GEEC/SOIL/2024/11/01
Customer Address:	A.T. Road, Seuni Ali, Jorhat-785001	Date of Sampling:	07/11/2024
		Sample Receipt Date:	08/11/2024
Sampling Location:	AEGCL Jakhalabandha Sub Station N:26°34'22.6", E:92°59'47.5"	Test Start Date:	08/11/2024
		Test Completion Date:	14/11/2024
Weather Condition at Site:	Partially Cloudy	Sample Description:	Soil Sample
Temperature at Site:	Max: 29.4°C Min: 19.1°C	Sample Condition:	Marked & Sealed in plastic Ziplock
Sampling Method:	GEEC/SOP/03	Test Performed At:	Laboratory
Sample Drawn By:	Mr. Dilip Kr. Deka		

SOIL ANALYSIS REPORT

Sl. No.	TEST	UNITS	RESULTS	TEST METHOD
1	pH	---	5.33	IS 2720 Part 26
2	Electrical Conductivity	mS/m	153	IS 14767
3	Moisture Content in	%	12.8	IS 15106
4	Organic Matter	%	1.4	IS 2720 Part 22

Checked by:  Dr. Belinda Lahon Quality Manager			Reviewed by:  Pranjal Buragohain Authorised Signatory
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- * The test report cannot be used as an evidence in a court of law without prior written approval of the laboratory.

***** End of Report*****

GEEC/FM/47/B

TEST REPORT

Ref. No.:	GEEC/FL/32/2024/11/01	Date of Reporting:	26/11/2024
Customer Name:	M/s Necon Power & Infrastructure Ltd.	Lab. ID No.:	GEEC/SOIL/2024/11/01
Customer Address:	A.T. Road, Seuni Ali, Jorhat-785001	Date of Sampling:	07/11/2024
		Sample Receipt Date:	08/11/2024
Sampling Location:	AEGCL Jakhalabandha Sub Station N:26°34'22.6", E:92°59'47.5"	Test Start Date:	08/11/2024
		Test Completion Date:	14/11/2024
Weather Condition at Site:	Partially Cloudy	Sample Description:	Soil Sample
Temperature at Site:	Max: 29.4°C Min: 19.1°C	Sample Condition:	Marked & Sealed in plastic
Sampling Method:	GEEC/SOP/03	Test Performed At:	Laboratory
Sample Drawn By:	Mr. Dilip Kr. Deka		

SOIL ANALYSIS REPORT

Sl. No.	TEST	UNITS	RESULTS	TEST METHOD
1	Sulphite as SO ₃	mg/kg	5.8	GEEC/SOP/03
2	Chloride	mg/kg	14.6	GEEC/SOP/03
3	ORP	mV	396	GEEC/SOP/03

Checked by:

Belinda Lahon

Dr. Belinda Lahon
Quality Manager



Reviewed by:

Pranjal Buragohain

Pranjal Buragohain
Authorised Signatory

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***** End of Report*****

WATER QUALITY MONITORING



Date of Sampling 07/11/2024
N:26°34'23", E:92°59'49"

JAKHALABANDHA SUB STATION
ASSAM ELECTRICITY GRID CORPORATION LTD

Sampling & Analysis Done By:
M/s GREEN TECH ENVIRONMENTAL ENGINEER AND CONSULTANTS
GUWAHATI, ASSAM-781028

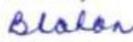
Format No.: GEEC/FM/50

TEST REPORT

ULR Number: TC14361240000349F			
Ref. No.: GEEC/FL/23/2024/11/11		Date of Reporting: 19/11/2024	
Customer Name:	M/S Necon Power & Infrastructure Ltd.	Lab. ID No.:	GEEC/WS/2024/11/11
Customer Address:	M/S Necon Power & Infrastructure Ltd. AT Road Seuni Ali, Jorhat Assam 785001	Date of Sampling:	07/11/2024
Sampling Location:	AEGCL Jakhlabandha Substation N:26°34'23", E:92°59'49"	Sample Receipt Date:	08/11/2024
Sample Description:	Ground Water (Borewell Project Premise)	Test Start Date:	08/11/2024
Sample Drawn By:	Mr. Dilip Deka	Test Completion Date:	16/11/2024
Sample Condition:	Sealed	Sampling Method:	GEEC/SOP/02

SL. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	pH	IS 3025 Part 11 2022	–	6.58	6.5 - 8.5	No relaxation
2	Conductivity	IS 3025 Part 14 1984 (RA 2019)	ms/cm	0.106	–	–
3	Colour	IS 3025 Part 4 1983 (RA 2021)	Hazen	1	5	15
4	Total Dissolved Solids	IS 3025 Part 16 : 2023	mg/l	52	500	2000
5	Total Suspended Solids	IS 3025 Part 17 : 2022	mg/l	< 10	–	–
6	Turbidity	IS 3025 Part 10 : 2023	NTU	0.65	1	5
7	BOD	IS 3025 Part 44 2023	mg/l	< 2	–	–
8	Dissolved Oxygen	IS 3025 Part 38 1989(RA 2019)	mg/l	4.6	–	–
9	Chlorides	IS 3025 Part 32 1988 (RA 2019)	mg/l	< 2	250	1000
10	Fluoride	APHA 24th EDITION, 2023	mg/l	< 0.5	1	1.5
11	Hardness	IS 3025 Part 21 2009 (RA 2019)	mg/l	37.8	200	600
12	Iron	IS 3025 Part 53 : 2024	mg/l	0.20	0.30	No relaxation
13	Oil & Grease	IS 3025 Part 39 2021	mg/l	< 2	–	–
14	Odour	IS 3025 Part 5 1983 (RA:2018)	–	Agreeable	Agreeable	Agreeable
13	Sulphates	IS 3025 Part 24 2022	mg/l	3.4	200	400

Remarks: The parameters tested are within the Acceptable Limit of IS-10500:2012

Checked by:  Dr. Belinda Lahon Quality Manager		Authorised by:  Mr. Pranjal Buragohain Authorised Signatory
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***** End of Report *****

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Format No.: GEEC/FM/50

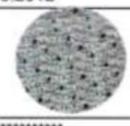
TEST REPORT

Ref. No.: GEEC/WS/2024/11/11		Date of Reporting:	19/11/2024
Customer Name:	M/S Necon Power & Infrastructure Ltd.	Lab. ID No.:	GEEC/WS/2024/11/11
Customer Address:	M/S Necon Power & Infrastructure Ltd. AT Road Seuni Ali, Jorhat Assam 785001	Date of Sampling:	07/11/2024
Sampling Location:	AEGCL Jakhlabandha Substation N:26°34'23", E:92°59'49"	Sample Receipt Date:	08/11/2024
Sample Description:	Ground Water (Borewell Project Premise)	Test Start Date:	08/11/2024
Sample Drawn By:	Mr. Dilip Deka	Test Completion Date:	13/11/2024
Sample Condition:	Sealed	Sampling Method:	GEEC/SOP/02

SL. NO.	DESCRIPTION	METHOD	UNIT	RESULTS	IS-10500:2012	
					Requirement (Acceptable Limit)	Permissible Limit in the absence of alternate source
1	Nitrate	IS 3025 Part 34 1988(RA:2019)	mg/l	<1	45	No relaxation
2	E. Coli	HiMedia Kit	Present/ Absent	Absent	Absent	Absent
3	Total coliform	APHA 24th EDITION, 2023	Present/ Absent	Absent	Absent	Absent
4	Pesticides	APHA 24th EDITION, 2023	µg/l	BDL	---	---
5	Taste	APHA 24th EDITION, 2023	--	Agreeable	Agreeable	Agreeable
6	Floating Materials	APHA 24th EDITION, 2023	--	Not visible	---	---

Remarks: The parameters tested are within the Acceptable Limit of IS-10500:2012

Checked by:  Dr. Belinda Lahon Quality Manager	Authorised by:  Mr. Pranjal Buragohain Authorised Signatory
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APPENDIX 9: AVIFAUNA DETAILS AS PER AVISTEP ANALYSIS

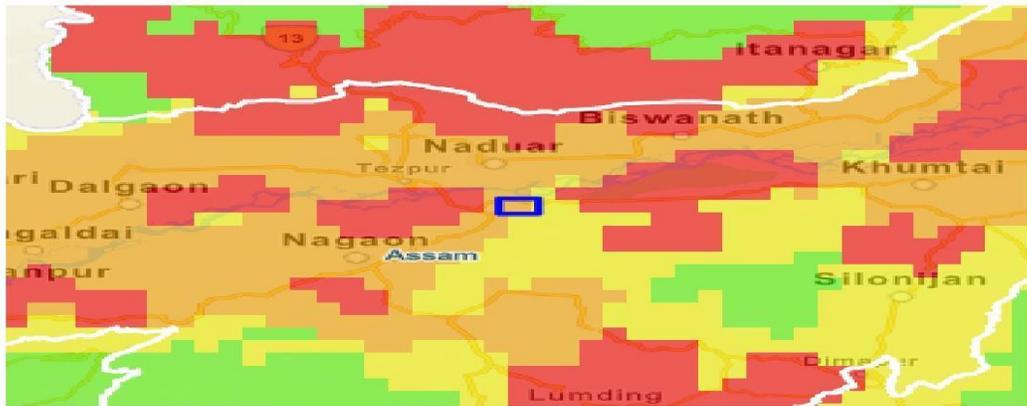
LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S

AVISTEP India 

Transmission Powerlines Assessment

26.55358N, 93.01191E Sensitivity Score: 80%

Development is considered to pose a high risk to bird populations. However, comprehensive site-level assessment is necessary to confirm this level of risk.



Grid cells represent approximately 5km x 5km area

AVISTEP India



Transmission Powerlines Assessment

📍 26.55358N, 93.01191E

Sensitivity Score: 80%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurrence Certainty
 Bengal Florican	<i>Houbaropsis bengalensis</i>	Critically Endangered (CR)	100.0	Low
 Greater Adjutant	<i>Leptoptilos dubius</i>	Endangered (EN)	87.9	Medium
 Sarus Crane	<i>Grus antigone</i>	Vulnerable (VU)	75.4	Low
 Lesser Adjutant	<i>Leptoptilos javanicus</i>	Vulnerable (VU)	73.7	Very High
 Asian Woollyneck	<i>Ciconia episcopus</i>	Nearly Threatened (NT)	58.8	Medium
 Painted Stork	<i>Mycteria leucocephala</i>	Nearly Threatened (NT)	58.8	Low
 Swamp Francolin	<i>Francolinus gularis</i>	Vulnerable (VU)	53.4	Low

AVISTEP India



Transmission Powerlines Assessment

26.55358N, 93.01191E

Sensitivity Score: 80%

Sensitive Species

Species	Scientific Name	Status	Collision	Occurrence Certainty
 Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	Nearly Threatened (NT)	53.1	Very High
 Baer's Pochard	<i>Aythya baeri</i>	Critically Endangered (CR)	50.8	Low

APPENDIX 10: WORKERS' CODE OF CONDUCT

WORKERS' CODE OF CONDUCT

I, _____ do hereby acknowledge that preventing any misconduct as stipulated in this code of conduct, including Gender-Based Violence (GBV), Sexual Exploitation and Abuse(SEA)/Sexual Harassment (SH) is important. Any activity that constitutes an act of gross misconduct is therefore ground for sanctions, penalties, termination of employment or even prosecution. All forms of misconduct are unacceptable, be it on the worksite, the worksite surroundings or at worker's camps.

I agree, while working on this project, that I will:

1. Consent to security background checks.
2. Treat women, children (persons under the age of 18) and persons with disability with respect regardless of race, language, religion, political or other opinion, nationality, ethnicity, cultural beliefs/practices, financial or other status.
3. Not use language or behaviour towards men, women or children/learners that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
4. Not participate in sexual activity with children/learners—including grooming or through digital media. Mistaken belief regarding the age of, and consent from, the child is not a defence in the eyes of the law.
5. Not exchange money, employment, goods, or services for sex, with community members, including sexual favours or other forms of humiliation, degrading or exploitative behaviour.
6. Not have sexual interactions with members of the communities surrounding the workplace, worker's camps and fellow workers that are not agreed to, with full consent by all parties involved in the act. This includes relationships involving the withholding, promise of, or actual provision of benefit (monetary or non-monetary) to community members in exchange for sex - such sexual activity is considered "non-consensual" within the scope of this Project.
7. Attend trainings related to HIV/AIDS, GBV (SEA/SH), occupational health and any other relevant courses on safety, as requested by my employer.

*OFFICIAL USE ONLY

- 8. Report to the relevant committee, any situation where I may have concerns or suspicions regarding acts of misconduct by a fellow worker, whether in my company or not, or any breaches of this code of conduct.
- 9. Refrain from any form of theft of assets and facilities, including from surrounding communities.
- 10. Remain in designated working area during working hours.
- 11. Ensure that possession of, or being under the influence of alcohol, illegal drugs and other controlled substances in the workplace and during working hours is strictly prohibited.
- 12. Wear mandatory PPE at all times during work.
- 13. Follow prescribed environmental and occupational health and safety standards.
- 14. Channel grievances through the established Grievance Redress Mechanism.

RAISING CONCERNS

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

****ATTESTATION****

I acknowledge that I have read and clearly understand this Code of Conduct, along with the consequences should I refuse to comply.

****WORKER****

Signed by:

Signature and Date: _____

****ENDORSED BY (THE EMPLOYER/SUPERVISOR) ****

Name and Designation:

Signature and Date: _____

শ্রমিকৰ আচৰণ বিধি

মই _____, এই আচৰণ বিধিৰ অধীনস্থ যিকোনো অনিয়ম, যাৰ অন্তৰ্ভুক্ত লিংগভিত্তিক হিংসা (GBV), যৌনশোষণ আৰু অপব্যৱহাৰ (SEA)/(SH) যৌন হানি ৰ দৰে কাৰ্য লগত জড়িত ব্যক্তিক আটক কৰাটো অতি গুৰুত্বপূৰ্ণ বুলি বিশ্বাস কৰোঁ। যিকোনো ধৰণৰ গৰ্ভীৰ অনিয়মৰ দৰে কাৰ্যত লিপ্ত থাকিলে আইনসম্মত ভাবে দণ্ডনীয় আৰু ইয়াৰ বাবে চাকৰিৰ পৰা বহিষ্কাৰ বা আইনী পদক্ষেপ গ্ৰহণৰ ব্যৱস্থা আছে। কামৰ ঠাই আৰু সেই স্থানৰ পৰিবেশ বা শ্রমিক শিবিৰত এই ধৰণৰ সকলো আচৰণ গ্ৰহণযোগ্য নহয়।

মই এই প্ৰকল্পত কাম কৰি থাকোঁতে, নিম্নলিখিত নিয়মসমূহ মানি চলিম:

১. নিৰাপত্তা জনিত নিয়মাবলী সমূহ ভালদৰে মানি চলিম।
২. মহিলা, শিশু (১৮ বছৰৰ তলৰ লোক) আৰু শাৰীৰিক ভাৱে অক্ষম ব্যক্তিসকলক জাতি, ভাষা, ধৰ্ম, ৰাজনৈতিক মতামত, জাতীয়তা, সাংস্কৃতিক বিশ্বাস/অনুশীলন, অৰ্থনৈতিক বা অন্য স্থিতিৰ পৰা নিৰপেক্ষভাৱে সন্মান প্ৰদৰ্শন কৰিম।
৩. পুৰুষ, মহিলা বা শিশু/বিদ্যাৰ্থীৰ সৈতে অপ্ৰাসঙ্গিক, অপমানজনক, যৌন হানি অথবা যৌন উৎপীড়ন দৰে কাৰ্য কলাপৰ লগতে অপ্ৰিতিকৰ ভাষা বা আচৰণ প্ৰদৰ্শন নকৰোঁ।
৪. শিশু/বিদ্যাৰ্থীৰ সৈতে যৌন সম্পৰ্কত লিপ্ত নহওঁ— এয়া ডিজিটেল মাধ্যমেৰে জৰিয়ত হওঁক বা অন্য উপায়েৰে হ'লেও। শিশুৰ বয়সৰ সম্পৰ্কত ভুল ধাৰণা বা তেওঁৰ অনুমতি থকাৰ ভুল বাখ্যা আইনগত ভাবে গ্ৰহণযোগ্য নহয়।
৫. বিশেষ সম্প্ৰদায়ৰ সদস্যসকলৰ সৈতে যৌন সুবিধাৰ বিনিময়ত ধন, চাকৰি, সামগ্ৰী বা সেৱা দান নকৰোঁ, বা অন্য কোনো অপমানজনক অথবা শোষণমূলক আচৰণ নকৰোঁ।
৬. কৰ্মক্ষেত্ৰ, শ্রমিকৰ শিবিৰ আৰু সহকৰ্মীসকলৰ সৈতে বা আশে-পাশে থকা সম্প্ৰদায়ৰ সদস্যসকলৰ সৈতে যৌন সম্পৰ্ক স্থাপন নকৰোঁ। ইয়াৰ ভিতৰত যৌনতাৰ বিনিময়ত সম্প্ৰদায়ৰ সদস্যসকলক সুবিধা (আৰ্থিক বা অ-আৰ্থিক) ৰখা, প্ৰতিশ্ৰুতি দিয়া বা প্ৰকৃততে প্ৰদান কৰা সম্পৰ্কসমূহো অন্তৰ্ভুক্ত - এনে যৌন কাৰ্যকলাপক এই প্ৰকল্পৰ পৰিসৰৰ ভিতৰত "অসম্মতিসূচক" বুলি গণ্য কৰা হয়।
৭. লিংগভিত্তিক হিংসা, যৌনশোষণ আৰু যৌন হানিৰ অপব্যৱহাৰপ্ৰতিৰোধ কৰা প্ৰশিক্ষণত আৰু কাৰ্য কৰ্মক্ষেত্ৰৰ স্বাস্থ্য আৰু নিৰাপত্তা সম্পৰ্কীয় প্ৰশিক্ষণত অংশগ্ৰহণ কৰিম।
৮. কোনো সহকৰ্মী (আমাৰ কোম্পানীৰ, বা অন্য কোম্পানীৰ) সৈতে অনৈতিক আচৰণ সংঘটিত হোৱাৰ সন্দেহ থাকিলে, আমি সংশ্লিষ্ট সমিতিক অৱগত কৰিম।
৯. কৰ্মসংস্থান আৰু কৰ্মসংস্থান লগত জড়িত সম্প্ৰদায়ৰ সম্পত্তিত কোনো ধৰণৰ চুৰি নকৰোঁ।

*OFFICIAL USE ONLY

১০. কর্মঘণ্টাৰ সময়ত নিৰ্ধাৰিত কামৰ স্থানত উপস্থিত থাকিম।
১১. কর্মঘণ্টাৰ সময়ত মাদক, সুৰা বা নিষিদ্ধ বস্তু ব্যৱহাৰ নকৰোঁ।
১২. কর্মক্ষেত্ৰত নিৰ্ধাৰিত ব্যক্তিগত সুৰক্ষা সঁজুলি (PPE) সদায় পৰিধান কৰিম।
১৩. পৰিবেশ আৰু কর্মক্ষেত্ৰৰ স্বাস্থ্য আৰু নিৰাপত্তাৰ নিৰ্ধাৰিত মানদণ্ড মানি চলিম।
১৪. অভিযোগৰ ক্ষেত্ৰত স্থাপন কৰা অভিযোগ নিষ্পত্তি প্ৰক্ৰিয়া (Grievance Redress Mechanism) অনুসৰণ কৰিম।

অভিযোগ উত্থাপন

এই আচৰণ বিধিত নিষিদ্ধ যিকোনো কাৰ্য সম্পৰ্কে অভিযোগ উত্থাপন কৰা যিকোনো ব্যক্তিৰ ওপৰত কোনো ধৰনৰ ব্যৱস্থা প্ৰতিশোধমূলক কাৰ্য হাতত নলৈও। এনে প্ৰতিশোধমূলক কাৰ্য্য এই আচৰণ বিধিৰ উলংঘন হিচাপে গণ্য কৰা হ'ব।

আচৰণ বিধি উলংঘনৰ ফলাফল

এই আচৰণ বিধি উলংঘন কৰিলে গভীৰ ফলাফলৰ সন্মুখীন হ'ব লাগিব, যাৰ অন্তৰ্ভুক্ত চাকৰিৰ পৰা বহিষ্কাৰ বা আইনী ব্যৱস্থা গ্ৰহণও অন্তৰ্ভুক্ত হ'ব পাৰে।

স্বীকাৰোক্তি

মই এই আচৰণ বিধি পঢ়িছোঁ আৰু ইয়াৰ বিধি-বিধান আৰু প্ৰযোজ্য পৰিণামবোৰ সম্পূৰ্ণৰূপে বুজি পাইছোঁ।

শ্ৰমিক স্বাক্ষৰ আৰু তাৰিখ:

অনুমোদন (নিয়োগকৰ্তা/পৰিদৰ্শক) _____

নাম আৰু পদবি: _____

স্বাক্ষৰ আৰু তাৰিখ: _____

APPENDIX 11: MAP SHOWING LOCATION OF NEAREST IBA SITES WRT PROJECT AREA



APPENDIX 12: DETAILS OF IBA SITES OF ASSAM

IMPORTANT BIRD AND BIODIVERSITY AREAS IN INDIA – ASSAM

IN-AS

IBAs of Assam		
IBA site codes	IBA site names	IBA criteria
IN-AS-01	Amchung Wildlife Sanctuary	A1
IN-AS-02	Bornil Range	A1, A2, A3
IN-AS-03	Bornadi Wildlife Sanctuary	A1
IN-AS-04	Bouwwa Beel	A1
IN-AS-05	Behuli Reserve Forest	A1, A3
IN-AS-06	Bherjan-Berajan-Podumoni Wildlife Sanctuary	A1
IN-AS-07	Bordhisan-Bilmukh Bird Sanctuary	A1
IN-AS-08	Bordoloni-Sampara	A1, A2, A4i
IN-AS-09	Chakrasila Complex	A1, A4i, A4iii
IN-AS-10	Chandubi Lake and adjoining areas	A1
IN-AS-11	Deobali Jalah	A1, A4i
IN-AS-12	Dhansiri Reserve Forest	A1, A4i
IN-AS-13	Dibru Saikhowa Complex	A1, A2
IN-AS-14	Deepor Beel Sanctuary	A1, A4iii
IN-AS-15	Dum Dunn-Dangori & Kumsong Reserve Forests	A1
IN-AS-16	East and North Karbi Anglong Wildlife Sanctuaries	A1
IN-AS-17	Garampani, Nambor and Doigrung	A1
IN-AS-18	Hollongapar Gibbon Sanctuary	A1
IN-AS-19	Habang and Umru	A4ii
IN-AS-20	Inner Line (East), Katakhali and Barak Reserve Forests	A1
IN-AS-21	Jamjing and Sengajan	A1
IN-AS-22	Jatinga	A1, A4iv
IN-AS-23	Jungla Beel and Sanguon	A1
IN-AS-24	Jhanjimukh-Kokilamukh	A1, A4i
IN-AS-25	Kaziranga National Park	A1, A2, A4i, A4ii
IN-AS-26	Kuarbari-Dolani	A1
IN-AS-27	Langting-Muga Reserve Forest	A1
IN-AS-28	Lankhona and Burbachipuri Sanctuaries	A1, A2
IN-AS-29	Lumding Reserve Forest	A1
IN-AS-30	Majuli Island	A1, A4iii
IN-AS-31	Manas National Park	A1, A2
IN-AS-32	Nameri National Park	A1, A2
IN-AS-33	Orang National Park	A1, A4ii
IN-AS-34	Pabha Reserve Forest	A1, A2
IN-AS-35	Pobitora Wildlife Sanctuary	A1, A2, A4iii
IN-AS-36	Pani-Dihing Bird Sanctuary	A1, A4iii
IN-AS-37	Ripu Reserve Forest	A1, A2
IN-AS-38	Sibsagar Tanks	A1, A4i
IN-AS-39	Soi Beel	A1
IN-AS-40	Sonai-Rupai Wildlife Sanctuary	A1
IN-AS-41	Sohansiri Dulung	A1, A2
IN-AS-42	Tamaranga-Doleci-Bhatrab Complex	A1, A4iii
IN-AS-43	Tirap-Burbidihing	A1
IN-AS-44	Upper Dihing (East) Complex	A1, A2
IN-AS-45	Upper Dihing (West) Complex	A1, A2
IN-AS-46	Urpoel Beel	A1, A4iii
IN-AS-47	Barail Wildlife Sanctuary	A1, A2, A3
IN-AS-48	Chirang Reserve Forest	A1, A2
IN-AS-49	Dadara-Patariya Singimari	A1
IN-AS-50	Innerline (West) and Kathakal Reserve Forest	A1
IN-AS-51	Krungming Reserve Forest, Khorongma & Kopli-Umrungsa Reservoir	A1, A4ii
IN-AS-52	Maguri and Metapung Beels	A1, A2
IN-AS-53	Manas Reserve Forest	A1, A2
IN-AS-54	Marat Longri Wildlife Sanctuary	A1
IN-AS-55	Sarower Beel	A1, A4iii

APPENDIX 13: DETAILS OF TREE ENUMERATION REPORT

TREE ENUMERATION OF LILO of 220 kV S/C Samaguri – Mariani Line -1 at Proposed Jakhalabandha S/S								
SL. NO.	LOCAL NAME OF TREE	GRITH IN Mtrs.	HEIGHT IN Mtrs. (APPROX.)	LEFT	RIGHT	NOS	Distance from the Center Line	English Name of the Tree
TOWER LOCATION AP 1 TO AP 2								
No Trees								
TOWER LOCATION AP 2 TO AP 2A								
No Trees								
TOWER LOCATION AP 2A TO AP 4								
No Trees								
TOWER LOCATION AP 4 TO AP 5								
1.	Segun	0.85	11	L		2	4	
2.	Pakori	2.5	12	L		1	3	
3.	Mehagony	.0.65	9	L		4	1	
4.	Bokul	0.68	7	L		2	5	
5.	Modar	0.65	7	L		2	3	
6.	Kadam	0.75	10	L		3	4	
TOWER LOCATION AP 5 TO AP 6								
7.	Jati Bah			L		65		
TOWER LOCATION AP 6 TO AP 7								
8.	Krishna Sura	0.75	7	L		1	3	
9.	Jati Bah					50	3	
10.	Segun	0.65	8	L		10	2	
TOWER LOCATION AP 7 to AP 10								
No Trees								
TOWER LOCATION AP 10 to AP 11								
11.	Segun	0.85	8		R	3	2	
12.	Pora Amolokhi	0.75	7		R	2	3	

**APPENDIX 14: PHOTOGRAPHS AND ATTENDANCE SHEET OF CONSULTATION WITH BURHAPAHAR
RANGE OFFICE**



ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet

Venue: Buxapahar Range office

Date: 15/07/2025

Purpose: Discussion with Forest Dept. verification of project fire TL with respect to Kaziranga National Park.

Sl. No.	Name	Designation	Contact no.	Signature
1.	Niloy Baruah	Range officer (KNP)	9101218911	Niloy Baruah
2.	Dipjyoti Saikia	FR 1	9101064315	Dipjyoti
3.	Kuldeep Barua	FGD	7002610657	Kuldeep Barua
4.	Dipshagan Kalita	Environmental Inv. officer	9957048366	Kalita
5.	Baranta Das	EHS	8638227648	B. Das
6.	Dipjyoti Barua	Sr. EM EXPERT	9435569108	Dipjyoti
7.	Khamin Barua	Sr. Social Exp	9864223185	Khamin



APPENDIX 15: PHOTOGRAPHS AND ATTENDANCE SHEET OF CONSULTATION WITH TRIBAL PEOPLE





ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT

Attendance Sheet of Public consultation with Tribal People

Venue: Bonhola Karbi gaon

Purpose: Public consultation

Date: 25/10/2025

Sl. No.	Name	Occupation	Contact no.	Signature
1.	Gudam Takbi	Skill wage worker		Gudam
2.	Kamxeng Terag	Wage worker		Kamxeng Terag
3.	Biren Kraamsa	Farmer		Biren Kraamsa
4.	Kildrap Terangpi	Homemaker		Kildrap Terangpi
5.	Ranjit takbi	Farmer		Ranjit takbi