ASSAM INTRA-STATE TRANSMISSION SYSTEM ENHANCEMENT PROJECT (PHASE-II)

Environmental and Social Impact Assessment (ESIA)-Environmental and Social Management (ESMP) for the Proposed 220/132kV GIS at Rowta (Package-A)

SUBMITTED TO

ASIAN INFRASTRUCTURE INVESTMENT BANK

PREPARED & SUBMITTED BY

ASSAM ELECTRICITY GRID CORPORATION LIMITED

DOCUMENT INFORMATION

This Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) Report for the Construction of 220/132kV GIS at Rowta (Package-A) under Assam Intra-State Transmission System Enhancement Project (AISTSEP) – Phase II, proposed to be financed by the Asian Infrastructure Investment Bank (AIIB), has been prepared under the guidance and leadership of the Assam Electricity Grid Corporation Limited (AEGCL).

We gratefully acknowledge the support and cooperation received from the Project Management Unit (PMU), AEGCL, the respective Project Implementation Units (PIUs), field-level staff, and stakeholders during the preparation of this report.

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LIST OF ABBREVIATIONS

AEGCL	Assam Electricity Grid Corporation Limited
AGM	Assistant General Manager
AIIB	Asian Infrastructure Investment Bank
AIS	Air Insulated Substation
AISTSEP	Assam Intra-State Transmission System Enhancement Project
ARAP	Abbreviated Resettlement Action Plan
ASBB	Assam State Biodiversity Board
ASDMA	Assam State Disaster Management Authority
ASTC	Assam State Transport Corporation
BMC	Biodiversity Management Committees
BOQ	Bill of Quantity
CEA	Central Electricity Authority
CESMP	Contractor's Environmental and Social Management Plan
CoP	Conference of Parties
CPCB	Central Pollution Control Board
CTE	Consent to Establish
CTO	Consent to Operate
CWRA	Central Wetlands Regulatory Authority
DC	Double Circuit
E&S officer	Environment and Social Officer
E&S Policy	Environmental and Social Policy
ESF	Environmental and Social Framework
ESS	Environmental and Social Standard
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
ESZ	Eco Sensitive Zone
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
IoE	Inspectorate of Electricity
INR	Indian Rupee
IP	Indigenous Peoples
IPP	Indigenous People Plan
IUCN	International Union for Conservation of Nature and Natural Resources
Km	Kilometre
LILO	Loop In Loop out
MoEF&CC	Ministry of Environment, Forest and Climate Change
MVA	Mega Volt Ampere
NBA	National Biodiversity Authority
NBWL	National Board of Wildlife
NGO	Non-Government Organization
NGT	National Geern Tribunal
OPGW	Optical Power Ground Wire
PAPs	Project Affected Persons
PCB	Pollution Control Board
PFA	Power for All
PIU	Project Implementation Unit
PMC	Project Management Consultancy
PMU	Project Management Unit
SBWL	State Board of Wildlife
SEIAA	State Environment Impact Assessment Authority
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)

TABLE OF CONTENTS

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

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 its support for the **"Assam Intra-State Transmission System Enhancement Project" (AISTSEP)** being implemented by Assam Electricity Grid Corporation Limited (AEGCL). This involves augmenting transmission line and substation capacity through the establishment of new transmission substations, accompanied by associated transmission lines, and enhancing existing transmission capacity. AISTSEP comprises two phases, Phase I (under implementation) and Phase II, with the anticipated outcome of significantly improving the reliability of the power network through these strategic interventions.

Phase-II of the project comprises construction of new 14 nos. of 220/132 kV and 132/33 kV GIS and AIS substations, as well as the associated transmission lines. The present Environmental and Social Impact Assessment-Environmental and Social Management Plan (ESIA-ESMP) report focuses on the proposed construction of 220/132 kV (2X160 MVA) GIS at Rowta, included in Package-A under **Phase II** of AISTSEP.

As part of AIIB's E&S policy and its compliance requirements as stipulated in the agreed Environmental and Social Management Planning Framework (ESMPF-Phase II) for the project, an Environmental and Social Impact Assessment including an Environmental and Social Management Plan (ESIA-ESMP) is to be in place for substations before commencement of the work. The present ESIA-ESMP report focuses on proposed new 220/132 kV (2X160 MVA) GIS Substation at Rowta (Package A) under Phase II of AISTSEP. ESIA-ESMP of the associated transmission line under Package A for the proposed substation will be prepared separately after completion of check survey.

Description of the Project: The detailed description of the proposed subproject locations is presented in the table below.

Name of Substation	GPS Coordinates	Location Village/Town	District	Name of the T&T Division	S/S Land Status	Area (Ha)	Terrain	Current Land-use
New 220/132 kV (2X160 MVA) GIS Substation at Rowta	26°43'25.44"N 92°11'22.17"E	Rowta, Udalguri	Udalguri	Depota	AEGCL own land	3.89	Plain	Barren land with vegetation, tree cover and old abandoned structures within existing boundary

The proposed subproject site is located within AEGCL's existing 132/33 kV (2x50 MVA) grid substation campus at Rowta in Udalguri district, Assam (26°43'25.44"N, 92°11'22.17"E). Rowta lies 13 km east of the District Headquarter Udalguri near the foothills of the Eastern Himalayas, and is surrounded by Bhutan and Arunachal Pradesh in the North, Sonitpur district in the east, Darrang district in the south and Baksa district in the west. The area features rural and semi-urban settlements with agriculture as the main livelihood. The site is about 108 km from Guwahati via NH 27, NH 15, and SH 10. It is accessible by road, rail (Rowta Bagan station, 2.5 km away), and air (Salonibari Airport, Tezpur, 65 km away). River Dhansiri flows 7 km east of the site.

Existing facilities of the subproject: The 132/33 kV (2X50 MVA) Rowta AIS Substation and associated transmission line is an existing facility of Assam Electricity Grid Corporation Limited (AEGCL). This subproject under AISTSEP Phase-II focuses solely on strengthening the intra-state transmission system by constructing a new 220/132 kV (2X160 MVA) GIS substation at Rowta within the same existing campus and 220kV Rowta (New) - New Rangia (Tamulpur) D/C Line of 69.238 km. As per the AIIB's ESF, 2024 the subproject do not encompass any associated facilities, reinforcing that its scope is limited to enhancing existing transmission infrastructures.

Land requirement for the 220/132 kV (2X160 MVA) Rowta GIS: During the joint site verification and stakeholder consultation carried out by the PMU Environmental & Social Safeguard Specialist along with PIU officials of AEGCL on 24th January and 8th July, 2025, it was observed that the identified land for the proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta is AEGCL's own land within an existing confined boundary and free from any form of encroachment. To confirm that the site is free from encroachment, a multi-step verification process was followed. The team conducted a detailed physical inspection of the entire 3.89-hectare area to check for any signs of occupation or use. Existing site boundaries were cross-verified with official land records. Satellite imagery was reviewed to detect any past or ongoing land use activities. In addition, direct consultations were held with Resident Engineer, 132/33 kV existing Rowta substation and nearby communities, who confirmed that since the land is confined with existing boundary walls, it is free from any claims or encroachments.

Costs of the proposed subproject: The total cost for the construction of the proposed 220/132 kV (2X160 MVA) GIS substation at Rowta is INR 315.83 crores.

Policy, Legal and Administrative Framework: Power substation and transmission line projects have not been listed in the list of environmentally sensitive projects and hence, no Environmental Clearance (EC) 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, associated activities, such as quarry operations related to the project, may necessitate prior Environmental Clearance (EC). AEGCL intends to commission this ESIA study for the proposed subproject "220/132 kV (2X160 MVA) GIS Substation at Rowta (Package A)" align with the requirements of AIIB's Environment and Social Policy (ESP) and Environment and Social Standards (ESSs). This ESIA and the resulting EESMP will outline measures to mitigate the environmental and social risks and impacts of the subproject in compliance with AIIB's ESP and ESSs.

As the Project is funded through the AIIB, the Bank's Environmental and Social Policy (ESP) applies. The project has been categorised as "Category B" as per AIIB's ESP with reservation as per the approved ESMPF and thus requires an ESIA–ESMP for the proposed substations to be covered under its investment.

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 confined in the existing boundary.

As the proposed substation will be constructed within the existing 132/33 kV (2x50 MVA) AIS substation land owned by AEGCL. Hence, land acquisition is not required for this component, ESS 2 is not triggered for the proposed substation construction. Also, no major impacts on Indigenous Peoples are expected for this component. However, minor disturbances such as construction-related dust and traffic may occur. ESS 3 is therefore triggered for the proposed substation construction.

Description of the Environment: The proposed subproject site is situated in Rowta, a town located in the Udalguri district of Assam, India within the premises of AEGCL's own land. Baseline data from secondary sources has been collected in the month of December, 2024. Site visit for primary data collection has been conducted January 24 and July 8, 2025 by comprising team of Environmental & Social Experts of PMU along with PIU officials of AEGCL. The details of the baseline condition of substation are provided in the main report.

The direct impacts of the subproject are confined within the existing boundary and indirect or induced impacts extends to the Area of Influence (AoI) defined by a buffer zone of 2 Km. A 10 Km radius is also considered for evaluating the impact on ecological and biological environment (flora & fauna) of the area. Additionally, sensitive receptors such as schools, hospitals, religious structures, and settlements have been specifically mapped within a 500-meter radius of each substation site to identify site-specific environmental and social risks.

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 visits, on-site monitoring and review of 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 government agencies & published articles/annual reports. An interdisciplinary team through discussions and professional judgment formulated the scoping and the extent of data generation.

The proposed subproject site is located in proximity to built-up areas and agricultural land. A total of 151 trees belonging to 33 different species were identified within the subproject area which are proposed to be felled. 14 species, covering 97 trees, are listed under Schedule-I and Schedule-II of the Assam Trees Outside Forest (Sustainable Management) Rules, 2022. These are exempted from requiring prior felling permission under the said rules. The remaining 19 species (including one endangered and one near-threatened species), covering 54 trees, are not listed under the above schedules and hence require prior permission from the concerned Forest Department for felling.

The site also contains 43 abandoned staff quarters, along with one old Resident Engineer's Office, a store room, a security barrack. These existing structures at the site are in a deteriorated and structurally unsafe condition. As part of the site preparation activities, these structures are proposed to be demolished. Additionally, a Shiv Temple located within the existing substation boundary is also proposed to be demolished prior to the commencement of construction activities. However, to respect religious sentiments and maintain continuity of cultural practices, the Temple will be relocated within the substation campus observing appropriate rituals & cultural practices.

No protected areas (National Park, Wildlife Sanctuaries, Biosphere Reserves), Reserved Forests, notified historical, archaeological and cultural sites etc. are falling in the vicinity or adjacent to the of the proposed subproject location.

Comprehensive Environmental Quality Monitoring Tests (EQMT) has been undertaken prior to the commencement of construction activities. The recorded PM_{10} and $PM_{2.5}$ concentrations were 61.8 µg/m³ and 36.4 µg/m³ respectively, which are significantly below the NAAQS 24-hour standard of 100 µg/m³. The recorded levels of SO_2, NO_2, NH_3, and CO are within both NAAQS and WHO limits. However, PM_{10} and $PM_{2.5}$ levels, though compliant with NAAQS, exceed WHO guidelines. In India, such exceedances are common due to road dust, vehicular emissions, and development activities. To mitigate impacts during substation construction, measures like water sprinkling, covering stockpiles, limiting dust-generating work during high winds, and providing PPE with awareness programs should be adopted.

The Leq (equivalent noise level) values at 220/132 kV Rowta GIS was measured at 62.8 dB(A) during the daytime, which are well within the permissible limit of 65 dB(A) for commercial areas as prescribed by the CPCB under The Noise Pollution (Regulation and Control) Rules, 2000 and WHO guidelines, 2021. These measurements establish the definitive baseline conditions, against which any future deviations will be systematically monitored and addressed through appropriate mitigation measures as outlined in the ESMP.

Impact Assessment: Environmental sensitive areas and Key Biodiversity Areas (KBA) are not located in the vicinity or adjacent to the proposed subproject sites i.e. 220/132 kV (2X160 MVA) GIS at Rowta. As assessed from the site visit and observation, the impacts are localized, temporary and manageable as no major environmental and social issues have been recorded. Details of impact and mitigation measures are discussed in the main report.

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 42.70 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 AIIB to ensure implementation of E&S requirement.

Climate Risk Assessment and Adaptation at the Design Stage: Remedial measures for climate risks have been adapted for the proposed sub-stations at design stage.

Stakeholder & Public Consultation and Information Disclosure: Stakeholder and Public consultations were conducted with local residents, government agencies, local governing bodies, SHGs, utility service providers, women, and vulnerable groups nearby the substation location 24th January, and 8th July, 2025. 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) Project Director cum CGM(PP&D),
   Address: 1st Floor, AEGCL, Bijulee Bhawan,
   Contact No.: 0361-2739520
   Website: www.aegcl.co.in
2) Project Manager cum AGM, Depota
   Address: - 132 kV Depota GSS, AEGCL
   Contact No.: 94351-38347

   Email: agm.depota@aegcl.co.in

The PMC, concern EPC contractor and PIU, officials of AEGCL will ensure that relevant environmental and social information from these documents is made available to affected communities and stakeholders in a timely, accessible, inclusive, and culturally appropriate manner, including translation into local language(s), particularly Assamese.

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.

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***

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, the proposed subproject will yield positive result in terms of reliable & enhanced power supply and the environment & social impacts identified in the ESIA study are manageable and can be mitigated effectively through preventive measures, and careful planning during the construction & operational phase.

Chapter 1: Introduction

1.1 Project Background and Rationale

Assam Electricity Grid Corporation Limited is a vibrant growth-oriented public sector company registered under the 'Company Act, 1956'. It was formed out of the restructured Assam State Electricity Board in 2003 and was notified as the State Transmission Utility (STU). Its core business is to efficiently transport electrical power from electrical power bulkheads to the distribution company networks in the state of Assam. In alignment with the Government of India's pursuit of the Sustainable Development Goal (SDG-7) for "Affordable and Clean Energy for All," the State of Assam is committed to bolstering its power transmission infrastructure. This initiative aims to ensure enhanced availability and accessibility of "Power for All" (PFA). To realize this vision, the Government of Assam (GoA), facilitated by the Government of India (GoI), has devised the **"Assam Intra-State Transmission System Enhancement Project (AISTSEP),"** supported by the **Asian Infrastructure Investment Bank (AIIB)**. The primary objective of the project is to elevate the power sector within the state, fostering capacity building for sustained long-term development. Addressing transmission network constraints and congestion is central to the project's goals. This involves augmenting transmission line and substation capacity through the establishment of new transmission substations, accompanied by associated transmission lines, and enhancing existing transmission capacity. AISTSEP comprises two phases, Phase I (under implementation) and Phase II, with the anticipated outcome of significantly improving the reliability of the power network through these strategic interventions.

Phase-II of the project comprises construction of new 14 nos. of 220/132 kV and 132/33 kV GIS and AIS substations, as well as the associated transmission lines. The present Environmental and Social Impact Assessment-Environmental and Social Management Plan (ESIA-ESMP) report focuses on the proposed construction of 220/132 kV (2X160 MVA) GIS at Rowta, included in Package-A under **Phase II** of AISTSEP.

1.2 Purpose of the ESIA study

Power Substation and Transmission Line Construction Projects have not been listed in the list of environmentally sensitive projects and hence, no Environmental Clearance (EC) 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, subproject linked activities, such as quarry operations may necessitate prior Environmental Clearance (EC). AEGCL intends to commission this ESIA study for the proposed subproject "220/132 kV (2X160 MVA) GIS Substation at Rowta (Package A)" align with the requirements of AIIB's Environment and Social Policy (ESP) and Environment and Social Standards (ESSs). This ESIA and the resulting Environmental and Social Management Plan (ESMP) will outline measures to mitigate the environmental and social risks and impacts of the subproject in compliance with AIIB's ESP and ESSs.

1.3 Objectives and scope of ESIA

The ESMPF which was developed for the overall Phase-II project under AISTSEP provides the guiding framework for the subproject specific ESIA study and ESMP in conformance with AIIB's ESP and ESSs. This ESIA-ESMP is prepared in line with the applicable laws and policies of GoI, GoA and AIIB's ESS considering the anticipated risks and impacts associated with the proposed subproject. The ESIA- ESMP will guide the subproject implementation and ensure that adequate measures are taken for managing and keeping any potential adverse environmental and social impacts at minimum while enhancing the significant positive and beneficial impacts associated with the proposed subproject activities.

In general, the scope of work for the ESIA study shall be as follows:

a) Identification and review of the applicable policy, legal and institutional framework relevant to the proposed subproject;
b) Description of the current baseline of the subproject in terms of physical, biological, ecological, social, cultural, and economic environment;
c) Analysis of alternatives (assessment of alternatives available for the subproject);
d) Identification of all potentially significant environmental and social impacts of the Subproject;
e) Assessment of environmental and social impacts/risks as a result of subproject interventions, and suggest measures to avoid/ minimize/ mitigate negative impacts and derive the maximum from positive impacts;
f) Climate risk assessment and adaptation at the design stage as per 2015 Paris Agreement, finalized at the COP21 climate conference in Paris;
g) Stakeholder analysis (key expectations, impacts, issues as related to each stakeholder), public consultation and discloser;
h) Formulation and implementation of Environmental and Social Management Plan (ESMP) in accordance to AIIB safeguard policies;
i) Institutional arrangement to cover role and responsibility of various players at subproject, district and state level. Grievance redress mechanism, monitoring and evaluation plan including indicators, capacity building requirements to manage E&S issues, and ESMP budget.

This ESIA exclusively covers the substation components. Under the EPC mode of implementation, AEGCL provides preliminary designs, while the EPC contractor finalizes the detailed engineering for both substation and associated transmission lines. Substation design is typically completed and approved earlier due to its limited footprint, uniform topography, and consistent geotechnical conditions.

In contrast, transmission line design depends on post-award activities such as detailed route surveys, profiling, and geotechnical investigations at each tower location. These are essential for finalizing tower placements, foundation types, and alignment, factors influenced by variable terrain, land use, infrastructure crossings, and the need for statutory clearances. Consequently, critical environmental and social data, such as land ownership, RoW impacts, and proximity to sensitive receptors, become available only after the EPC contractor completes the detailed design and tower schedule.

1.4 Approach and key tasks for this ESIA study

The objective of conducting the ESIA is to ensure that the subproject is environmentally and socially sound and fits well with the community/ beneficiaries' needs and aspirations. The study therefore describes and quantifies the potential impacts on the physical environment, ecological and biological environment and the beneficiary and neighbouring populations prior to, during, and on completion of the subproject. The approach adopted for the execution of the ESIA for the subproject is provided below:

Screening: Assessment for the requirements of national, state, international and AIIB's legal policy. Environmental Clearance is not required as per the EIA Notification of MoEF&CC. The project has been categorised as "Category B" as per AIIB's E&S policy with reservation as per the approved ESMPF and thus requires an ESIA–ESMP for the proposed substation to be covered under its investment.

Scoping: A reconnaissance survey was conducted within the subprojects' footprint, covering areas within a 2 km radius and extending up to 10 km from the proposed substation boundaries to assess potential environmental and social sensitivities, including ecological conditions. Additionally, sensitive receptors such as schools, hospitals, offices, religious structures, and settlements have been specifically mapped within a 500-meter radius of each substation site to identify site-specific social and environmental risks. This scoping exercise was essential to delineate the study area, guide primary data collection, and support impact identification.

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 the substation boundary. Baseline data from secondary sources has been collected in the month of December, 2024. Site visit for primary data collection has been conducted January 24, and July 8, 2025 by comprising team of Environmental & Social Specialists of PMU along with PIU officials of AEGCL. A detailed inventory and mapping of sensitive receptors within 500 meters of each substation site were also carried out to support risk assessment and inform mitigation planning.

Stakeholder and Public consultations: The stakeholder and public consultation has been conducted on January 24 and July 8, 2025.

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

1.4.1 Key Tasks under this ESIA study

The following tasks were carried out by AEGCL team for this study:

Table 1 : Tasks undertaken for preparation of the ESIA-ESMP report

Sl. No.	Task	Details
1	Desk study/literature review	Prior to the site visit for screening, AEGCL-PMU conducted desk review of subproject specific secondary information
2	Site reconnaissance	AEGCL-PMU team undertook a site reconnaissance visit at proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta for screening and scoping exercise for the ESIA study. (RESA checklist is provided in **Appendix 1**).
3	Site Visit and Consultations	AEGCL-PMU team conducted a site visit to the proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta on January 24 and July 8, 2025. The visit aimed to gain a deeper understanding of the subproject area and its surrounding environment through a comprehensive physical assessment. As part of the visit, stakeholder and public consultations were also held with communities in the villages within the study area. (Details of stakeholder consultation is given in **Chapter 10** Supported by **Table No. 26).**
4	Baseline data collection	Qualitative methods were largely employed for baseline data collection. Secondary data was gathered through desk research and literature reviews while primary data was obtained through physical observations, stakeholder and public discussions, and photography conducted during site visit.
5	Impact assessment	Following the identification of potential impacts, a detailed assessment was conducted to develop appropriate mitigation measures to minimize the potential impacts.
6	Analysis of Alternatives	This section analyzes alternatives for construction of the proposed subproject location in line with AIIB's Environmental and Social Framework (2024). A "without project" scenario was deemed unviable due to continued overloading, poor power quality, and limited renewable energy integration. Site selection was guided by criteria favoring AEGCL's own existing land, government land, proximity to roads, and avoidance of environmentally sensitive areas, with land at the location allocated by the Government of Assam and found suitable through environmental and social due diligence.

Sl. No.	Task	Details
7	Development of an Environmental & Social Management Plan (ESMP) and Monitoring Plan (ESMoP)	Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP) are designed to ensure effective management and monitoring of environmental and social impacts identified during the assessment process. The ESMP outlines how the project will manage its environmental and social impacts during its lifecycle (design, construction and operation) whereas the ESMoP is a framework for monitoring and evaluating the effectiveness of mitigation measures outlined in the ESMP.
8	Institutional arrangements	The existing institutional arrangements for the project; covering all key entities and the organization structure recommended in ESMPF for the Phase II of AIIB funded AISTSEP was taken into consideration while determining the implementation mechanism and roles and responsibilities at subproject site.
9	Grievance Redressal Mechanism	A multi-tiered Grievance Redress Mechanism (GRM) has been established for both the subprojects. The details of the the GRMs are provided in **Chapter-11.**

1.5 Limitation of the ESIA study

This ESIA report is based on scientific principles and professional judgment applied to certain facts with resultant subjective interpretations. Professional judgments expressed herein are based on the facts currently available within the limits of the scope of work, information available regarding the subproject, availability of secondary data, stakeholder feedback, budget and schedule. The secondary data utilized for the purpose of baseline assessment in the subproject site i.e. Rowta, Udalguri District is limited to that available in the public domain. AEGCL's past and current experiences of conducting similar projects in the state of Assam has been utilized to collate baseline information. Additionally, the consultations undertaken during the site visits were limited to the stakeholders, who were available for consultation during the site visit; which included local community and stakeholders.

1.6 Report structure

The ESIA-ESMP report contains the following chapters:

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 ESIA study, 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 provides comprehensive technical description of the subproject components, related infrastructure activities during different phases of the project, land requirement and allotment process and other relevant information.

Chapter 3: Policy, legal and institutional framework

This chapter outlines Constitutional Provisions, Policies and Regulations of the Governments of Assam and India and the AIIB's Environmental and Social Standards (ESSs) those are relevant to the subproject.

Chapter 4: Description of Environmental & Social Baseline Conditions

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

Chapter 5: Analysis of alternatives

This chapter elucidates detailed analysis about different options of site selection with considering design, environmental, social and economic aspects. The selection of final site with their justification is reflected in this chapter.

Chapter 6: Assessment for potential environmental and social impacts, its significance and mitigation measures

This chapter identifies potential risks and impacts on physical environment, ecological and biological environment and social environment associated with the subproject activities. It also outlines measures to mitigate these risks and minimize adverse effects.

Chapter 7: Environmental and Social Management Plan (ESMP) & Monitoring Plan (ESMoP) and Budget

This chapter presented the Environmental and Social Management Plan (ESMP), detailing the identified impacts and outlining the administrative framework necessary to ensure the implementation of mitigation measures and the monitoring of their effectiveness. This chapter also presents the Environmental and Social Monitoring Plan (ESMoP) for the project, along with the budgetary allocation required for the implementation of the Environmental and Social Management Plan (ESMP).

Chapter 8: Climate Risk Adaptation & Vulnerability Assessment

This chapter describes climate risks and adaptation taken at the design stage, and recommends measures that will improve the climate resilience of the project.

Chapter 9: Institutional arrangement for monitoring and reporting

The chapter addresses the institutional setup and capacity-building measures necessary for effective implementation of the Environmental and Social Management Plan (ESMP) and Environmental and Social Monitoring Plan (ESMoP). This involves defining roles and responsibilities of various entities involved in the project life-cycle.

Chapter 10: Stakeholder & public consultation and information disclosure

This chapter outlines the strategies and processes for engaging with stakeholders and the public. It elaborates stakeholder identification, stakeholder mapping and analysis, stakeholder consultations undertaken as part of the ESIA process and their participation in the project as a continuous process.

Chapter 11: Grievance redress mechanism

This chapter establishes a mechanism for addressing grievances and complaints arises during implementation of the project. It ensures that affected parties have a channel through which they can express concerns and seek resolution.

Chapter 12: Gender Action Plan

This chapter aims to ensure that both women and men benefit equitably from project interventions, with specific strategies to reduce gender disparities in access to project resources, employment, training, and decision-making opportunities.

Chapter 13: Summary, recommendations and conclusion

This chapter summarize the impacts, mitigation and management plans of the subproject activities with recommendations and conclusion.

Appendices: Appendices of the project related documents shall be detailed at the end of the report.

Chapter 2: Project Description

The project, AISTSEP Phase-II is dedicated to expanding the state's electricity transmission capacity by constructing new power substations, associated transmission lines, and complementary infrastructure. This initiative aims to enhance energy accessibility for industries and businesses while reducing transmission losses and supporting economic growth and sustainability. This chapter provides a detailed overview of the proposed subproject, including the planned location for the newly proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta (included in Package A) and the scope of related infrastructure enhancements.

2.1 Subproject location and description

The proposed subproject site is located within the AEGCL's existing 132/33 kV (2X50 MVA) grid substation campus at Rowta, a town, in the Udalguri district of Assam, India. Geographically, it lies at **26°43'25.44"N** latitude and **92°11'22.17"E** longitude. The town is situated 13 KM towards East from District Headquarter Udalguri near the foothills of the Eastern Himalayas, contributing to its unique geographical and ecological features. Rowta town is surrounded by Bhutan and Arunachal Pradesh in the North, Sonitpur district in the east, Darrang district in the south and Baksa district in the west. The area is characterized by a mix of rural and semi-urban settlements, with agriculture being a predominant occupation among the local population.

The proposed substation site is approximately 108 km from Guwahati City via Darrang district, accessible through NH 27, NH 15 and SH 10. The road conditions on these routes are good. River Dhansiri is situated 7 KM apart from the proposed subproject location towards East. Transportation to and from Rowta is facilitated by government-operated Assam State Transport Corporation (ASTC) buses, Bodoland Transport Services, and various private operators offering services between Guwahati and Tezpur, as well as Rowta and Kokrajhar via Tamulpur. The subproject location is also connected by rail through Rowta Bagan Railway Station, located about 2.5 km north of Rowta Chariali. For air travel, the nearest airport is Salonibari Airport (Tezpur Airport), approximately 65 km from Rowta.

Table 2 : Subproject location details

Name of Substation	GPS Coordinates	Location Village/Town	District	Name of the T&T Division	S/S Land Status	Area (Ha)	Terrain	Current Land-use
New 220/132 kV (2X160 MVA) GIS Substation at Rowta	26°43'25.44"N 92°11'22.17"E	Rowta, Udalguri	Udalguri	Depota	AEGCL own land	3.89	Plain	Barren land with vegetation, tree cover and old abandoned structures within existing boundary

Figure 1 : Photograph showing Proposed site of 220/132 kV GIS at Rowta

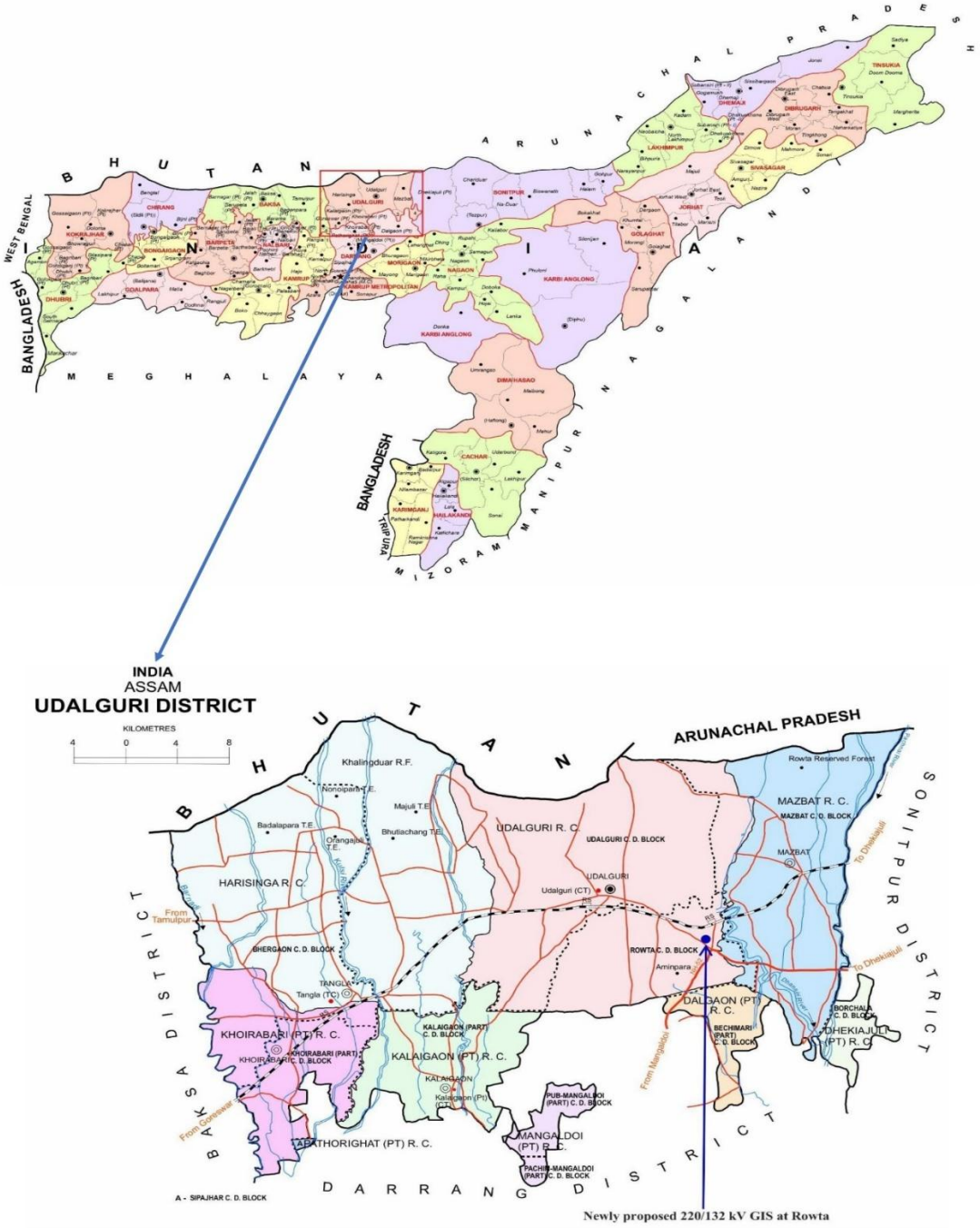

Figure 2 : Map showing the proposed 220/132 kV GIS at Rowta at Udalguri District

2.2 Subproject component features

The proposed 220/132 kV GIS at Rowta will be developed on a 3.89-hectare land parcel located in Rowta Town of Udalguri district, Assam. The layout design for the substation is appended in **Appendix 2** of this report. The entire area for the subproject will be demarcated by a boundary wall of the existing AEGCL campus, within which all substation components are systematically arranged as per standard engineering practice. Landscaping and plantation provisions are incorporated in the layout plan and will be carried out in areas free from electrical hazard zones, primarily along the boundary periphery and other non-electrified pockets within the premises. The key electrical components are provided in **Table 3.**

Table 3 : Subproject components

Sl.No.	Equipment	Nos. / Length	Details
1. Inter Connecting Transformers (ICTs)			
a	220/132kV	2 nos.	2 x 160 MVA ICTs
2. 220 kV Bays			
a	Transformer Bays	2 nos.	
b	Feeder Bays	4 nos.	
c	Bus Coupler	1 no.	
3. 220 kV Connectivity			
a	Erection of 220kV D/c line with Single AAAC Zebra conductor	69.238 km	220kV Rowta (New)-New Rangia (Tamulpur) D/C Line
4. 132kV Bays			
a	Transformer bays	2 nos.	
b	Feeder bays	4 nos.	
c	Bus Coupler	1 no.	

Subproject Linked activities and access road:

Construction materials for the substation like sand, aggregates, bricks, etc. will be sourced from nearby government-approved suppliers. These sources will have valid statutory approvals such as Environmental Clearance (EC), Consent to Establish and Consent to Operate by Assam State Pollution Control Board, ensuring compliance with applicable environmental regulations. Final selection of material sources will be made by the EPC contractor upon mobilization and will be subject to verification and approval by the PIU and PMU. All sourcing activities will adhere to the prevailing state regulations, including payment of applicable royalties as per Assam Government norms. The estimated earthwork requirement for site development and leveling is **35,000 cubic meters** for 220/132 kV GIS at Rowta.

The proposed substation site is well connected by all-weather motorable roads, ensuring year-round accessibility. It is located approximately 108 km from Guwahati City and can be reached via Darrang district through a combination of National Highways—NH 27, NH 15, and SH 715A.

2.3 Existing facilities of the project

The 132/33 kV (2X50 MVA) Rowta AIS Substation and associated transmission line is an existing facility of Assam Electricity Grid Corporation Limited (AEGCL). This subproject under AISTSEP Phase-II focuses solely on strengthening the intra-state transmission system by constructing a new 220/132 kV (2X160 MVA) GIS substation at Rowta within the same existing campus and 220kV Rowta (New) - New Rangia (Tamulpur) D/C Line of 69.238 km. An E&S audit has been conducted for the existing 132/33 kV (2X50 MVA) Rowta AIS Substation and the due audit findings are provided in the **Appendix 3**.

According to AIIB's Environmental and Social Framework (ESF) 2024, associated facilities are defined as: activities that are not included in the description of the Project set out in the Legal Agreements governing the Project (not financed by the project), but are determined to: (a) directly and materially related to the Project; (b) carried out, or planned to be carried out, contemporaneously with the Project; and (c) necessary for the Project to be viable and would not be carried out if the Project did not exist. As per the AIIB's ESF, 2024 the subproject does not encompass any associated facilities.

2.4 Manpower requirement for the subproject

EPC contractor is responsible for the overall engineering, procurement, supply, construction, erection, installation, commissioning of the project. Sub-contractors may be engaged to carry out specific components of the work, as required. During the construction phase of the proposed subproject, the estimated number of workers will vary based on the nature and stage of activities being undertaken.

Site preparation and earthwork are expected to involve approximately 15–20 workers. Foundation and civil works will require the highest labor force, with an estimated 50–60 workers. Structural erection, including installation of equipment structures and gantries, will engage around 25–30 workers. Electrical equipment installation will necessitate approximately 15–20 workers, while cable laying and termination, as well as the earthing and lightning protection system, will each require about 10–15 workers. Additionally, around 20–25 workers will be involved in switchyard graveling, and the construction of internal roads and drainage systems.

These estimates are indicative and subject to variation depending on actual site conditions and subproject requirements during implementation.

2.5 Land requirement for the subproject

During the joint site verification and stakeholder consultation carried out by the PMU Environmental & Social Safeguard Specialist along with PIU officials of AEGCL on **24th January and 8th July, 2025,** it was observed that the identified land for the proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta is AEGCL's own land within an existing confined boundary and free from any form of encroachment. The 3.89-hectare land related documents are appended in **Appendix 4**. The land lies on plain terrain.

To confirm that the site is free from encroachment, a multi-step verification process was followed. The team conducted a detailed physical inspection of the entire 3.89-hectare area to check for any signs of occupation or use. Existing site boundaries were cross-verified with official land records. Satellite imagery was reviewed to detect any past or ongoing land use activities. In addition, direct consultations were held with Resident Engineer, 132/33 kV existing Rowta substation and nearby communities, who confirmed that since the land is confined with existing boundary walls, it is free from any claims or encroachments.

2.6 Costs and implementation schedule

The total cost for the construction of the proposed 220/132 kV (2X160 MVA) GIS substation at Rowta is INR 315.83 crores and the detailed implementation schedule is provided in **Table 4.**

Table 4 : Implementation schedule for construction of 220/132 kV (2X160 MVA) GIS substation at Rowta

Sl. No.	Job Description	Time Scale (in Years)											
		Y1 (2025)		Y2 (2026)				Y3 (2027)				Y4 (2028)	
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
1	Signing of Contract Agreement												
2	Design/Drawing approval												
3	Civil Works												
4	Testing & Inspection of Equipment												
5	Transportation to Site												
6	Erection of Equipment												
7	Cable laying and Termination												
8	Testing and Commissioning												
9	Monitoring of ESMP Implementation and reporting												
10	Stakeholder and Public Consultation												
11	Taking over by AEGCL												

Chapter 3. Legal and Regulatory Framework

This chapter reviews existing policies, legislation, and regulations relevant to the implementation of the Environmental and Social Management Plan (ESMP). It highlights the requirements that govern the management of environmental and social (E&S) risks and impacts associated with the proposed subproject. Various frameworks from the Government of India (GoI), Government of Assam (GoA), and international conventions are identified as pertinent. Additionally, since this subproject is financed by the Asian Infrastructure Investment Bank (AIIB), its guidelines are crucial and are thoroughly addressed. The applicable legal and regulatory frameworks are essential for the effective management of environmental and social aspects. These include requirements related to site selection criteria, environmental pollution control measures, institutional mechanisms, occupational and community health and safety standards, efficient resource utilization, and cultural and social considerations.

3.1 Constitutional Provisions

The Constitution of India (1950) stands out for including specific provisions aimed at protecting and improving the nation's environment. 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.

Article 48 A
"The State shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country".

Article 51 A (g)
"It shall be the duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures".

Thus, the Indian Constitution includes in the "Directive Principles of State Policy" a specific directive to the State to protect and improve the environment. At the same time, the Fundamental Duties laid down for all Citizens of the country include a specific provision to improve and protect the natural environment and to have compassion for the living creatures. Apart from this, the Right to Life guaranteed by Article 21 of the Constitution has been interpreted by the Supreme Court of India in several recent judgements to include the right to live in a clean and healthy environment. This is a very significant development in favour of environmental protection.

Similarly, the constitutional provisions in regard to social safeguards are enshrined in the Preamble to the Constitution, such as JUSTICE, social, economic and political; LIBERTY of thought, expression, belief, faith and worship; EQUALITY of status and of opportunity; FRATERNITY assuring the dignity of the individual and the unity and integrity of the Nation. Fundamental Rights and Directive Principles guarantee the right to life and liberty. Health, safety and livelihood have been interpreted as part of this larger framework. The provisions on social safeguards are contained in Articles 14, 15, 17, 23, 24, 25, 46, 330, 332, etc.

AEGCL is committed to upholding and implementing the aforesaid constitutional provisions, especially in fulfilling its role and responsibilities in regard to environment and social issues.

3.2 GoI and GoA Laws/Regulations/Policies

Table 5 : Environmental and Social Policies and Regulatory Framework (National and Assam State Regulation)

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	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.	Applicable; Power Substation and Transmission Line Construction 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.	Central Electricity Authority, Regulatory Commissions and establishment	EPC Contractor / PMC / AEGCL
2.	EIA Notification, 2006 and subsequent amendments	EIA notification 2006 and its subsequent amendments lists out type of projects that requires EIA study and Environmental Clearance from MoEF&CC or State EIA Authority.	Not Applicable; The construction of substation and Transmission line project does not come under purview EIA Notification 2006 and its subsequent amendments. However, project associated activity like creation of borrow area (if any) for the project will require prior Environmental Clearance.	MoEF&CC or State EIA Authority (SEIAA)	-
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.	Applicable; should adhere to NEP conservation of environmental resources and abatement of pollution.	MoEF & CC / Central State Pollution Control Board (CPCB) / Pollution Control Board (PCB), Assam	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	Applicable; respected to area where development activities may cause any damage to environment and property.	National Green Tribunal (NGT)	EPC Contractor / PMC / AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
		of forests and other natural resources including enforcement of any legal right relating to 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	This Act was introduced as an umbrella legislation that provides a holistic framework for the protection and improvement to the environment the coordination of central and state authorities. Emissions and discharges from the facilities to be created or refurbished or augmented shall comply with the notified standards notified.	Applicable; Power Substation and Transmission Line Construction Projects are non-polluting in nature and do not involve any disposal of solid waste, effluents and hazardous substances on land, air and water, so limited requirements of Environment (Protection) Act, 1986 are applicable (minor to moderate air emission is expected from the subproject construction phase).	MoEF & CC/CPCB	EPC Contractor / PMC / AEGCL
6.	Eco-Sensitive Zone Notifications	Regulate certain activities around National Parks and Wildlife Sanctuaries so as to minimise the negative impacts of such activities on the fragile ecosystem encompassing the protected areas. Eco Sensitive Zones have been notified for each National Park and Wildlife Sanctuary.	Not applicable; none of the subproject activity falls within declared ESZ.	Department of Environment and Forest, Assam and MoEF & CC, New Delhi	-
7.	The Forest (Conservation) Act,1980 and subsequent amendments and rules	This Act provides for the conservation of forests and regulating diversion of forestlands for non-forestry purposes. When transmission projects fall within forestlands, prior clearance is required from relevant authorities under the Forest (Conservation) Act, 1980. State governments cannot de-reserve any forestland or authorise its use for any non-forest purposes without approval from the Central government.	Not Applicable, no notified forest land involved within the subproject area.	Department of Environment and Forest, Assam, IRO-MoEF & CC, Guwahati.	-
8.	National Forest Policy, 1988	It articulates the twin objectives of ecological stability and social justice; recognizes	Not Applicable, no notified forest land	Department of Environment & Forest,	-

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
		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.	involved within the subproject area.	Assam and MoEF&CC, New Delhi	
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.	Not Applicable	Department of Environment and Forest, Assam	-
10.	Wildlife Protection Act, 1972 and Subsequent Amendments	The Act provides for the protection of wildlife 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.	Not Applicable; subproject is not located within Wildlife Sanctuary, National Park, wildlife corridors, etc.	Department of Environment and Forest, Assam, SBWL, and NBWL-MoEF&CC, New Delhi	-
11.	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 (State Biodiversity Boards -SBB and GP level Biodiversity Management Committees) for conservation of biological diversity.	Not Applicable	National Biodiversity Authority (NBA), Assam State Biodiversity Board (ASBB) and Biodiversity Management Committees (BMCs)	-
12.	The Compensatory Afforestation Fund Act, 2016	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	Not Applicable, no notified forest land involved within the subproject area.	Department of Environment and Forest, Assam and MoEF&CC, New Delhi.	-

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
	State Compensatory Afforestation Fund Management and Planning Authority Forest (Conservation) Amendment Rules, 2014	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 be utilized for afforestation, regeneration of forest system, wildlife protection and infrastructure development			
13.	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	Not Applicable, no notified forest land involved within the subproject area.	Department of Environment and Forest, Assam	-
14.	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.	Applicable	Department of Environment and Forest, Assam	-EPC Contractor / PMC / AEGCL
15.	The Assam Trees Outside Forest (Sustainable Management Rules), 2022	Provides regulation for Tree Cutting Permission outside forest in a sustainable manner.	Applicable; Approx. 151 trees, including both timber and fruit-bearing varieties, will need to be felled for the construction of the subproject. (Tree enumeration details are provided in **Appendix 5.**	Department of Environment and Forest, Assam.	EPC Contractor / PMC / AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
16.	Wetland (Conservation and Management) Rules, 2010	Applies to protected wetlands notified under the rules (which include Ramsar sites; wetlands in ESZ/ United Nations Educational, Scientific and Cultural Organization (UNESCO) sites, high altitudes, etc.).	Not applicable; subproject activity does not fall within declared wetland areas.	Central Wetlands Regulatory Authority (CWRA)	-
17.	Air (Prevention and Control of Pollution) Act, 1981 and subsequent amendments The Air (Prevention & Control of Pollution) Assam Rule, 1991	This Act establishes ambient air quality standards[1] to provide for the prevention, control and abatement of air pollution. The Act also establishes ambient air quality standards.	Applicable; based on the project scale of civil works during construction phase and other ancillary activities (minor to moderate fugitive dust emission is expected). Implementing measures to mitigate air pollution from project activities; construction facilities.	State Pollution Control Board, Assam. Consent to Establish (CTE) and Consent to Operate (CTO) to be obtained by contractor for operation of DG sets and procurement of construction materials.	EPC Contractor / PMC / AEGCL
18.	Water Prevention and Control of Pollution) Act, 1974 and subsequent amendments The Water (Prevention & Control of Pollution) Assam Rule, 1977	This Act was enacted to provide standards[2] 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 through administering conditions imposed in consent issued under provision of the Water (Prevention and Control of Pollution) Act of 1974.	Applicable; to manage liquid effluent discharges from construction and or from domestic activities. Implementing measures to mitigate water pollution from project activities; construction facilities.	State Pollution Control Board, Assam. Prevention of water pollution due to project activities.	EPC Contractor / PMC / AEGCL
19.	Noise Pollution (Regulation and Control Act) 2000 and subsequent amendments	The Rules stipulate ambient noise limits[3] during daytime and night time for industrial, commercial, residential and ecologically sensitive areas. The rules apply both during the construction and operation of the	Applicable; since minor to moderate noise emission from proposed activities during construction stage like operation of DG sets, construction machineries and vehicles and concrete mixers of applicable ratings.	Central Pollution Control Board & State Pollution Control Board, Assam	EPC Contractor / PMC / AEGCL

[1] *NAAQS table*
[2] *Water standard annexure*
[3] *Ambient Quality Standards in respect of noise*

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
		project. Violation of the standards for assessing the noise quality due to the project will lead to penalty as under the EP Act 1986.	Contractors need to ensure all noise-producing activities during civil works conform to standards.		
20.	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.	Applicable; AEGCL will seeks authorisation for disposal of hazardous waste from concerned State Pollution Control Board (SPCB), Assam as and when required. The transformer oil can be auctioned to authorised/registered re-refiners and information to the respective SPCB. There are 43 nos. of abandoned structures are proposed to be demolished. These structures have been confirmed to be free of asbestos and other hazardous materials. The C&D wastes shall be disposed as per the Construction and Demolition Waste Management Plan as provided in **Appendix 7.**	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plan for reuse or safe disposal.	EPC Contractor / PMC / AEGCL
21.	Manufacture Storage, & imports of Hazardous Chemicals Rules, 1989 and subsequent amendments	Usage and storage of hazardous substances.	Applicable. Use of SF_6 as insulator in the transformers.	State Pollution Control Board, Assam.	EPC Contractor / PMC / AEGCL
22.	Construction and Demolition Waste Management Rules, 2016	The rules provide guidance for safe disposal and management of building materials, debris and rubble resulting from construction, repair, and demolition of any civil structure.	Applicable. Construction and demolition waste generated from the subproject activities shall be managed and disposed as per the rule.	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies. Contractor needs to submit plan for reuse or safe disposal.	EPC Contractor / PMC / AEGCL
23.	Solid Waste management Rules, 2016	The rules provide guidance for safe disposal and collection municipal solid waste.	Applicable. All forms/types of solid waste generated during subproject construction activities	State Pollution Control Board, Assam and Local Municipal Board (MCB). Contractor needs to submit plans for its safe disposal/burial.	EPC Contractor / PMC / AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
24.	Plastic waste management Rules, 2016	The rules provide a regulatory frame work for management of plastic waste generation minimization, source segregation, recycling and disposal effectively.	Applicable. Plastic waste generation from proposed subproject activities. Safe disposal as per rules	State Pollution Control Board, Assam, Local Municipal Board (MCB) and other Local Bodies.	EPC Contractor / PMC / AEGCL
25.	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.	Applicable but limited to the consumers that generate significant quantities of e-waste.	Central Pollution Control Board & State Pollution Control Board, Assam	EPC Contractor / PMC / AEGCL
26.	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.	Applicable. Backup power supply.	State Pollution Control Board, Assam	EPC Contractor / PMC / AEGCL
27.	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.	Applicable during transportation of manpower and construction material. Also applicable during the use of construction equipment and vehicles.	Commissionerate of Transport (District Transport Offices, Assam)	EPC Contractor / PMC / AEGCL
28.	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.	Applicable, as the construction works shall require stones, aggregates, sand, earth, etc. Permission/consent for mining of minerals (stones, aggregates, sand, earth, etc.) from river beds/ quarries will be provided.	Directorate of Geology and Mining, Assam and Department of Environment and Forest, Assam	EPC Contractor / PMC / AEGCL
29.	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.	Applicable as the construction works shall require stones, aggregates, sand, earth, etc. Permission/consent for mining of minerals (stones, aggregates, sand, earth, etc.) from river beds/ quarries will be provided and required royalties shall also be paid.	Directorate of Geology and Mining, Assam and Department of Environment and Forest, Assam	EPC Contractor / PMC / AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
30.	Disaster Management Act, 2005	This act provides an effective management of disasters and for matters connected therewith or incidental thereto.	The proposed subproject area falls under the seismic zone V and flood prone zone and hence any construction activities/ interventions will be under purview of this act.	Assam State Disaster Management Authority (ASDMA)	EPC Contractor / PMC / AEGCL
31.	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 development plans and projects; build capacity and preparedness measure; and specify roles and responsibilities to each dept. in relation to adopted measure.	Applicable for preparedness, response and recovery during all stages of the subproject implementation for the timely and effective response to disaster.	Assam State Disaster Management Authority (ASDMA)	EPC Contractor / PMC / AEGCL
32.	Energy Conservation Act, 2001	This act provides for efficient use of energy and its conservation and for matters connected therewith or incidental thereto.	Applicable all project activities involve use of energy efficient equipment.	Inspectorate of Electricity (IEC), Assam	EPC Contractor / PMC / AEGCL
33.	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.).	Applicable to the design and construction of substation buildings and associated infrastructure.	Approval building plan from appropriate agency	EPC Contractor / PMC / AEGCL
34.	Guidelines to Regulate and Control Ground Water Extraction in India, 2019	This act regulates and control ground water extraction for various construction purpose.	Applicable. Proper consent/NOC is required for ground water extraction for subproject construction activities.	Central Ground Water Board (CGWB)	EPC Contractor / PMC / AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
Social Regulations					
1.	The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013	The act aims to provide fair compensation to landowners and ensure transparency in land acquisition processes. Additionally, it focuses on the rehabilitation and resettlement of affected persons.	Not Applicable as the proposed substation will be constructed within AEGCL's own existing 132/33 kV (2X50 MVA) AIS substation campus and therefore, involuntary land acquisition is not required.	State Revenue Department/ District Administration	AEGCL
2.	Rights of Persons with Disabilities Act, 2016	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.	Applicable. For the proposed subproject where Persons with Disabilities are present and affected.	Ministry of Social Justice & Empowerment/ Commissionerate of Labour, Government of Assam	EPC Contractor / PMC / AEGCL
3.	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.	The subproject activities come under the preview of Right to Information Act and any citizen can obtained any information about any aspect of the proposed subproject. All documents pertaining to the subproject would be disclosed to public.	Directorate of Economics and Statistics, Government of Assam	EPC Contractor / PMC / AEGCL
4.	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 resources, biodiversity and provision for benefit sharing for ST and other forest dwelling communities.	Not Applicable, no notified forest land within the subproject area.	Department of Environment and Forest, Assam and District Administration	-
5.	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	Not Applicable as the proposed substation will be constructed within AEGCL's own	Revenue & Disaster Management (LR)	AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
		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.	existing 132/33 kV (2X50 MVA) AIS substation campus and therefore, involuntary land acquisition is not required.	Department, Govt. of Assam	
6.	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 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.	Not applicable. No notified Archaeological site is located within 300m of the subproject.	Archaeological Survey of India (ASI), GoI	-
7.	Government of India Act, 1935 (6th 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[4]	Applicable. The proposed area falls within a Schedule-6 district i.e. Rowta under BTAD, which is designated for the protection of Indigenous communities, however the proposed substation expansion remains within the existing AEGCL boundary and does not encroach upon Indigenous lands or affect their customary rights. As a result, the project does not pose any adverse impact on Indigenous communities' access to land,	District Autonomous council	EPC Contractor/PMC /AEGCL

[4] *https://www.mea.gov.in/Images/pdf1/S6.pdf*

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
			livelihoods, or cultural heritage. During work execution, all the judicial and administrative requirements will be followed as per Autonomous District Councils (ADCs) provisions.		
Labour Laws Applicable to Establishments Engaged in Building and Other Construction Work					
1.	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.	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.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
2.	Workmen Compensation Act, 1923	It provides for payment of compensation by employers to their employees for injury/ fatalities / disablement by accident including occupational disease.	Applicable because contractor shall be applying large number of labours during construction which will include both Men and Women	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
3.	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.	Applicable because contractor shall be applying large number of labours during construction which will include both Men and Women	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
4.	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.	Applicable to ensure that 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.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
5.	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.	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.	District Administration	EPC Contractor/PMC /AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
6.	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 of contract labour and also to introduce better conditions of work.	Contractors shall employ work-force during Construction. The Act applies to the 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.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
7.	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.	Applicable because contractor Shall be employing large number of workers during construction and should comply minimum wages act.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
8.	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.	Applicable because contractors shall be employing Workman more than 20 persons during Construction Phase. Contractor should adhere the both Gratuity Act and Rules.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
9.	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.	Applicable because contractors shall be employing Workman more than 20 persons during Construction Phase.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
10.	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 bed rest or miscarriage etc.	Applicable if the contractors shall be employing women workman during Construction Phase. This act safeguards the interest of all women employees and workers engaged under the subproject. Contractor should follow as per the requirement of the Act.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
11.	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	Applicable because contractors shall employ numbers of Labours during civil construction. Contractor will ensure that there is no Bonded Labour by him or subcontractors.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL

Sl. No	Relevant Acts and Policies of GoI and GoA	Mandate of the Act/Policy	Applicability	Competent Authority	Responsibility / Supervision / Monitoring
12.	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.	Applicable for Occupational Safety, Health and Working Conditions in construction and other works.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
13.	National Institute of Occupational Safety and Health (NIOSH) Publication No. 98-126	NIOSH has laid down criteria for a recommended standard for occupational noise exposure. The standard is a combination of noise exposure levels and duration that no worker exposure shall equal or exceed.	Applicable, contractors are required to provide hearing-protection equipment and ensure exposures of workers to noise-generating activities are within allowed NIOSH standards.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
14.	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.	Applicable for ensuring safety of the workforce during the substation construction under the subproject.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
15.	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 of discrimination, on the ground of sex, against women in the matter of employment and for matters, connected therewith or incidental thereto.	Applicable because contractor shall be applying large number of labours during construction which will include both Men and Women. Compliance of regulations required.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL
16.	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.	Applicable because contractor shall be employing large number of workers during construction. Contractor should comply if migration labours are engaged in construction work.	Commissionerate of Labour, Government of Assam	EPC Contractor/PMC /AEGCL

3.3 International Conventions and Treaties relevance to the project

India is a signatory to several international environmental conventions and treaties that aim to protect biodiversity, regulate hazardous substances, mitigate climate change, and promote sustainable development. Although these conventions are primarily applicable at the national policy level, their underlying principles are reflected in India's domestic environmental laws, guidelines, and standards. For power infrastructure projects relevance is typically assessed in terms of potential impacts on biodiversity, handling of hazardous materials (e.g., transformer oil), and broader environmental safeguards.

The table below presents a list of selected international treaties and conventions to which India is a party, along with their specific applicability or relevance to the proposed subproject.

Table 6 : International Environment Conventions and Treaties

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 but specific bird routes/wintering sites not identified yet in Assam.
5	CAWT, 2005 (Coalition Against Wildlife Trafficking)	No
6	CBD, 1992 (Convention on Biological Diversity)	No
7	Commission on Sustainable Development, 1992	No
7	ITTA, 1983 (International Tropical Timber Agreement)	No
8	UNFF, 2000 (United Nations Forum on Forests)	No
9	IUCN-World Conservation Union, 1948 (International Union for Conservation of Nature and Natural Resources)	No
10	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
5	Basel Convention on the Control of Trans-boundary Movement of Hazardous Waste and Their Disposal, 1989	Yes, Use of Transformer oil
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	Yes, Use of SF_6
D. Marine environment		
1.	IWC (International Whaling Commission), 1946	No

The International Labour Organisation (ILO) has ratified six of the eight core/fundamental conventions. A brief description of these International Conventions that the nation is adopted is given in **Table 7.**

Table 7 : International Labour Law Conventions

S. 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.

3.4 AIIB's Environmental & Social Policies/Directives[5&6]

The AIIB serves as an international financial institution facilitating multilateral financing and investment opportunities aimed at fostering infrastructure development and improving connectivity across Asia. Acknowledging the paramount importance of environmental and social sustainability, the AIIB emphasizes its integral role in achieving goals aligned with its mandate. AIIB's Environmental and Social Framework (**ESF**) supports the Bank's clients in achieving environmentally and socially sustainable development outcomes. The **ESF** includes an introductory overview, an aspirational Vision Statement, a mandatory Environmental and Social Policy (**ESP**), accompanied by three mandatory Environmental and Social Standards (**ESSs**) and an Environmental and Social Exclusion List (**ESEL**). The three ESSs comprise: **ESS 1**: Environmental and Social Assessment and Management, **ESS 2**: Land Acquisition and Involuntary Resettlement and **ESS 3**: Indigenous Peoples.

A. Environmental and Social Standards (ESSs): These are designed to help Borrowers (AEGCL) to manage the risks and impacts of a project, and improve their environmental and social performance, through a risk and outcomes-based approach. The desired outcomes for the project are described in the objectives of each ESS is given in **Table 8,** followed by specific requirements to help Borrowers (AEGCL) achieve these objectives through means that are appropriate to the nature and scale of the project and proportionate to the level of environmental and social risks and impacts.

[5] *https://www.aiib.org/en/policies-strategies/_download/environment-framework/AIIB-Revised-Environmental-and-Social-Framework-ESF-May-2021-final.pdf*
[6] *https://www.aiib.org/en/about-aiib/who-we-are/role-of-law/.content/index/_download/AIIB-Directive-on-the-Environmental-and-Social-Framework-2023.pdf*

Table 8 : Environmental and Social Standards of AIIB

Environmental and Social Standards (AIIB)	Objective & Brief Description
ESS-1: Environmental and Social Assessment and Management	ESS1 seeks to guarantee the sustainability and soundness of projects from an environmental and social perspective, as well as to facilitate the incorporation of these factors into the decision-making and execution stages of projects. If the Project is anticipated to have negative social or environmental risks and impacts (or both), then ESS 1 is applicable. 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 (including Climate Risk assessment and Greenhouse Gas (GHG) Reporting in line with Paris Agreement 2015, Biodiversity Assessment, Project-level GRMs, Labor Management Relations etc.) to be carried out for any project to be financed by the Bank. 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 confined in the existing boundary.
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 a plan or framework, as applicable, which may be called a land acquisition and resettlement plan (LARP) or, in the case of a framework, a land acquisition and resettlement planning framework (LARPF) of the projects involving involuntary resettlement. As the proposed Rowta 220/132 kV substation will be constructed within the existing 132/33 kV (2x50 MVA) AIS substation land owned by AEGCL. Hence, land acquisition is not required for this component, ESS 2 is not triggered for the proposed substation construction.
ESS-3: Indigenous Peoples	If there are Indigenous Peoples in the proposed project area or if they have a collective relationship to it and are likely to be impacted by the project, then the ESS 3 is applicable. In general, the phrase "Indigenous Peoples" refers to a unique, vulnerable, social and cultural group that varies in the degree that it possesses the following traits: • 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. The ESS 3 defined detailed requirements of a plan or framework, as applicable, which may be called an Indigenous Peoples plan (IPP) or Indigenous Peoples planning framework (IPPF), which is provided to the Bank as a freestanding document, an annex to the assessment report, or incorporated as a recognizable element of the report. As the proposed Rowta 220 kV substation will be constructed within the existing 132/33 kV (2x50 MVA) AIS substation land owned by AEGCL, which has a secure boundary, no land acquisition or major impacts on Indigenous Peoples are expected for this component. However, minor disturbances such as construction-related dust and traffic may occur. ESS 3 is therefore triggered for the proposed substation construction. Meaningful consultations have been conducted with Indigenous Peoples and the local community, and the details are provided in **Chapter 10.**

B. Environmental and Social Exclusion List: The Bank will not finance Projects that it determines do not comply with the ESP and applicable ESSs. The Bank will not knowingly finance a Project that: (a) either involves or results in forced evictions[7]; or (b) involves activities or items specified in the list set forth in the Environmental and Social Exclusion List **(Appendix 6).**

C. Project categorization: The project has been assigned as "Category "B" by AIIB in accordance with the ESP on the basis that the project environmental and social (E&S) risks and impacts are site-specific, temporary and can be mitigated through standard E&S management practices. This ESIA-ESMP will set out the measures to mitigate the subproject's E&S risks and impacts in a manner consistent with AIIB's ESP and ESSs. A Rapid Environmental and Social Assessment (RESA) Checklist is attached as **Appendix 1** which served as a tool to preliminarily identify and evaluate potential environmental and social risks and sensitivities associated with the proposed subproject.

3.5 Gap Analysis between National and AIIB Policies and Standards

Following gaps has been identified:

- Power Substation and Transmission Line Construction Projects are not classified as environmentally sensitive projects under the EIA Notification, 2006, and are categorized as B2, which does not require an Environmental Impact Assessment (EIA) under Indian regulations. However, according to the Environmental and Social Framework (ESF) of AIIB, power transmission projects may have potential adverse environmental and social impacts and are typically classified as Category B. Consequently, these projects require the preparation of ESIA-ESMP report.
- As per national regulations, the analysis of project alternatives is not mandatory for Power Substation and Transmission Line Construction projects. However, in accordance with AIIB's guidelines, an alternatives analysis is a mandatory requirement and must be included as part of the project's environmental and social assessment.
- As per the GoI and GoA guidelines, the preparation of an Environmental and Social Management Plan (ESMP) and allocation of a corresponding budget are not mandatory for Power Substation and Transmission Line Construction projects. However, as per AIIB's guidelines, both the development of a comprehensive ESMP and provision for budget allocation are required to ensure effective implementation of environmental and social mitigation measures.
- Under national regulations, public consultation is not required for Power Substation and Transmission Line Construction projects, and the EIA Notification does not mandate the establishment of a grievance redress mechanism. In contrast, AIIB guidelines require meaningful public consultation and the establishment of a grievance redress mechanism to receive and address concerns or complaints from affected stakeholders.
- Under Indian regulations, public disclosure of information is not mandatory for Power Substation and Transmission Line Construction projects. However, AIIB guidelines require timely and transparent disclosure of environmental and social information to stakeholders as part of the project preparation and implementation process.
- There are no specific national guidelines prescribing minimum environmental standards for Power Substation and Transmission Line Construction projects. However, the IFC Environmental, Health, and Safety (EHS) Guidelines for Electric Power Transmission establish clear minimum standards for air, water, noise, and soil quality, which should be adhered to in the planning and implementation of such projects.
- National regulations do not provide for compensation to all displaced persons, particularly those without legal titles, such as individuals occupying government land. In contrast, AIIB requires that all affected persons—regardless of legal ownership or title status—be compensated and assisted as part of its social safeguard policies.

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

- Under Indian standards, Power Substation and Transmission Line Construction projects are not subject to mandatory environmental and social monitoring and reporting requirements. However, AIIB guidelines stipulate that such projects must include regular monitoring and reporting as part of the environmental and social management process.

3.6 AEGCL's Environmental and Social Policy and Procedures

AEGCL has collaborated with Multilateral Development Banks (MDBs) such as the World Bank (WB) and the Asian Development Bank (ADB). Through past projects, AEGCL established its Environmental and Social Policy and Procedures (ESPP)[8]. With experience gained from ADB-funded initiatives, AEGCL has adeptly developed and managed Environmental and Social (E&S) instruments in accordance with MDBs' stipulations. Additionally, AEGCL's operational safety manual[9] serves as a testament to its dedication to fulfilling E&S responsibilities, including occupational health and safety.

[8] *https://www.powergrid.in/sites/default/files/inline-files/ESPPF_ASSAM.pdf*
[9] *https://www.aegcl.co.in/wp-content/uploads/2020/12/Safety_Manual_AEGCL.pdf*

Chapter 4: Description of Environmental & Social Baseline Conditions

This chapter presents the existing environmental and social conditions of the subproject location. The assessment is based on data collected through a combination of primary and secondary sources, including literature reviews, site visits, stakeholder consultations, and field data collection. In addition, remote sensing techniques and GIS-based mapping have been employed to analyze and visualize the current conditions of the subproject area.

The baseline assessment provides a comprehensive understanding of the physical, biological, and social environment within the study area. This information serves as a foundation for evaluating potential impacts and ensuring informed decision-making.

4.1 Study Area

To establish the baseline and assess potential impacts, a defined zone around the subproject site has been considered for evaluating the environmental and social baseline as well as the ecological and biological environment. While direct impacts will be limited to the project footprint area, indirect and induced impacts extend to the Project's Area of Influence (AoI), as described below.

- **Project Footprint Area:** Refers to the selected area of 3.89 Ha covering entire area allotted for the proposed substation, the **220/132 (2X160 MVA) GIS at Rowta**.
- **Project Area of Influence (AoI):** Includes areas affected by potential indirect and induced impacts from subproject activities. A 2 km buffer zone has been identified for environmental and social baseline assessments, while a 10 km buffer zone has been designated for evaluating the ecological and biological environment.
- Additionally, sensitive receptors such as schools, hospitals, offices, religious structures, and settlements have been specifically mapped within a 500-meter radius of each substation site to identify site-specific environmental and social risks.

A toposheet map illustrating the 2 km buffer zone, existing substation, and proposed substation location is provided in **Figure 3**.

4.2. Physical Environment Baseline of the Study Area

4.2.1 Physiography and Terrain

Udalguri district is characterized by diverse landforms, with the northern region intersected by numerous hill streams and the southern part lying within the vast alluvial plains of the Brahmaputra Valley Zone. Geomorphologically, the district consists of denudation structural hills and alluvial plains, which include both older alluvium (found in the northern piedmont zone bordering Bhutan) and newer alluvium (comprising sand, gravel, pebbles, silt, and clay in the plains). Overall, the district is predominantly plain, with minor undulations.

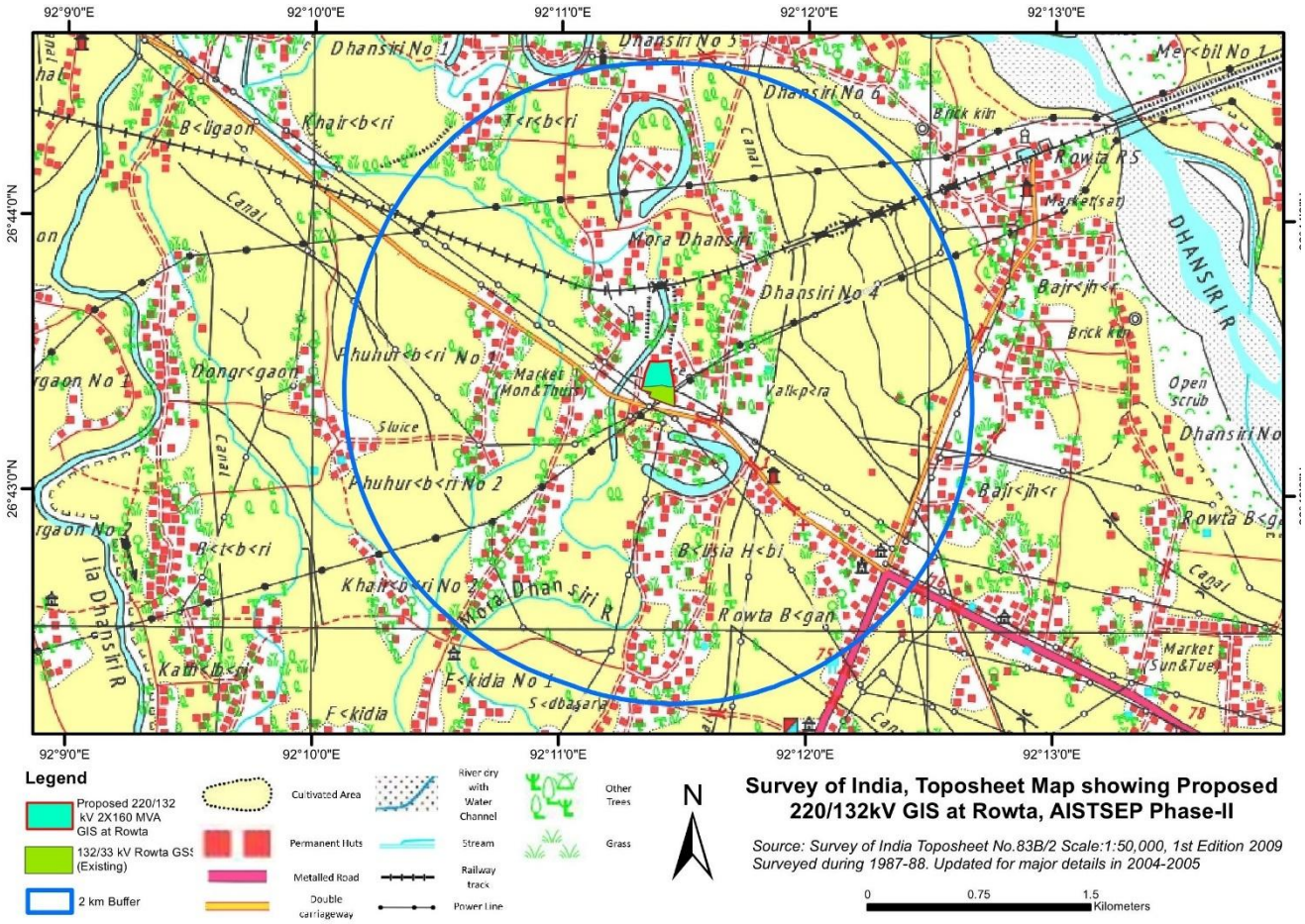

Figure 3 : SoI Toposheet showing Proposed 220/132 kV GIS at Rowta, AISTSEP, Phase-II

4.2.2 Geology and Soil type

The soils of Udalguri district can be broadly classified into four main types: Red Loamy Soil, Lateritic Soil, New Alluvial Soil, and Older Alluvial Soil. Red Loamy Soil is primarily found along the northern border of the district, typically developing on hill slopes under high rainfall conditions. It is characterized by low nitrogen and phosphate content, medium to high potash levels, and acidic pH. Lateritic Soil occurs in the hilly regions and is a product of intense leaching. It is generally brick-red to brownish-red in colour, nutrient-poor, and acidic due to the leaching of bases and the formation of clay minerals and ferric hydroxides.

Major Soil Classes	Area (ha)
Coarse Loam	67539.74
Fine Loam	83955.48
Loamy Skeletal	14437.17
Coarse Loamy Alluvium	930.77

Table 9 : Soil Profile of Udalguri

(Source: District Irrigation Plan, 2016-2020 Udalguri, Assam)

In contrast, the New Alluvial Soil is found in the floodplain areas and is frequently subjected to silt deposition from recurring floods. This soil type is a mixture of sand, silt, and clay in varying proportions, with feebly alkaline pH and moderate fertility. It exhibits nominal mineral weathering and geochemical changes, though biological activity has led to some incipient modifications in the top layer. Older Alluvial Soil, which occurs at higher elevations, represents relatively unaltered alluvium, displaying a broad spectrum of sand, silt, and humus-rich clay. It is generally more acidic than the newer alluvial soil, making it more sensitive for agricultural activities.

The district's major soil classes include Fine Loam (83,955 ha), Coarse Loam (67,539 ha), Loamy Skeletal (14,437 ha), and Coarse Loamy Alluvium (930 ha). These classifications suggest that loamy soils dominate the region, varying in texture and fertility. The overall soil characteristics of the area indicate diverse drainage capacities,

nutrient compositions, and pH levels, which influence both vegetation patterns and land use practices in Udalguri.

4.2.3 Climate, Temperature and Rainfall Pattern

The district experiences a sub-tropical humid climate characterized by semi-dry hot summers and cold winters. Agro-climatically, it falls under the North Bank Plain Zone. The region receives heavy rainfall during the southwest monsoon (May to early September). The temperature varies between a maximum of 34.5°C and a minimum of 13.5°C, while relative humidity ranges from 82% to 88%.

The plot of 5 years average month wise rainfall data from 2018 to 2022 **(Table No. 10 and Figure No. 4)** highlights significant seasonal variations and interannual differences. The district experiences a dry period from October to May, with minimal rainfall, except for occasional pre-monsoon showers. January and February typically record the least rainfall, except for February 2022 (95.7 mm), which was unusually high. March to May marks the pre-monsoon period, where rainfall gradually increases, with May being the wettest pre-monsoon month—peaking at 537.8 mm in 2022 and 395 mm in 2019.

The monsoon season (June to September) brings the highest rainfall. July receives the highest rainfall, with 2019 recording 657.5 mm, while September also experiences substantial rainfall, particularly in 2018 (355 mm) and 2019 (357.4 mm). August rainfall is relatively moderate, ranging from 137.4 mm (2022) to 325.2 mm (2018). Interannual variations are notable, with 2022 experiencing the highest total rainfall, particularly in June (786.7 mm) and May (537.8 mm), while 2021 had the lowest monsoon rainfall (July: 346.9 mm, August: 144.8 mm).

The rainfall pattern underscores climatic variability, frequent flooding during wet months, and moisture stress in dry months. This necessitates effective flood control measures and water resource management strategies, ensuring resilience against extreme weather conditions.

Table 10 : Rainfall Distribution in Udalguri District, Assam

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
2018	0.0	3.1	71.6	59.0	265.6	338.4	502.2	325.2	355.0	63.8	7.4	23.0
2019	0.0	49.2	33.0	207.6	395.0	347.2	657.5	289.6	357.4	60.2	3.6	11.2
2020	13.9	26.7	28.3	-----	365.2	421.1	439.2	171.4	304.1	125.0	1.2	0.0
2021	14.4	1.9	41.4	53.6	218.1	300.2	346.9	144.8	212.8	58.6	0.8	0.0
2022	16.4	95.7	76.6	425.2	537.8	786.7	210.4	137.4	104.4	178.6	0.0	1.6

***Source**: Customized Rainfall Information System (CRIS), Hydromet Division, IMD, Ministry of Earth Sciences, GoI*

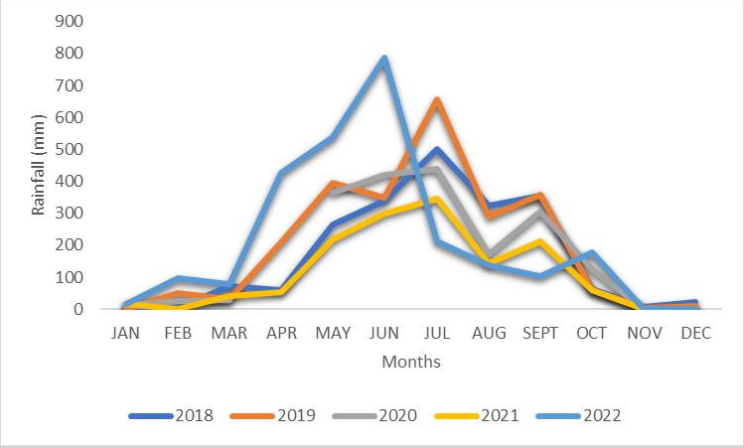

Figure 4 : Rainfall Distribution in Udalguri District, Assam

4.2.4 Land use pattern

The total geographical area of Udalguri district is 201,200 hectares, with a significant portion allocated to agriculture, forests, and non-agricultural uses. The net sown area constitutes 116,271 hectares, accounting for approximately 57.8 percent of the total area, indicating a strong agricultural presence. The forest cover extends over 21,996 hectares, playing a crucial role in maintaining ecological balance and biodiversity. Non-agricultural land, which includes settlements, infrastructure, and other built-up areas, covers 44,748 hectares. Uncultivated land, spanning 17,822 hectares, represents areas that are either unsuitable for cultivation or left fallow for regeneration. The land use pattern highlights the district's dependency on agriculture while also emphasizing the presence of forested and non-agricultural spaces, essential for environmental sustainability and developmental planning.

LULC Type	Area in Ha
Forest	21996
Non-Agri	44748
Un-cultivated	17822
Fallow	363
Net Area Sown	116271
Total Geographical Area	**201200**

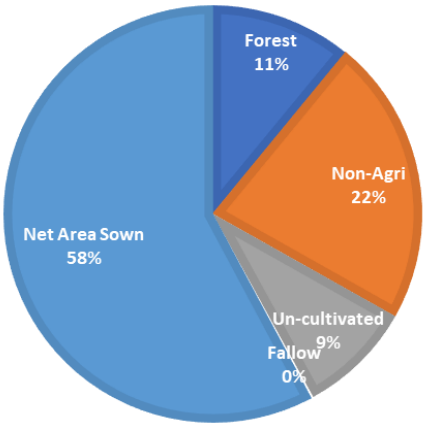

Figure 5 : Land Use classification of Udalguri District as per Statistical Handbook of Assam-2023

The Land Use/Land Cover classification of the proposed subproject site is based on Sentinel-2 satellite imagery, which identifies key land cover types such as built-up areas, agricultural land, vegetation cover, water bodies, and open spaces, as presented in **Figure 7.** The proposed subproject site is located within the campus of the existing 132/33 kV Rowta GSS, in proximity to built-up areas and agricultural land. The site contains 151 trees and 43 abandoned staff quarters, along with one old Resident Engineer's Office, a store room, a security barrack. These existing structures at the site are in a deteriorated and structurally unsafe condition. As part of the site preparation activities, these structures are proposed to be demolished. Additionally, a Shiv Temple located within the existing substation boundary is also proposed to be demolished prior to the commencement of construction activities. However, to respect religious sentiments and maintain continuity of cultural practices, the Temple will be relocated within the substation campus observing appropriate rituals & cultural practices. The details of the structures identified for demolition are provided in **Appendix-8.**

Figure 6 : Abandoned and deteriorated existing staff quarters and Shiv Temple to be demolished

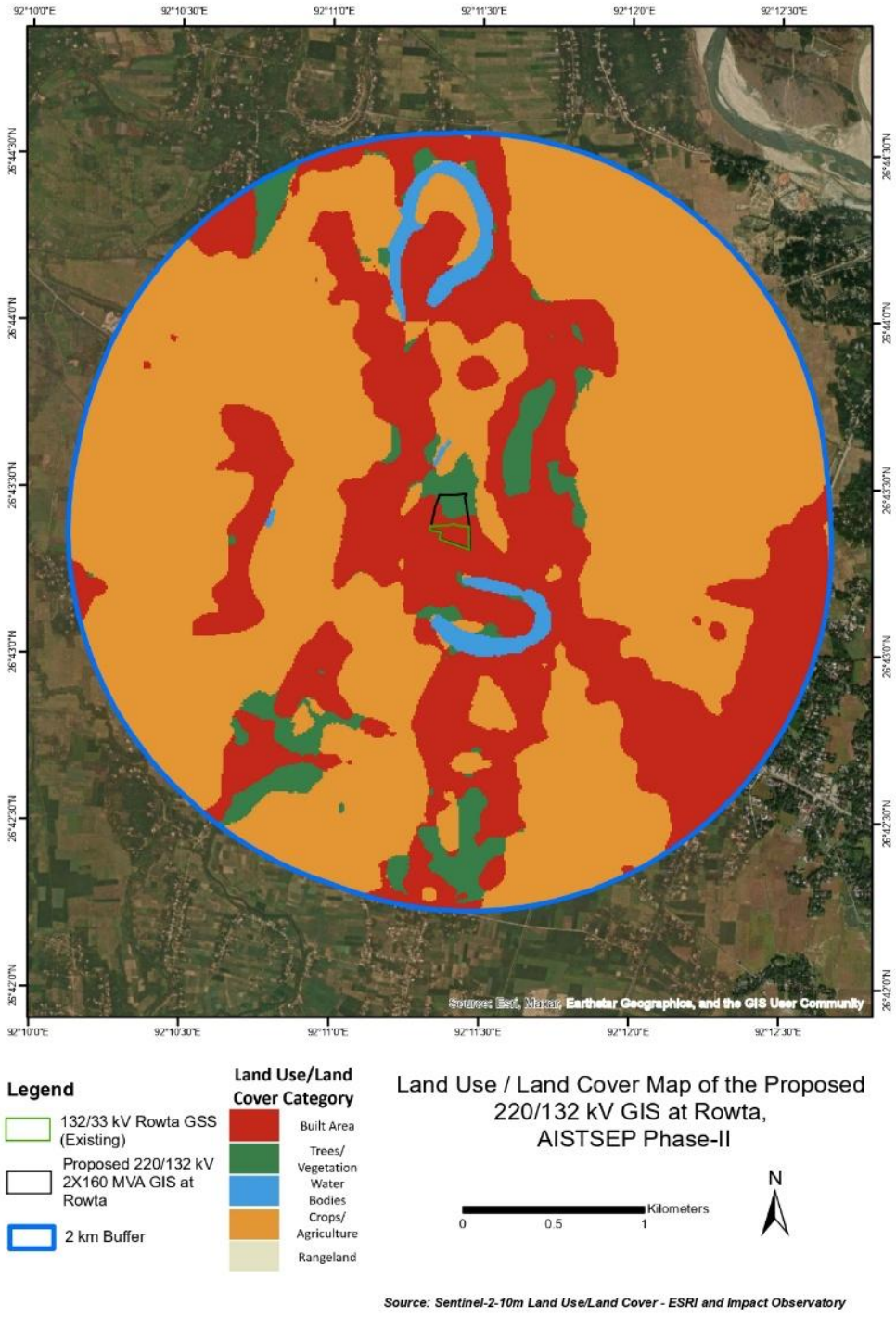

Figure 7 : Land use / Land Cover Map of the Proposed 220/132 kV Rowta GIS

Details of the Sensitive Receptors

A detailed layout plotted on a Google Earth image has been developed to visually demarcate the proposed 220/132 kV Rowta GIS site and its immediate surroundings. This visual representation clearly outlines the substation boundary and highlights the locations of sensitive receptors such as schools, offices, religious institutions, and healthcare facilities located within a 500-meter buffer zone. This spatial mapping aids in assessing potential environmental and social impacts, ensuring that appropriate mitigation measures are integrated into project planning and implementation to safeguard nearby communities and ecological features.

Sl. No.	Sensitive Receptor	GPS Coordinates	Aerial Distance from Proposed 220/132 GIS at Rowta
1	Office of the Circle Inspector of Police, Rowta	26°43'29.44"N 92°11'23.74"E	25.71 m
2	Residential Houses adjacent to the existing substation boundary	**From:** 26°43'19.13"N 92°11'28.50"E **To:** 26°43'24.31"N 92°11'27.81"E	From 4 to 11 m
3	1 No. Phuhurabari Shiva Temple (Devalaya)	26°43'19.32"N 92°11'11.47"E	263.67 m
4	Lakshmi Temple	26°43'23.14"N 92°11'8.41"E	320.46 m
5	No. 1 Phuhurabari LP School	26°43'24.86"N 92°11'6.33"E	377.41 m
6	Bhelapara Primary School	26°43'16.26"N 92°11'39.11"E	381.77 m
7	Namghar	26°43'27.63"N 92°11'42.79"E	436.29
8	Shri Narmadeshwar Shiva Temple	26°43'40.14"N 92°11'34.68"E	425.75

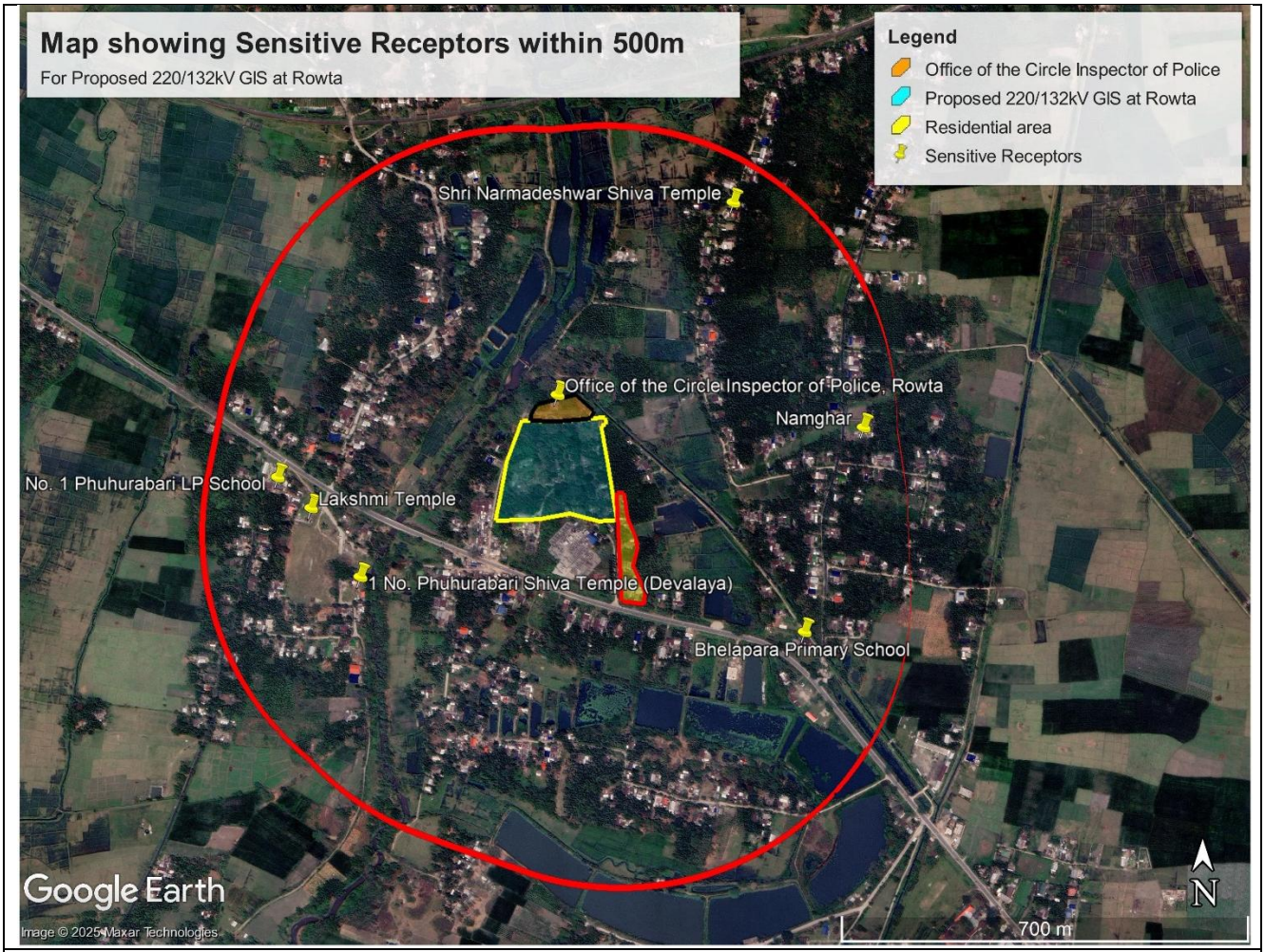

Figure 8: Map showing sensitive receptors within 500 m radius of Rowta GIS site

Photographs of the sensitive receptors within 500 m radius of Rowta GIS site	
	
Office of the Circle Inspector of Police, Rowta	Residential houses adjacent to the SS boundary
	
1 No. Phuhurabari Shiva Temple (Devalaya)	Lakshmi Temple
	
No. 1 Phuhurabari LP School	Bhelapara Primary School
	
Namghar	Shri Narmadeshwar Shiva Temple

4.2.5 Hazards

Hazards are generally identified as sources of danger or risk and can be categorized as natural or man-made. As per District Disaster Management Plan of Udalguri District, prepared by the District Disaster Management Authority, Udalguri, Govt of Assam (2024-2025), Udalguri district is prone to multiple hazards, including floods, flash floods, storms, earthquakes, erosion, droughts, forest fires, and epidemic diseases. Given the geographical and climatic conditions of the district, natural hazards such as floods and storms are common, with incidents reported almost every year. The outbreak of COVID-19 in 2020-21 significantly impacted the district, resulting in 80 reported deaths and widespread disruption of normal activities.

Hazard Analysis of Mazbat Revenue Circle

The proposed 220 kV GIS at Rowta is located within Mazbat Revenue Circle comprises three Mouzas namely Orang, Udalguri, and Barsola and consists of 168 villages. The area is largely rural, with several tea gardens. Natural hazards such as floods, flash floods, and erosion are recurrent, especially during the monsoon season. Notably, the region falls under Seismic Zone-V, indicating a high risk of seismic activity. Earthquakes in this zone are inherently unpredictable, posing a significant challenge to infrastructure resilience and disaster preparedness.

Flood Hazard

Mazbat Revenue Circle experiences annual floods, primarily caused by the Pagla, Rowta, Batiamari, Pachnoi, and Dhansiri rivers. Flash floods are a significant concern, particularly during heavy rainfall in the hills of Bhutan and Arunachal Pradesh. While these floods are usually short in duration, their impact can be severe, leading to the destruction of houses, embankments, irrigation dams, roads, and communication infrastructure. Land erosion is another major issue in the region, with the Pagla River causing extensive damage to paddy fields and disrupting transportation networks.

Historical flood data indicates varying impacts:

- In 2018, 14 villages were affected, with 700 households and 6,995 people impacted.
- In 2019, 8 villages were affected, impacting 525 households and 3,155 people.
- In 2020, the impact was minimal, with only 2 villages affected.
- In 2022, 42 villages were affected, with 1,340 households and 10,000 people impacted.

However, according to the Flood Hazard Map of Udalguri district, the proposed subproject site falls within a 'Very Low Flood Hazard Zone', indicating minimal flood risk at the substation location. As per community consultations, there is no recorded history of flooding at the proposed subproject site. Local residents and stakeholders confirmed that this proposed area has not experienced significant flood events in the past, indicating that the site is relatively safe from flood-related risks. This information supports the suitability of the selected location for the proposed substation from a flood vulnerability perspective. The flood hazard map is presented in **Figure 9.**

Wind and Storm Hazard

Storms have been an intermittent hazard in Mazbat Revenue Circle, with notable occurrences in 2020 and 2022:

- In 2020, 61 villages were affected, impacting 512 households and 2,150 people.
- In 2022, 42 villages faced storm damage, affecting 369 households and 666 people.

Moreover, according to the Wind Hazard Map of Assam published in the BMTPC: Vulnerability Atlas - 3rd Edition by BMTPC, the subproject location falls within a Very High Damage Risk Zone – B, with a Basic Wind Speed (Vb) of 50 m/s highlighting the need for wind-resistant structural designs. These classifications indicate the susceptibility of both areas to moderate to severe wind events, particularly during the pre-monsoon and monsoon seasons when convective storms are frequent. The corresponding map is presented in **Figure 10**, where the subproject location is marked with a red dot.

Earthquake Hazard

Although there have been no recent major earthquakes in Mazbat Revenue Circle, the region remains vulnerable due to its location in Seismic Zone V. Minor seismic activities were recorded in 2021 and 2022, affecting 18 villages and 589 households each year. Moreover, as per Earthquake Hazard Map of Assam published in the BMTPC: Vulnerability Atlas - 3rd Edition, the subproject location falls within a Very High Damage Risk Zone (MSK IX or more). Earthquake-resistant design standards must therefore be strictly followed at Rowta substation site. The corresponding map is presented in **Figure 11**, where the subproject location is marked with a yellow dot.

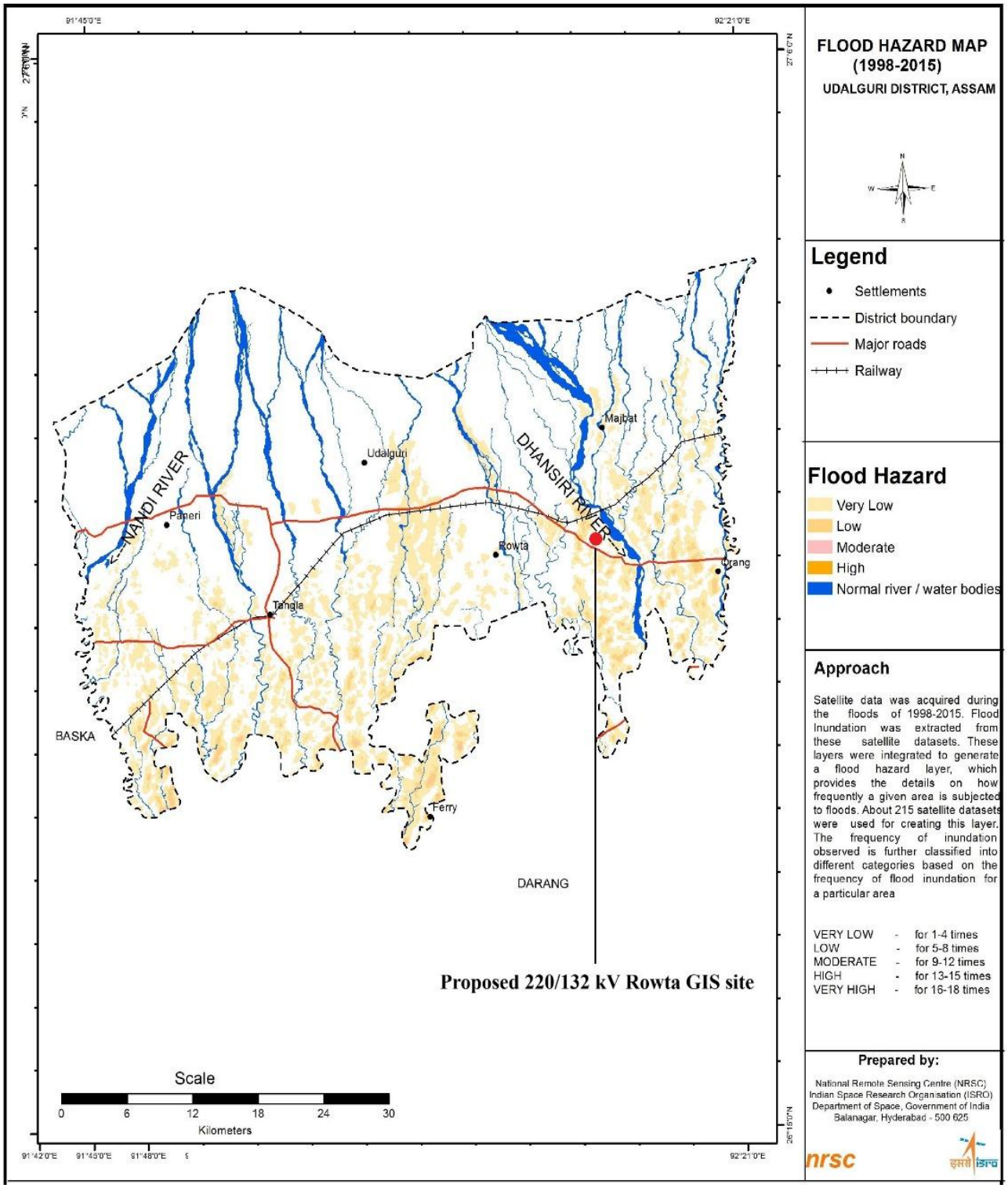

Figure 9 : Flood Hazard Map of Udalguri District (Sup-project location Marked in Red Dot), Assam State Disaster Management Authority, 2016

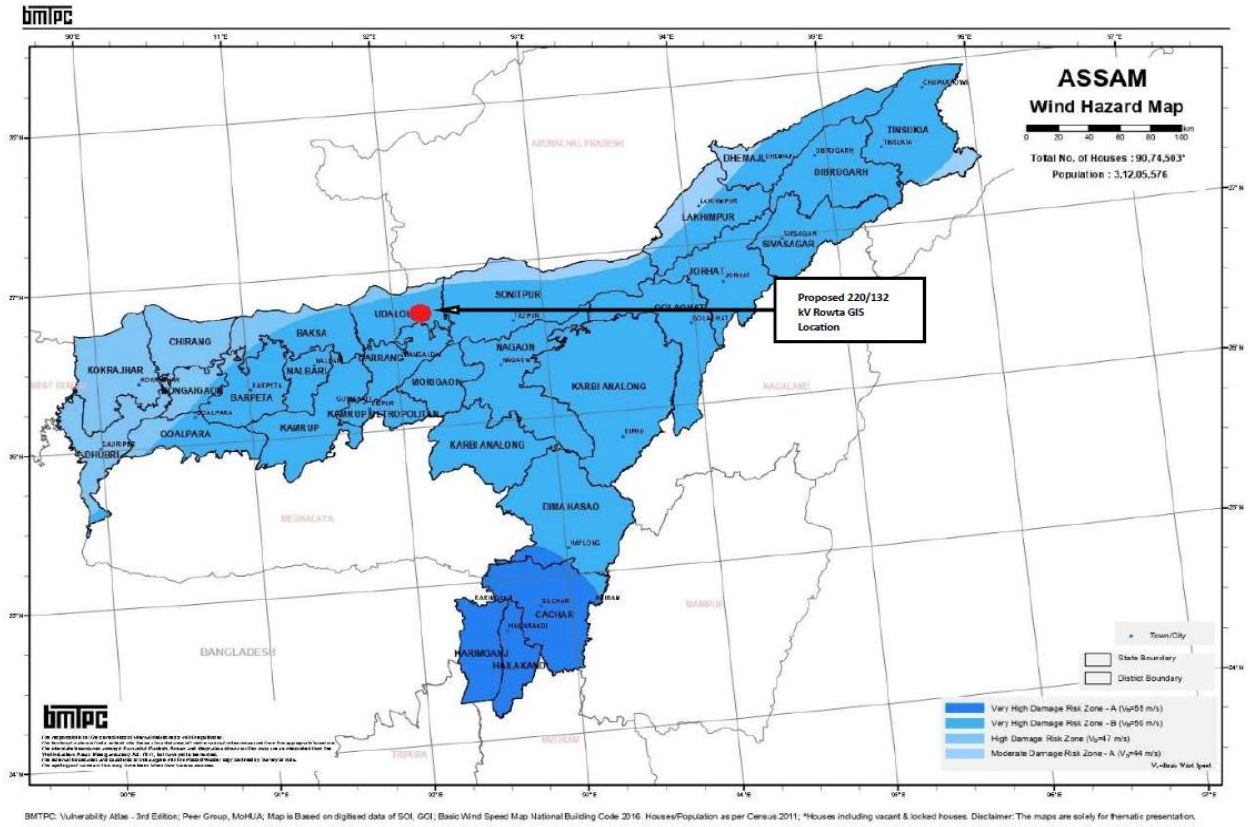

Figure 10 : Wind Hazard Map of Assam (Sup-project location Marked in Red Dot), BMTPC: Vulnerability Atlas - 3rd Edition

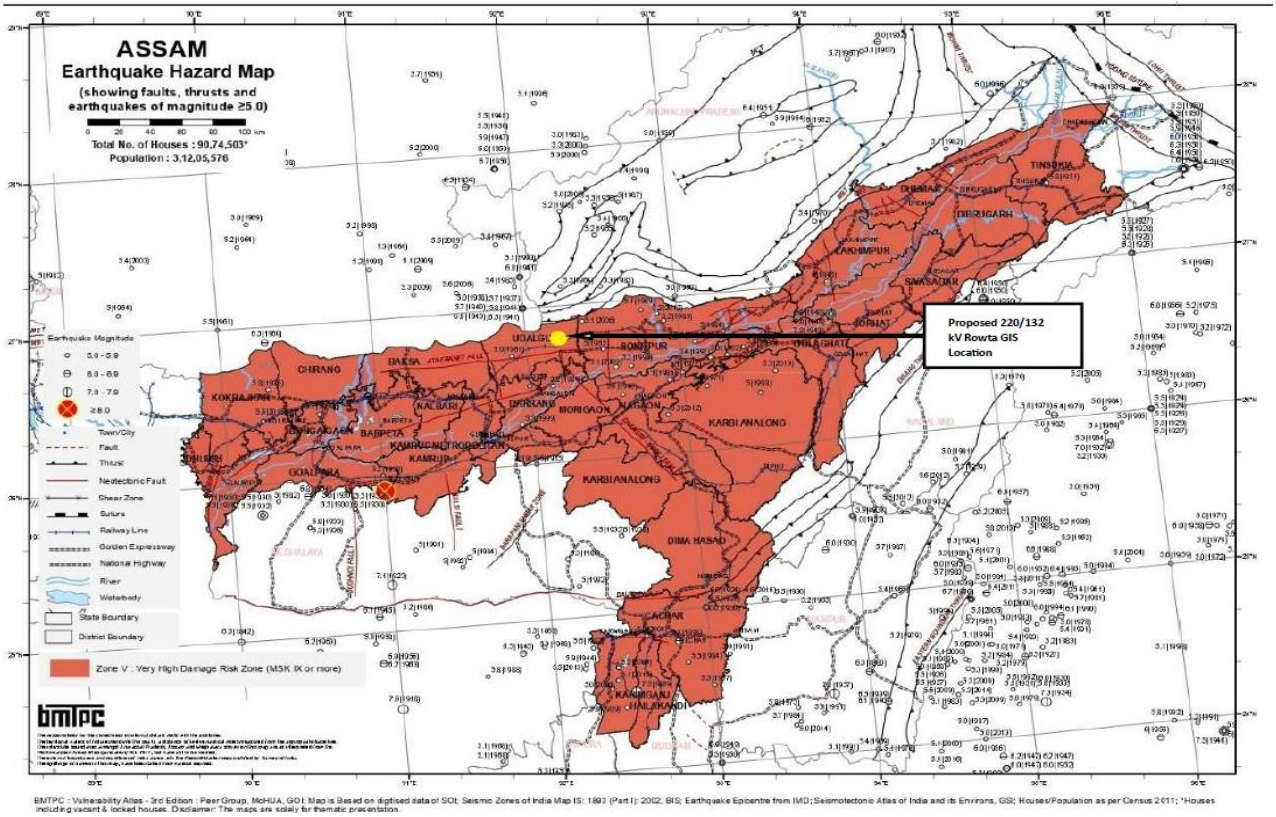

Figure 11 : Earthquake Hazard Map of Assam (Sup-project location Marked in Yellow Dot), BMTPC: Vulnerability Atlas - 3rd Edition

4.2.6 Water Resources

A. Surface Water:

Several perennial streams flow through the Udalguri district from north to south, eventually joining the Brahmaputra River. The major streams in the district include the Barnadi, Kulsi, Noanadi, Bega, Mara Dhansiri, Jiya Dhansiri, and Pachnai rivers. The Jiya Dhansiri River is one of the primary tributaries of the Brahmaputra. Originating in the Bhutan hills, it spans approximately 80 kilometers from its source to its confluence. Another significant river, the Noanadi, also originates in the Bhutan hills, collecting drainage from the surrounding terrain before reaching the plains. The Nanai River has its source in the Bhutan range of the Himalayas, specifically in the Tongsa province, at an elevation of about 1,220 meters above mean sea level. Upon crossing the Bhutan border, the river enters Udalguri district and flows through the Khalingduar Forest, where it carves through gorges and rapids before reaching the plains near Bhutiachang village.

The proposed subproject location is situated at an aerial distance of approximately 3.3 km from the Dhansiri River. An irrigation canal is located at a distance of approximately 100 meters from the proposed substation site. The wetland map of the district, presented in **Figure 12**, marks the subproject location with a red dot.

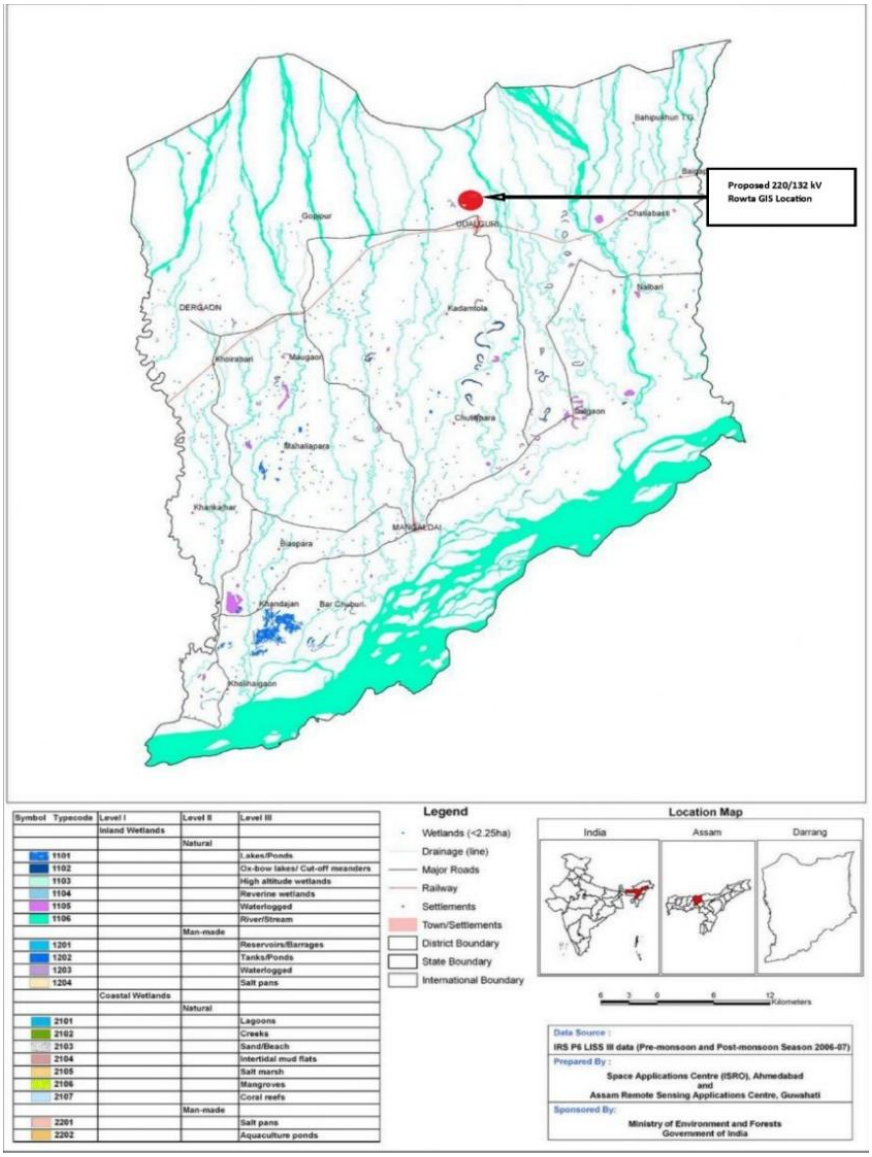

Figure 12 : Wetland Map of Udalguri District as published in National Wetland Atlas of Assam by Space Applications Centre (ISRO), Ahmedabad and Assam Remote Sensing Applications Centre, Guwahati

B. Ground Water

As per the Aquifer Mapping and Management Plan of Udalguri District, Assam (Annual Action Plan, 2019-20) dynamic Groundwater Resources of Udalguri district have been estimated based on the methodology recommended by Groundwater Estimation Committee (GEC 2015).

As of March 2020, the Net Annual Groundwater Availability stands at 63,738 ham after accounting for environmental flow. The total annual groundwater recharge, combining rainfall and other sources, is 67,093 ham.

Table 11 : Net Ground Water Availability (Ham) of Udalguri District

Total GW recharge				Total annual ground water recharge	Environmental Flow (ham)	Net Annual Ground Water Availability (ham)
Monsoon season		Non-monsoon season				
Rainfall recharge	Recharge from other source	Recharge from rainfall	Recharge from other source			
37653	5576	22261	1602	67093	3354	63738

The categorization of groundwater resources shows that annual extractable groundwater resources are 63,738 ham, with a total groundwater extraction of 8,209 ham, including 4,467 ham for irrigation, 3,376 ham for domestic use, and 366 ham for industrial use. The groundwater availability for future use is 58,652 ham, and the stage of groundwater extraction is 12.88%.

Table 12 : Categorization of Ground Water Resources (Ham)

Annual Extractable GW Resources	Annual GW extraction				Domestic uses up to 2025	Ground water availability for future use	Stage of ground water extraction (%)
	Irrigation	Domestic extraction	Industrial extraction	Total			
63738	4467	3376	366	8209	3540	58652	12.88

The stage of groundwater extraction was determined by the ratio of total groundwater draft to net annual availability, multiplied by 100. Based on this calculation, the district falls under the **safe category,** as its groundwater extraction remains low, with no significant long-term depletion trends in pre- and post-monsoon water levels.

Note: The data and calculations presented in this section are entirely sourced from the Aquifer Mapping and Management Plan of Udalguri District, Assam (Annual Action Plan, 2019-20). No modifications have been made to the original figures, and this section only presents the information for reference and analysis only.

4.2.7 Ambient Air and Acoustic (Noise) Environment

A. Ambient air quality

Ambient air quality monitoring was carried out at the proposed Rowta substation location on 08.07.2025 to assess baseline air quality conditions. The monitoring was conducted near the proposed substation boundaries which represents the core zone and the most likely area of impact during construction.

The results for air quality parameters are presented in the **Table 13** and the map showing the sampling location is provided in the **Figure 13**.

Table 13 : Air quality of the proposed subproject location

Sl. No.	Parameters	Unit	Results	Limits (NAAQS-24 hours)	Limits (WHO Global Air Quality Guidelines, 2021)	Test Method
1	Particulate Matter (PM_{10})	$\mu g/m^3$	61.8	100	45	IS 5182(23)
2	Particulate Matter ($PM_{2.5}$)	$\mu g/m^3$	36.4	60	5	IS 5182(24)
3	SO_2	$\mu g/m^3$	8.6	80	40	IS 5182(2)
4	NO_2	$\mu g/m^3$	9.2	80	25	IS 5182(vi)
5	NH_3	$\mu g/m^3$	6.8	400	-	Indophenol Blue Method
6	CO	mg/m^3	0.2	04	04	Organic Vopour Sampler (APM 850) along with CO tube attachment

Interpretation of Results

- The recorded PM_{10} concentrations was 61.8 $\mu g/m^3$, significantly below the NAAQS 24-hour standard of 100 $\mu g/m^3$ but exceeds the WHO 24-hour standard of 45 $\mu g/m^3$.
- The recorded $PM_{2.5}$ concentrations was 36.4 $\mu g/m^3$, significantly below the NAAQS 24-hour standard of 100 $\mu g/m^3$ but exceeds the WHO 24-hour standard of 5 $\mu g/m^3$.

The recorded concentrations of SO_2, NO_2, NH_3, and CO are within the permissible limits prescribed by both the National Ambient Air Quality Standards (NAAQS) and the World Health Organization (WHO) guidelines. While the recorded PM_{10} and $PM_{2.5}$ levels comply with the National Ambient Air Quality Standards (NAAQS), they exceed the more stringent World Health Organization (WHO) guidelines. This reflects the difference in regulatory focus i.e. NAAQS consider the country's socio-economic conditions and existing pollution levels, while WHO sets ideal health-based targets. In urban and semi-urban areas of India, ambient air quality often exceeds WHO limits due to sources like road dust, vehicular emissions, biomass burning, and ongoing development activities. To address these exceedances, appropriate mitigation measures should be implemented during the construction of the proposed substation. These include regular water sprinkling, covering material stockpiles, scheduling dust-generating activities during low-wind periods, and providing adequate personal protective equipment (PPE) along with awareness programs for workers and nearby communities to reduce health risks.

B. Acoustic (Noise) Quality

Noise level monitoring was conducted on 08.07.2025 near the proposed substation premises to establish baseline ambient noise levels prior to construction. The location represents typical existing sound conditions in the proposed confined area with relatively clean and rural environment dominated by low anthropogenic and industrial activity.

The results for noise quality parameters are presented in the **Table 14** and the map showing the sampling location is provided in the **Figure 13**.

Table 14 : Acoustic (Noise) quality of the proposed subproject locations

Sl. No.	Parameters	Unit	Results at 132/33kV Serfanguri AIS	Method	WHO/CPCB Limit as per The Noise Pollution (Regulation and Control) Rules, 2000 Leq (dBA)
1	Leq	dB(A)	**62.8**	Ambient GEEC/SOP/AN/01 Issue Date 27/05/2017	WHO/CPCB Limit for Commercial Area: Day Time Leq<65 Night Time<55
2	Lmin	dB(A)	**54**		
3	Lmax	dB(A)	**71**		

Interpretation of Results

- The Leq (equivalent noise level) values was measured as 62.8 dB(A) during the daytime, which is well within the permissible limit of 65 dB(A) for commercial areas as prescribed by the CPCB under The Noise Pollution (Regulation and Control) Rules, 2000 and WHO standard.
- The Lmin and Lmax values at both sites further indicate that the noise environment is stable and not subject to abrupt or excessive peaks.
- The monitored noise levels reflect a low ambient noise environment, consistent with the surrounding land use, which is generally peaceful and sparsely developed in terms of commercial or traffic sources.

These results indicate compliance with national noise standards, suggesting no significant ambient noise pollution in the project influence areas. The baseline values provide a reference for monitoring potential noise increases during substation construction and operation phases.

Figure 13: Baseline Air and Noise quality monitoring locations within proposed substation location

4.3 Biological Environment Baseline of the Study Area

4.3.1 Forest Cover in Udalguri District

As per the 2023 forest assessment data, the total geographical area of Udalguri district is 2,013 sq. km (as calculated by the Survey of India). The total forest cover is reported as 411.85 sq. km, which constitutes approximately 20.46% of the district's area.

The breakdown of the forest cover is as follows:

- Very Dense Forest: 7.47 sq. km
- Moderately Dense Forest: 78.69 sq. km
- Open Forest: 325.69 sq. km
- Scrub: 5.85 sq. km

The data reveals that Open Forest dominates the forest landscape of the district, forming nearly 79% of the total forest area. Moderately Dense Forests account for approximately 19%, whereas Very Dense Forests are scarce, covering only 7.47 sq. km, just 1.8% of the forest area. Scrublands, covering 5.85 sq. km, represent ecologically degraded or regenerating forest areas that require attention for restoration and greening.

4.3.2 Tree Inventory and Vegetation Cover

As part of the baseline biodiversity assessment, a preliminary site reconnaissance was carried out during the environmental and social screening phase within the proposed site boundary of the 220/132 kV GIS Substation

at Rowta. This area defines the study zone for biodiversity-related observations under this subproject. The site primarily consisted of vegetation with scattered tree cover, and no significant natural forest patch was observed within the substation footprint.

During the site assessment, it was observed that several mature trees fall within the subproject footprint and are likely to be impacted due to site clearance activities. Accordingly, the Divisional Forest Office, Dhansiri Forest Division was approached, to facilitate an official assessment of the vegetation cover.

Subsequently, a joint verification was conducted at the site by officials from the Dhansiri Forest Division along with the PIU officials on 05.06.2025 to assess and mark the trees to be felled prior to commencement of civil works. Based on this verification, a total of **151 trees belonging to 33 different species** were identified within the subproject area. The species-wise enumeration is provided in **Table 15**, and detailed inventory including scientific names and girth sizes is appended as **Appendix 5**.

Table 15 : Summary of Tree Species and Regulatory Status

Sl. No.	Scientific Names of the Trees	Nos.	IUCN Status	Enlisted under "The Assam Trees Outside Forest (Sustainable Management) rules, 2022"
1	*Aegle marmelos*	1	Near Threatened	Not Listed
2	*Albizia lebbeck*	8	Not Evaluated	Schedule-II
3	*Derris robusta*	16	Least Concern	Schedule-I
4	*Artocarpus integrifolia*	6	Not Evaluated	Schedule-I
5	*Bombax ceiba*	4	Least Concern	Schedule-I
6	*Cassia javanica*	1	Least Concern	Schedule-II
7	*Chukrasia velutina*	1	Least Concern	Not Listed
8	*Delonix regia*	6	Least Concern	Schedule-I
9	*Duabanga grandiflora*	1	Least Concern	Not Listed
10	*Elaeocarpus serratus*	1	Not Evaluated	Not Listed
11	*Erythrina variegata*	2	Least Concern	Not Listed
12	*Ficus auriculata Lour.*	1	Least Concern	Not Listed
13	*Ficus benghalensis*	2	Least Concern	Not Listed
14	*Ficus religiosa*	2	Least Concern	Schedule-I
15	*Gmelina arborea*	2	Least Concern	Not Listed
16	*Lannea coromandelica*	1	Least Concern	Not Listed
17	*Machilus bombycina*	1	Not Evaluated	Not Listed
18	*Mangifera indica*	26	Not Evaluated	Schedule-I
19	*Melia azedarach*	2	Not Evaluated	Schedule-II
20	*Michelia champaca L.*	1	Least Concern	Not Listed
21	*Millettia pinnata*	13	Least Concern	Not Listed
22	*Mimusops elengi*	3	Least Concern	Not Listed
23	*Neolamarckia cadamba*	6	Not Evaluated	Schedule-I
24	*Phyllanthus emblica Linn*	1	Least Concern	Not Listed
25	*Polyalthia longifolia*	14	Least Concern	Schedule-I
26	*Pterospermum acerifolium*	2	Least Concern	Not Listed
27	*Shorea robusta*	1	Least Concern	Not Listed
28	*Spondias pinnata*	2	Not Evaluated	Not Listed
29	*Sterculia villosa*	1	Least Concern	Not Listed

Sl. No.	Scientific Names of the Trees	Nos.	IUCN Status	Enlisted under "The Assam Trees Outside Forest (Sustainable Management) rules, 2022"
30	*Syzygium cumini*	2	Least Concern	Schedule-I
31	*Tamarindus indica*	1	Least Concern	Schedule-I
32	*Tectona grandis*	17	Endangered	Not Listed
33	*Terminalia chebula*	3	Least Concern	Schedule-I
Total		**151**		

From the above data, it was observed that:

- 14 species, covering 97 trees, are listed under Schedule-I and Schedule-II of the *Assam Trees Outside Forest (Sustainable Management) Rules, 2022*. These are exempted from requiring prior felling permission under the said rules.
- The remaining 19 species (including one endangered and one near-threatened species), covering 54 trees, are not listed under the above schedules and hence require prior permission from the concerned Forest Department for felling.
- Most of the identified tree species at the site are known to play important ecological roles, serving as bird-nesting habitats, pollinator-friendly species, and fruit-bearing trees. Their presence indicates the area supports resident bird species through canopy cover for nesting and roosting and nectar and fruit for birds and pollinators.

AEGCL has formally submitted the request to the Dhansiri Forest Division for obtaining the necessary clearance, and it is anticipated that the required approval will be granted upon completion of due verification and compliance with applicable regulatory conditions.

Figure 14 : Trees to be felled within the subproject site

4.3.3 Faunal Observations and Community Inputs

To assess the presence of fauna in and around the project site, a community consultation was conducted with local residents, during the site visit. Based on the feedback gathered from the community and the observations made during the visit, it was confirmed that the subproject site is neither located within nor adjacent to any designated Protected Areas (PAs), Eco-sensitive Zones (ESZs), or Critical Habitats. This was further validated by the map **(Figure 15),** which illustrates the absence of sensitive ecological zones in proximity to the subproject site.

The surrounding land use of the study area is predominantly composed of built-up areas and agricultural lands, which typically support low faunal diversity. No sightings of wildlife species were reported by the local community or observed during the field visit. Common domestic animals such as cattle, goats, dogs, and cats are frequently seen in and around the site. While occasional sightings of monkeys and snakes have been reported by residents, such occurrences are rare and transient. The avifauna observed in the area includes only common resident bird species such as mynas, bulbuls, pigeons, sparrows, crows etc.

Need to refer stakeholder chapter.

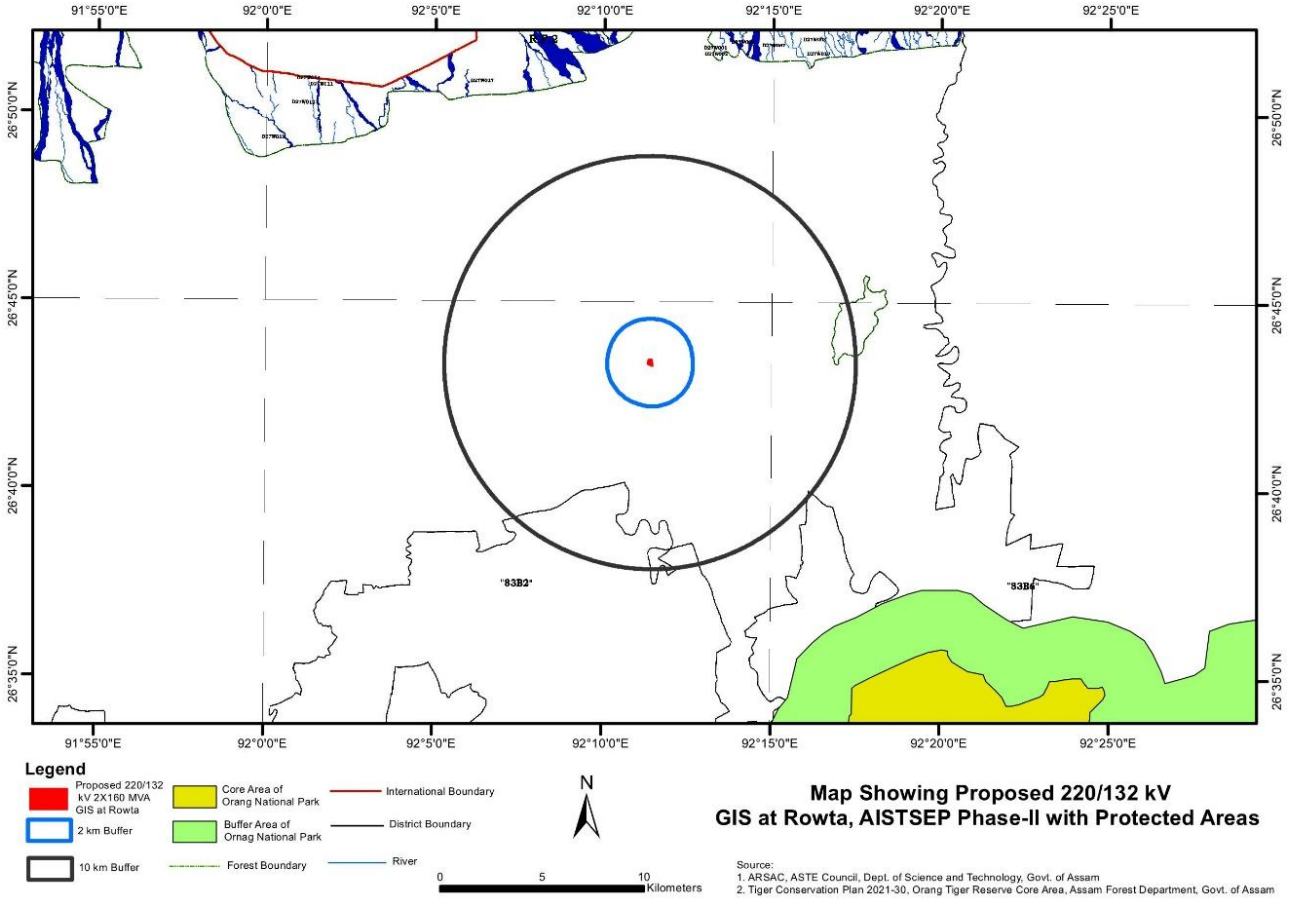

Figure 15 : Map showing proposed subproject site with protected areas

4.4 Socio-economic Environment

4.4.1 Demographic Profile

The proposed 220/132 kV Gas Insulated Substation (GIS) will be constructed in the revenue village of Phuhurabari under Rowta Block of Udalguri District. Udalguri District was officially formed on June 14, 2004, as one of the four new districts created under the Bodoland Territorial Autonomous District (BTAD), following the Government of Assam notification No.GAG(B)137/2002/Pt/117 dated October 30, 2003. The district was carved out by bifurcating the erstwhile Darrang District and incorporating a portion of Sonitpur District. Geographically, Udalguri shares its northern boundary with Bhutan and Arunachal Pradesh, its eastern boundary with Sonitpur District, western boundary with Baksa District, and southern boundary with Darrang District. The total geographical area of the district is 1,985.68 square kilometers. As per the 2011 Census, the total population of Udalguri District is 831,668, comprising 421,617 males and 410,051 females, with a population density of 413

persons per square kilometer. The district headquarters is located at Udalguri town, which lies approximately 140 kilometers from Assam's capital city, Guwahati. Administratively, the district is divided into 11 Community Development (CD) Blocks, one of which is Rowta.

Rowta Block, where the substation is proposed, is situated along the bank of the River Dhansiri and falls under the jurisdiction of the BTC. According to the 2011 Census, Rowta Block has a total population of 86,575, with 44,163 males and 42,412 females. The Scheduled Caste (SC) population in the block is 1,592, while the Scheduled Tribe (ST) population is 20,422. The block comprises 67 villages and covers a total area of 16,480.87 hectares, of which 11.25% is under cultivation.

The existing 132/33 kV Grid Substation (GSS) in Rowta where the new proposed 220/132 kV GIS will also be set up is located in Phuhurabari revenue village. Phuhurabari village has a total population of 760 across 140 households, and spans an area of 25.6 hectares.

As per the 2011 Census, the total literate population in Udalguri District was 469,926, comprising 264,326 literate males and 205,600 literate females. The district recorded an average literacy rate of 65.41%, with male literacy at 72.58% and female literacy at 58.05%. In Rowta Block, the total literate population stood at 43,018, including 24,228 males and 18,790 females.

In 2011, the sex ratio of Udalguri stood at 973 females per 1,000 males. Comparatively, the national average sex ratio of India was 940 females per 1,000 males as per the 2011 Census Directorate. The child sex ratio (0–6 years) in Udalguri was 973 girls per 1,000 boys in 2011.

4.4.2 Economic Profile

Rowta, a block-level administrative region in Udalguri district, is largely agrarian, with agriculture and livestock forming the backbone of its local economy. The area is enriched with fertile alluvial soil and benefits from a network of rivers and beels that support multiple cropping seasons. Major crops include rice (Ahu, Sali), mustard, jute, and vegetables. Livestock rearing is also a crucial livelihood activity, with cattle, goats, pigs, ducks, and poultry commonly raised by households. The presence of tea gardens, small trading centers, and local markets such as Rowta Bazar provides additional employment opportunities, especially in retail and services.

Phuhurabari, a rural village under Rowta Block and Harisinga Revenue Circle, reflects the typical economic characteristics of the region. According to the Census 2011, the majority of the village population is engaged in agriculture, either as cultivators or agricultural laborers. The land use in Phuhurabari is mainly agricultural, with small plots used for growing paddy, mustard, vegetables, and pulses. The livestock sector plays a significant supportive role, with most households keeping cattle, goats, and poultry for milk, meat, and additional income. The rearing of pigs is common among certain communities, serving as both a cultural practice and a livelihood strategy. Backyard poultry is widely practiced, enhancing both nutrition and market income.

Phuhurabari has access to rural road infrastructure connecting it to Rowta town and nearby marketplaces. Electricity and basic water supply are available, though advanced irrigation systems and mechanized farming are still limited. Financial access is mostly through cooperative societies and Self-Help Groups (SHGs), which are growing steadily in the area. The economic activities in Phuhurabari are closely integrated with the rest of Rowta Block, contributing to its agrarian-based rural economy.

The proposed 220/132 kV GIS substation at Rowta will be constructed inside the secure boundary of premises owned by AEGCL; hence, there will be no impact on grazing land. This was confirmed during consultations with the PIU of AEGCL and through a public consultation held with nearby communities on 08/07/2025.

4.4.3 Road Network

Rowta has a well-developed road network, connecting it to Udalguri town, Mangaldai, Tezpur, and Guwahati. The National Highway (NH-15) and state highways play a crucial role in regional connectivity. The locality is well-connected with black-topped (pucca) roads, along with gravel (kuchha) roads serving rural areas.

Rowta has strong road infrastructure with National Highway 15 providing major connectivity. It is also linked to Assam's state highways, ensuring easy access to neighboring towns. The town features well-maintained black-topped pucca roads, while surrounding villages are connected via gravel and earthen rural roads. Public and private bus services connect Rowta to major cities like Guwahati and Tezpur. The town is served by a railway station, improving regional access. Local transport includes auto-rickshaws, taxis, and modified autos for easy travel within Rowta and nearby areas.

The proposed substation construction site is located at Phuhurabari Village, approximately 2.7 kilometres from Rowta Chariali, and is accessible via State Highway (SH-10). The site is also about 12 kilometres from Udalguri town, connected through National Highway (NH-15) and SH-10.

4.4.4 Literacy Rate and Education

According to the 2011 Census, Udalguri district has a literacy rate of 65.41%, with male literacy at 72.58% and female literacy at 58.05%. In rural areas of Udalguri, the literacy rate stands at 64.43%, with male literacy at 71.75% and female literacy at 56.92%. Urban areas exhibit a higher literacy rate of 85.14%, with male literacy at 89.08% and female literacy at 81.03%.

While specific literacy data for Rowta town is not separately detailed in the available census records, the town hosts several government and private educational institutions, including schools offering education up to the higher secondary level and a few colleges providing undergraduate courses. These institutions contribute to the educational development of the area.

Despite these advancements, challenges persist, particularly in rural regions, where access to quality education and educational infrastructure remains limited. Ongoing efforts by the government and non-governmental organizations aim to improve literacy rates, enhance educational facilities, and ensure better educational opportunities for all residents of Udalguri district.

According to the 2011 Census Rowta Block comprises 67 villages with a total population of 86,575. Of these villages, 65 have primary schools, 23 have middle schools, 12 are served by secondary schools, and 4 have senior secondary schools. Additionally, the block is home to 2-degree colleges offering courses in arts, science, and commerce.

Bhelapara LP (Lower Primary) School which includes classes 1 to 5 and a pre-primary section (age group 3 to 10 years) having total 37 numbers of student is located at a distance of 381.77 meters from the proposed 220/132 kV substation site at Phuhurabari, highlighting the proximity of educational infrastructure to the project location.

4.4.5 Health Infrastructure

Rowta Model Hospital, located in Phuhurabari Khoyerbari, Assam, is a key healthcare facility in Udalguri district, situated within 1 km of the 220/132 kV GIS construction site. As a model hospital, it operates 24/7, providing essential medical services, including outpatient consultations, inpatient care, and emergency treatment, ensuring continuous healthcare access for the local community.

Rowta, a town in Udalguri district, has a basic healthcare infrastructure comprising primary health centres (PHCs) and private clinics that offer essential services such as outpatient care, emergency treatment, and maternal health support. However, for specialized medical care, residents often travel to larger towns or district hospitals.

According to the 2011 Census, Rowta Block is served by a range of healthcare facilities, including 5 Primary Health Centres (PHCs) and 10 Primary Health Sub-Centres. Additionally, the block has 2 Maternity and Child Welfare Centres, 2 Tuberculosis (T.B.) Clinics, and 2 Dispensaries, contributing to the basic healthcare infrastructure available to the local population.

In the project area, including Rowta and surrounding villages of Udalguri district, the average life expectancy is around **65 to 68 years**, which is slightly below the national average. This estimate is in line with rural health trends reported in NFHS-5 (National Family Health Survey, Assam, 2019-21) and the Assam State Health Indicators published by the Directorate of Health Services. The region experiences a dual burden of disease, with both communicable and non-communicable diseases impacting the local population. Malaria, tuberculosis, and water-borne infections such as diarrhea and typhoid remain prevalent, especially during the monsoon, due to poor drainage and sanitation infrastructure.

In parallel, there is an increasing incidence of non-communicable diseases (NCDs) such as hypertension, diabetes, and chronic respiratory illnesses, particularly among middle-aged and elderly residents. These trends are reflective of findings in District Health Surveys and the Annual Health Survey Assam (2012-13), which identified lifestyle changes, low awareness, and poor screening as contributing factors. Maternal and child health indicators have shown gradual improvement due to government programs, yet challenges like anemia, malnutrition, and incomplete immunization coverage persist in interior rural belts. Health services in the project area are primarily delivered through Primary Health Centres (PHCs), Sub-Centres, and Accredited Social Health Activists (ASHAs). While infrastructure has expanded under the National Health Mission (NHM), access to specialist care and diagnostics remains limited in areas.

4.4.6 Electricity, Water and Sanitation Facilities

Rowta Development Block of Udalguri District, has access to essential utilities such as electricity, water, and sanitation, though certain infrastructural challenges persist. The town is connected to the state electricity grid, providing a generally steady power supply; however, occasional outages do occur, particularly during peak demand periods or adverse weather conditions. During public consultations, local community members expressed optimism that the construction of the proposed 220/132 kV substation at Phuhurabari will significantly enhance the reliability and quality of electricity supply in the area.

Water in Rowta is primarily sourced from wells, tube wells, and limited piped supply systems. While these sources meet basic needs, access to clean and consistent drinking water remains a concern, particularly in more remote rural areas. Sanitation infrastructure is gradually improving, supported by local awareness campaigns and government initiatives aimed at increasing the availability of household latrines and promoting hygienic practices. Across Udalguri District, progress has been made in expanding rural electrification and water supply systems, yet there remains a need for more robust infrastructure development, especially in hard-to-reach villages. Waste management systems are still underdeveloped in some areas, and the local administration continues to work on addressing these gaps through various government schemes and development programs.

4.4.7 Cultural Resources

Rowta and Udalguri district reflect the rich cultural heritage of Assam, influenced by diverse ethnic communities, including Bodos, Assamese, Bengalis, and Adivasis. Traditional Bodo culture is prominent in the district, with

festivals like Bwisagu celebrated with dance, music, and local cuisine. The region is known for its folk traditions, including Bagurumba, the graceful Bodo dance, and various Assamese Bihu festivities.

Handloom weaving is a significant cultural practice, with traditional Bodo dokhonas and Assamese mekhela chadors crafted by local artisans. The district also hosts various fairs and religious festivals that showcase Assam's vibrant cultural diversity. Despite modernization, efforts continue to preserve indigenous traditions, making Udalguri a unique blend of heritage and contemporary influences.

4.4.8 Archaeological and Historical Monuments

Rowta and Udalguri district have a rich historical and cultural heritage, though they are not widely known for major archaeological sites. The region is influenced by the legacy of the Bodo, Ahom, and Koch kingdoms, with traces of ancient settlements and historical significance.

In Udalguri district, several old temples, monasteries, and sacred sites reflect the area's spiritual history. The district is home to remnants of traditional Bodo cultural heritage, including ancient prayer sites and age-old practices. While no major excavated monuments are present, historical landmarks and folklore link the region to Assam's broader history. Nearby districts, however, have more well-documented archaeological sites, adding to the historical richness of the area.

As per the consultation with the local community people there is no archeologically sensitive sites around the 10 KM radius of the proposed substation construction site at Phuhurabari in Rowta Block.

Sensitive receptors (please add a section here and describes sensitive receptors in and around the proposed sites.

Chapter 5: Analysis of Alternatives

5.1 Introduction

This chapter presents the analysis of alternatives for the proposed construction of proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta. In accordance with AIIB's Environmental and Social Framework (ESF, 2024), this assessment explores environmentally and socially viable options considered during project planning.

AIIB's ESF requires that the alternatives be evaluated in a comparative manner, including investment, location, design, technology, and the "no project" scenario. The analysis aims to establish whether the selected options effectively minimize environmental and social risks, optimize cost-effectiveness, and ensure operational feasibility under local conditions.

5.2. Without Project Scenario

If the proposed substations are not constructed, the transmission network in the region would continue to face multiple constraints, such as:

- Overloading of existing substations and transmission lines,
- Inability to meet growing regional power demand,
- Reduced reliability and quality of electricity supply,
- Limited capacity for integrating renewable energy,
- Adverse impacts on regional socio-economic growth.

Hence, the "without project" alternative is not viable, as it fails to support the region's developmental and energy reliability goals.

5.3. Site Selection Process

As Assam's state transmission utility, the Assam Electricity Grid Corporation Limited (AEGCL) prioritizes minimizing social and environmental impacts in the planning and implementation of substation projects. For the development of the 220/132 kV substation at Rowta, no new land acquisition will be necessary. The substation will be constructed within **3.89 hectares** of land already owned by AEGCL, located within the premises of the existing 132/33 kV Rowta substation. This site was selected due to several significant advantages:

- Eliminates the need for additional land acquisition, thereby avoiding any risk of involuntary resettlement or displacement of communities.
- The land is already under AEGCL ownership and confirmed to be free from encroachment, legal disputes, or environmental sensitivities such as forest areas, archaeological sites, or ecologically protected zones. (The methodology used to confirm the absence of encroachment is provided in **Chapter 2 – Section 2.5**.)
- Utilizing existing infrastructure aligns with principles of sustainability and resource optimization, reducing the need for extensive new civil works and land development.
- The site is easily accessible by public roads, facilitating the transport of equipment and materials during construction and operations.
- There is convenient access for terminating high-voltage lines (132 kV and 33 kV), as the site is free from physical obstructions.

This approach aligns with Environmental and Social Standards (ESS), particularly the principle of "Avoid, Minimize, and Mitigate." By utilizing existing land and infrastructure, the project avoids the environmental and social impacts typically associated with new land acquisition and minimizes disruption to local communities and biodiversity. (Land possession Copy is Appended in **Appendix 4**).

Although the identified area falls within a Schedule-6 district, which is designated for the protection of Indigenous communities, the proposed substation expansion remains within the AEGCL existing land and does not encroach upon Indigenous lands or affect their customary rights. A meaningful consultation was conducted with the Indigenous Peoples (IP) community on **24st January 2025 and 8th July 2025**. Photographs and attendance records are included in **Appendix 12**.

Although a formal multi-site selection study was not conducted, AEGCL undertook Environmental and Social Due Diligence, confirming:

- The sites do not fall within forested or ecologically sensitive areas,
- No resettlement or private land acquisition is required and the sites are free from any encroachment.
- Adequate road access and grid connectivity are available,
- The sites pose low environmental and social risks.

5.4. Assessment of Hypothetical Alternative Sites

While no official alternatives were appraised due to land available with AEGCL, a comparative matrix is provided to evaluate the selected sites against hypothetical private or forest land options:

Criteria	Hypothetical Alternative Site	Selected AEGCL existing Land Site
Land Ownership	Private/Forest	AEGCL existing land
Land Acquisition Requirement	Yes	No
Resettlement Risk	High	None
Environmental Sensitivity	Unknown	Low (screened and verified)
Cost Implication	High (due to acquisition and compensation)	Low (AEGCL existing land)
Grid Connectivity Feasibility	Uncertain	Technically Feasible

This comparison validates the appropriateness of the selected sites from environmental, social, and technical standpoints.

5.5. Technological Alternatives

The substation is planned using GIS (Gas-Insulated Substation) technology at the 220/132 kV voltage level. This choice is consistent with CEA and AEGCL standards and is considered optimal based on the specific site and project requirements.

Gas-Insulated Substation (GIS) technology has been selected over AIS due to the following reasons:

- Limited availability of land at the project site, making GIS preferable due to its compact footprint.
- Better reliability and reduced maintenance requirements, as GIS components are enclosed and protected from environmental factors such as dust, humidity, and pollution.
- Enhanced safety and operational performance, particularly in high voltage installations, where GIS provides better insulation and reduced risk of flashovers.
- Faster installation and commissioning, as GIS units are modular and factory-tested, leading to reduced on-site work and construction time.
- Minimized environmental and visual impact, which is beneficial in areas where aesthetic concerns or environmental constraints are present.

Thus, GIS technology offers a technically robust, space-efficient, and reliable solution, justifying its selection despite the higher initial capital investment.

Chapter 6: Assessment of potential environmental and social impacts, its significance and mitigation measures

6.1 Introduction

This chapter provides a comprehensive assessment of the potential environmental and social impacts associated with the construction of the proposed **220/132 kV GIS in Rowta, Assam**. The assessment is based on a detailed understanding of the existing environmental and socio-economic baseline conditions, established through a combination of primary field surveys and secondary data analysis in alignment with applicable statutory and regulatory requirements, as well as the Environmental and Social Standards (ESSs) of AIIB.

The assessment focuses on the physical, biological, and socio-economic components of the proposed subproject area and evaluates potential risks and impacts across all phases of the project—pre-construction, construction, and operation. It identifies likely anticipated impacts and proposes mitigation measures in accordance with the mitigation hierarchy: avoidance, minimization, mitigation, and compensation or offset for any residual impacts. A **site-specific Environmental and Social Management Plan (ESMP)** has also been developed and is presented in **section 7.1** of this chapter. This ESMP outlines the mitigation and monitoring measures, along with corresponding institutional responsibilities, to ensure effective implementation and compliance throughout the subproject lifecycle.

The methodology adopted for this assessment includes the following key steps:

- **Identification and evaluation** of the range and severity of potential environmental and social impacts across all subproject phases;
- **Recommendation of viable, cost-effective, and environmentally sound mitigation measures** to address the identified impacts; and
- **Formulation of a comprehensive site-specific ESMP** that integrates the proposed mitigation measures into a structured and actionable implementation framework.

6.2 Assessment of Impact Significance

The assessment of impact significance involves evaluating the potential environmental and social impacts of the proposed subproject in terms of their type, scale, duration, frequency, extent, and likelihood. This process is essential to prioritize impacts based on their severity and to inform the design of appropriate mitigation measures. The significance of each identified impact is determined by considering both the **magnitude** of the impact and the **sensitivity/vulnerability/importance** of the affected environmental and social receptors.

Magnitude refers to the intensity or scale of the predicted change affecting a specific environmental or social resource/receptor as a result of the impact and categorized as ***Negligible***, ***Small***, ***Medium***, **or** ***Large***. The **sensitivity/vulnerability/importance** of a receptor indicates its ecological, social, or economic importance and its capacity to absorb or tolerate change and categorized as ***Low***, ***Medium***, **or** ***High***. By combining these two parameters, the **significance of each impact** is determined qualitatively in the relevant sections of the report. The evaluation framework is summarized as follows:

Table 16 : Impact Significance Evaluation Matrix

		Sensitivity/Vulnerability/Importance of Receptor		
Magnitude of Impact		Low	Medium	High
	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Thus, the impact significance was determined and following ratings are assigned: ***Negligible, Minor, Moderate, and Major***. This significance rating matrix is applied uniformly across all receptors and associated impacts, as receptor-specific considerations are already incorporated into the determination of magnitude and sensitivity. It is also important to note that impact prediction and evaluation takes into account any embedded controls (i.e., physical or procedural controls that are already planned as part of the subproject design, regardless of the results of the impact assessment process).

Table 17 : Context of Impact Significance

Interpretation/Context of Impact Significance			
Negligible	**Minor**	**Moderate**	**Major**
An impact of ***negligible*** significance is one where a resource/ receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.	An impact of ***minor*** significance is one where a resource/ receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards/ guidelines.	An impact of ***moderate*** significance has an impact magnitude that is within applicable standards/guidelines, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is '*as low as reasonably practicable*' (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.	An impact of ***major*** significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of impact assessment is to get to a position where the subproject does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the subproject.

6.3 Impact Mitigation Strategy

Once the significance of an impact has been characterized, the next step was to evaluate what mitigation and enhancement measures are warranted. For the purposes of this IA, AEGCL adopted the following Mitigation Hierarchy:

- **Avoid at Source, Reduce at Source**: avoiding or reducing at source through the design of the subproject.
- **Abate on Site**: add something to the design to abate the impact.
- **Abate at Receptor**: if an impact cannot be abated on-site then control measures can be implemented off-site.
- **Repair or Remedy**: some impacts involve unavoidable damage to a resource (e.g. vegetation and crop land and tree loss due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- **Compensate in Kind, Compensate Through Other Means**: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of access, recreation and amenity spaces etc.).

The primary focus of mitigation was to first apply measures at the source of the impact—aiming to avoid or reduce the magnitude of the impact arising from project activities. Once all reasonably practicable source-level mitigations had been implemented, the remaining residual effects on the affected resources or receptors were addressed through on-site abatement, off-site measures, or compensatory actions, in order to further reduce the overall significance of the impact.

6.4 Environmental and Social Impacts and Mitigation Measures

6.4.1 Impact on Physical Environment

The development of the proposed 220/132 kV Gas-Insulated Substation (GIS) over existing AEGCL land in Phuhurabari Village involves limited physical disturbance, primarily due to its location within the premises of an existing grid substation. This section evaluates the potential impacts of construction and operation activities on the physical environment, including land use, soil quality, air quality, water resources, and ambient noise levels. The assessment considers both short-term construction-phase impacts and long-term operational-phase implications, and recommends suitable mitigation measures to ensure compliance with environmental standards and minimize any adverse effects.

A. Impacts during Pre-Construction and Construction Phase

Land use and Land Cover	
Context and receptor	• The proposed 220/132 kV GIS substation at Rowta will be constructed within the premises of the existing 132/33 kV GSS owned and operated by AEGCL. The land for the project is already under the ownership of AEGCL. • The proposed substation site is located on fairly plain terrain. • The site contains 43 nos. of abandoned staff quarters, Old Resident Engineer's Office, Store room, a security barrack and a Temple, which will be demolished. Visual inspection during the baseline survey confirmed that these structures do not contain asbestos-containing materials (ACMs) or any other hazardous substances. • The subproject will result in change of the land use within the footprint of the substation area.
Embedded measures	• The proposed subproject site was selected within existing AEGCL-owned premises to avoid additional land acquisition, thereby minimizing pressure on surrounding land resources and preventing any displacement or land-use conflict. • Integrating substation design to fit within the current land footprint, minimizing expansion beyond

Land use and Land Cover	
	existing boundaries and preserving surrounding land uses. • Avoiding use of surrounding agricultural or undeveloped land for any project-related temporary use, including vehicle movement, worker accommodation, or laydown areas. • Use of existing roads for accessibility.
Impact Significance	The total land area for the subproject is approximately 3.89 hectares, which will undergo a permanent change in land use. However, this transformation will occur entirely within the boundary of the existing 132/33 kV Rowta GSS premises. Considering that the site is already under utility use and the expansion is confined within an existing substation complex, the **magnitude** of this land use impact is assessed as ***small*** with **sensitivity** on receptor is accessed as ***low***. According to the Impact Significance Assessment Matrix, a combination of a small magnitude of impact with low receptor sensitivity leads to the conclusion that the overall **significance** of the impact is ***negligible***.
Additional mitigation measures	• All demolition activities will be carried out in accordance with the Generic Construction and Demolition Waste Management Plan provided in **Appendix 7**. The estimation of waste quantities will be undertaken by the EPC Contractor prior to the commencement of demolition activities. As per consultations with the Municipal Board of Udalguri on 08.07.2025, it was suggested to consider a suitable local landfill site in coordination with the Village Head and the local community. In the absence of a suitable local disposal site, the Municipal Board has agreed to allow the use of their existing landfill site, located approximately 10.1 km from the proposed substation site (GPS coordinates: 26°44'52.89"N, 92°6'58.53"E), subject to a formal request from the EPC Contractor. • Demolition debris will be transported in covered trucks to prevent dust dispersion and spillage. The movement of debris-carrying vehicles will be restricted to designated haulage routes to minimize local nuisance and avoid road damage. • The EPC Contractor will maintain complete records of waste quantities, reuse/recycling efforts, disposal locations, and stakeholder consultations. These will be documented and submitted as part of the Monitoring Reports. • Preservation of topsoil from for reuse in landscaping or greenbelt development within or around the substation. • Storage of Construction materials within the designated subproject area to avoid spillage into adjacent agricultural land.
Residual impact significance	---

Soil Environment	
Context and receptor	• At the substation site, site clearance, excavation, and ground levelling activities during the pre-construction and construction phases are expected to disturb the natural soil strata, leading to potential erosion and degradation of soil quality. • There is a risk of soil contamination due to accidental leaks or spills of oil, lubricants, diesel, and hydraulic fluids from construction machinery and vehicles. • Construction activities will generate various forms of construction and demolition (C&D) waste, including concrete debris, wooden pallets, scrap metal, packaging materials (plastic and paper), which, if not managed properly, may result in localized soil pollution. • Additionally, domestic solid waste such as food waste, plastics, glass, aluminum cans, and paper generated by the construction workforce and labour camps poses a risk of contaminating the soil if improperly handled or disposed off. • The haphazard storage of construction materials, especially aggregates like sand and gravel, directly on exposed or fertile soil areas, may reduce soil productivity and increase the risk of runoff-induced sedimentation, contributing to further soil degradation and pollution.
Embedded measures	• Site selection within existing AEGCL premises minimizing the risk of new soil disturbance and limiting excavation to the defined project footprint to avoid unnecessary soil disturbance. • Pre-identification of designated zones for temporary stockpiling of materials, vehicular movement, and equipment storage during the planning stage, helping to avoid soil degradation in unintended

Soil Environment	
	areas. • Integration of landscape restoration measures in the masterplan.
Impact Significance	Although the substation lies within the existing AEGCL premises, construction activities like excavation, material storage, and waste generation may still cause soil contamination and degradation. Potential leaks of oils, fuels, and improper handling of C&D waste increase this risk. Thus, the **magnitude** of impact is assessed as ***medium*** and the receptor **sensitivity** as ***medium***. According to the Impact Significance Assessment Matrix, a combination of a medium magnitude of impact with medium receptor sensitivity leads to the conclusion that the overall **significance** of the impact is ***Moderate***.
Additional mitigation measures	• Excavation activities shall be confined strictly to the designated and marked excavation and construction zones to minimize unnecessary disturbance to the surrounding soil. • The excavated soil shall be stored onsite in a designated area for reuse in backfilling, in accordance with IS 1200 (Part 1): 1992 guidelines on earthwork measurements and reuse. • Topsoil, if removed for foundation or leveling work, shall be temporarily stored separately in properly demarcated heaps (not exceeding 2 meters in height) and covered with tarpaulin or geo-textile fabric to prevent erosion and loss. This preserved topsoil shall be used for landscaping or as a top cover layer after completion of construction activities. • After construction is completed, the site shall be cleared of excess excavated earth and leftover construction materials. These materials shall be disposed of only at approved disposal sites, identified in consultation with the local Urban Local Bodies (ULB) or Panchayat authorities, following the Construction and Demolition Waste Management Rules, 2024. • Spill containment kits shall be made available at all construction zones and fueling areas. In the event of an oil or fuel spill, immediate clean-up will be conducted using absorbent materials, and the contaminated soil will be disposed of in line with Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. • Waste collection bins shall be provided at the labour camp site for the segregation and storage of domestic solid waste. Waste shall be disposed of through authorized municipal collection systems or other appropriate mechanisms approved by local authorities. • Wherever possible, existing approach roads shall be utilized to access the subproject site to avoid vehicular movement on agricultural land, thereby preventing soil compaction and crop damage.
Residual impact significance	After implementation of mitigation measures, **significance** of residual impacts for construction activities will be ***minor***.

Ambient Air Quality	
Context and receptor	Ambient air quality near the proposed Rowta substation site may be temporarily impacted during the construction phase due to the following sources: • Fugitive dust emissions from excavation, drilling, backfilling, and vehicular movement. • Emissions from operation of construction machinery and diesel generator (DG) sets. • Dust from transportation and handling of raw materials such as sand, soil, and aggregates. Monitoring data reveals that the baseline concentrations of SO_2, NO_2, CO, and NH_3 are within the permissible limits set by both the National Ambient Air Quality Standards (NAAQS) and the World Health Organization (WHO). However, while PM_{10} and $PM_{2.5}$ levels comply with NAAQS limits, they exceed the more stringent, health-based guidelines recommended by the WHO. This discrepancy highlights the distinction between regulatory standards that accommodate socio-economic feasibility (NAAQS) and those founded on strict epidemiological evidence (WHO AQGs, 2021). Such exceedances are typical in Indian semi-urban settings, primarily due to cumulative emissions from vehicular traffic, biomass burning, unpaved roads, and local anthropogenic sources. A receptor-based impact assessment identifies the presence of multiple **sensitive receptors** within a 500-meter radius of the substation site. These include residential houses and socially significant structures such as temples, schools, and religious institutions, as listed below:

<table>
<tr><th colspan="3">Ambient Air Quality</th></tr>
<tr><td></td><td colspan="2">
<table>
<tr><th>Sl. No.</th><th>Sensitive Receptor</th><th>GPS Coordinates</th><th>Aerial Distance from Proposed 220/132 GIS at Rowta</th></tr>
<tr><td>1</td><td>Office of the Circle Inspector of Police, Rowta</td><td>26°43'29.44"N
92°11'23.74"E</td><td>25.71 m</td></tr>
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• The project site is not located within or adjacent to any Protected Area (PA), Eco-Sensitive Zone (ESZ), or Critical Habitat, indicating low ecological sensitivity but moderate social sensitivity due to the presence of vulnerable receptors.
</td></tr>
<tr><td>Embedded measures</td><td colspan="2">• Inclusion of pollution control clauses in contractor's tender documents, mandating air quality protection measures in design and planning, such as restrictions on batch plant placement or requirement for low-emission DG sets.</td></tr>
<tr><td>Impact Significance</td><td colspan="2">Construction-phase activities such as excavation, material transport, and operation of machineries and vehicles are expected to generate fugitive dust and emissions, potentially affecting nearby receptors including residences, a school, and a market within 500 meters. However, with the implementation of embedded mitigation measures such as pollution control clauses in tender documents and requirements for low-emission equipment, the magnitude of impact is assessed as Medium. Given the presence of sensitive receptors nearby but absence of any ecologically protected areas, the sensitivity of receptors is assessed as Low.
Based on this, the overall significance of impact on ambient air quality is considered Minor.</td></tr>
<tr><td>Additional mitigation measures</td><td colspan="2">• Maintaining all construction vehicles and machinery in good working condition with valid PUC (Pollution Under Control) certificates, and restricting unnecessary idling of vehicles.
• Dampening unpaved access roads and active work areas with water sprinklers during dry and windy conditions to control dust emissions.
• Covering all loose construction materials such as sand and aggregates during transport and storage to prevent dust dispersion.
• Using tarpaulin covers for transport vehicles carrying fine construction materials like soil, sand, and cement, and preventing overloading.
• Installation of dust screens/barriers around the construction site.
• Using silent and low-emission diesel generator (DG) sets with stack height conforming to CPCB norms to ensure adequate emission dispersion.
• Limiting vehicle speed to less than 20 km/h within the construction site to reduce dust generation.
• Encouraging the use of low-emission or electric-powered equipment where feasible.
• A functional grievance mechanism will be maintained throughout construction stage, to address the air quality and dust-related concerns. The mechanism will include a clear process for recording, evaluating, and resolving complaints in a time-bound and transparent manner. Consultations will be conducted with the concerned affected communities for the dissemination of the GRM including the distribution of flyers, posters etc. on monthly basis.</td></tr>
<tr><td>Residual</td><td colspan="2">After implementation of mitigation measures, significance of residual impacts for construction activities</td></tr>
</table>

Ambient Air Quality	
impact significance	will also be ***minor***.

Acoustic Environment	
Context and receptor	The proposed construction of 220/132 kV GIS at Rowta will involve multiple noise-generating activities, including the operation of construction machinery, diesel generator (DG) sets, excavation equipment, and transportation vehicles. These activities are expected to elevate ambient noise levels in the immediate vicinity of the substation sites. Baseline ambient noise quality monitoring was conducted as part of the ESIA study at both subproject locations. The recorded values were found to be within permissible limits as prescribed by the Central Pollution Control Board (CPCB) and WHO, indicating a low pre-existing noise environment. A receptor-based impact assessment identifies the presence of multiple **sensitive receptors** within a 500-meter radius of the substation site. These include residential houses and socially significant structures such as temples, schools, and religious institutions, as listed below:

Sl. No.	Sensitive Receptor	GPS Coordinates	Aerial Distance from Proposed 220/132 GIS at Rowta
1	Office of the Circle Inspector of Police, Rowta	26°43'29.44"N 92°11'23.74"E	25.71 m
2	Residential Houses adjacent to the existing substation boundary	**From:** 26°43'19.13"N 92°11'28.50"E **To:** 26°43'24.31"N 92°11'27.81"E	From 4 to 11 m
3	1 No. Phuhurabari Shiva Temple (Devalaya)	26°43'19.32"N 92°11'11.47"E	263.67 m
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8	Shri Narmadeshwar Shiva Temple	26°43'40.14"N 92°11'34.68"E	425.75

	The project site is **not located within or adjacent to any Protected Area (PA), Eco-Sensitive Zone (ESZ), or Critical Habitat**, indicating low ecological sensitivity but moderate social sensitivity due to the presence of vulnerable receptors.
Embedded measures	• Construction activities are to be carried out during the daytime (6:00 am- 6:00 pm); • Avoidance of unnecessary honking of horns.
Impact Significance	Construction activities such as operation of heavy machinery, DG sets, and transport vehicles will generate noise, potentially affecting nearby sensitive receptors including a school, market, government office, and village habitations located within 500 meters. However, with embedded measures such as restricting activities to daytime hours and avoiding unnecessary honking, the **magnitude** of impact is assessed as ***Medium***. Given the proximity of sensitive human receptors but absence of any ecological sensitivity, the receptor **sensitivity** is also assessed as ***Medium***. Therefore, the overall impact **significance** on ambient noise quality during construction is considered ***Moderate***.
Additional mitigation measures	• Regular maintenance of machinery, including lubricating moving parts, tightening loose components, and replacing worn-out parts. • Shut down or throttle down of machinery and equipment when not in use, especially during non-working hours. • Use of low-noise equipment as far as practicable to minimize noise generation.

Acoustic Environment	
	• Reducing the number of equipment operating simultaneously whenever possible. • Use of Diesel Generator sets fitted with acoustic enclosures to control noise emissions. • Minimizing the use of vehicle horns within the project area to reduce unnecessary noise. • Restriction of noisy construction activities to daytime hours (e.g., 6 AM to 6 PM) to limit disturbance to nearby sensitive receptors such as Phuhurabari Village, Mora Dhansiri Weekly Market, Circle Inspector's Office, and Bhelapara LP School. • Providing hearing protection (ear plugs or earmuffs) to workers exposed to high noise levels. • A functional grievance mechanism will be maintained throughout construction stage, to address the noise-related concerns. The mechanism will include a clear process for recording, evaluating, and resolving complaints in a time-bound and transparent manner. Consultations will be conducted with the concerned affected communities for the dissemination of the GRM including the distribution of flyers, posters etc. on monthly basis.
Residual impact significance	After implementation of mitigation measures, **significance** of residual impacts for construction activities will be ***minor***.

Water Resources and Quality	
Context and receptor	• The proposed subproject site falls under the "safe" category as per the Aquifer Mapping and Management Plan of Udalguri District, Assam (Annual Action Plan 2019–20), indicating no critical stress on the groundwater table. • Local communities in the area depend on groundwater (via tube wells and borewells) domestic/drinking and irrigation canal water for agriculture purposes. • An irrigation canal is located at a distance of approximately 100 meters from the proposed substation site. • The proposed subproject location is situated at an aerial distance of approximately 3.3 km from the Dhansiri River, a significant surface water body in the region. • For construction activities, existing borewells within the premises of the existing 132/33 kV Rowta GSS will be used to avoid additional stress on local water resources.
Embedded measures	• Avoidance of storage of construction materials on agricultural land and near water bodies including canals and drainage lines. • Ensuring excess excavated material is not dumped in or near the irrigation canal, drainage channels, or natural watercourses. • Provision of access to safe and clean water for bathing, washing, and cooking at labour camps. • Domestic wastewater generated at labour camps shall be managed through septic tanks and soak pits. • Prohibition of direct discharge of wastewater or stormwater into canals or nearby water bodies without treatment or sedimentation. • Storing of construction chemicals (cement, paints, oils, anti-termite solutions) on impervious surfaces with secondary containment.
Impact Significance	Considering that the project site lies within a groundwater-safe zone, uses existing borewells, and incorporates several embedded mitigation measures (such as controlled wastewater discharge and protection of nearby water bodies), the **magnitude** of impact on water resources is assessed as ***small***. Although local communities rely on groundwater and an irrigation canal is located nearby, the receptor **sensitivity** is assessed as ***medium*** due to the preventive nature of the site's water use and distance from critical water bodies. Therefore, the overall **significance** of the impact on the water environment is assessed as ***minor***.
Additional mitigation measures	• Sensitization of construction workers on water conservation practices and monitoring of water use for optimal consumption. • Regular inspections to detect and repair leakages in water supply lines, construction hoses, or tanker connections. • Design and implementation of a temporary drainage system at the construction site to channel all surface runoff from material storage areas, equipment yards, and excavated zones into sedimentation tanks before safe discharge. • Reuse of treated water from sedimentation tanks or soak pits for dust suppression, equipment

Water Resources and Quality	
	cleaning, or curing to reduce freshwater demand. • Engagement of licensed contractors for the collection, treatment, and disposal of sludge or hazardous waste, in accordance with the Hazardous Waste Management Rules, 2016. • Ensuring fuel, oils, paints, and chemicals are stored in bunded enclosures under roofing to localize any accidental spills or leakages. • Spill containment kits shall be made available at all construction zones and fueling areas. In the event of an oil or fuel spill, immediate clean-up will be conducted using absorbent materials, and the contaminated soil will be disposed of in line with Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016. • Restriction of vehicle and machinery movement near irrigation canals and ensure that drainage patterns are not obstructed during construction.
Residual impact significance	After implementation of mitigation measures, **significance** of residual impacts for construction activities will also be ***minor***.

Drainage	
Context and receptor	• An irrigation canal is located at a distance of approximately 100 meters from the proposed substation site, which may be sensitive to changes in surface runoff or accidental discharge from the construction area. • The subproject is situated at an aerial distance of approximately 3.3 km from the Dhansiri River, a major surface water body in the region. • The project site may experience significant surface runoff during monsoons, requiring careful management to prevent flooding, erosion, or siltation of nearby water bodies and agricultural fields.
Embedded measures	• A stormwater drainage system is proposed to effectively collect and channelize rainwater runoff within the site, minimizing waterlogging and erosion risks. • Site grading and contouring will be done to guide stormwater away from critical infrastructure and avoid stagnation.
Impact Significance	Given the proximity of the irrigation canal (100 m) and the potential for increased surface runoff during monsoons, there is a moderate risk of localized impacts such as erosion or siltation. However, with embedded measures like stormwater drainage planning and proper site grading, the **magnitude** of impact is assessed as ***small***. Considering the canal's functional importance for agriculture, the receptor is **sensitivity** assessed as ***medium***. Therefore, the overall **significance** of the impact on the surface water environment is considered ***minor***.
Additional mitigation measures	• Minimum alteration of the natural drainage pattern by aligning construction with existing contours and using permeable surfaces wherever feasible. • Construction of temporary diversion dykes or bunds around excavation sites, especially during the monsoon season, to prevent runoff carrying silt and debris from entering the irrigation canal or surrounding farmland. • Restriction of all construction activities within the approved construction footprint to prevent unnecessary soil compaction or obstruction of natural runoff paths. • Periodical cleaning and inspection of stormwater drains and sedimentation structures to maintain functionality throughout the construction period. • Discharge from the site will be routed through sedimentation tanks or silt traps before being allowed to flow into the natural drainage system to ensure that no significant sediment or pollutants enter the irrigation canal.
Residual impact significance	After implementation of mitigation measures, **significance** of residual impacts for construction activities will also be ***minor***.

B. Impacts during Operation Phase

Soil Environment	
Context and receptor	• During the operation phase, employees/workers will be deployed at the substation, working in shifts. Food waste, packaging, and sanitary waste from staff areas, if improperly disposed, may cause localized soil and groundwater contamination through leachate generation. • Used/spent oil and oil-soaked cotton, rags, and filters from equipment maintenance can contaminate soil if not properly handled and disposed of. • Scrap Metal and Insulated Copper/Aluminium Wires: From replacement of conductors, cables, and bus bars. • Waste Gas Insulated Equipment Components: Including damaged/obsolete GIS modules containing SF_6 gas and associated residues. • Though Sulphur Hexafluoride (SF_6) is a gas, accidental leaks or emissions during GIS maintenance can result in formation of by-products (e.g., SO_2, HF, SOF_2) that may settle on soil surfaces and react with moisture, leading to acidification and soil degradation.
Embedded measures	• Spent transformer oil and lubricants will be collected and stored in leak-proof containers and regularly disposed of through approved vendors. • SF_6 retrieving and filling equipment will be used to ensure gas is recovered and reused without release. Routine leak checks and preventive maintenance will be carried out.
Impact Significance	During the operation phase, the types and volume of waste generated are limited and localized, with appropriate mitigation measures in place such as secure waste handling and SF_6 management. While there is potential for localized soil contamination if these are mismanaged, the embedded controls significantly reduce the likelihood. Hence, the **magnitude** of impact is assessed as ***small***. Given the substation's controlled operational environment and distance from sensitive receptors, the receptor **sensitivity** is considered ***low***. Therefore, the overall impact **significance** on soil during the operation phase is assessed as ***negligible***.
Additional mitigation measures	• Ensure hazardous waste such as used oil, oil-soaked rags, and filters are properly labelled and stored on an impervious surface under a covered shed with secondary containment to prevent leaks and spills. • Carry out regular disposal of hazardous waste through authorized vendors in compliance with the Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, and maintain proper documentation and records. • Dispose of e-waste and used/discarded batteries in accordance with the E-Waste Management Rules, 2022 and Battery Waste Management Rules, 2022 through authorized recyclers. • Provide and maintain spill control kits at key operational and maintenance locations to effectively contain and clean up minor leaks or spills. • Staff will be trained in Handling of Municipal Solid Waste and Hazardous Waste, Including Spill Response. The Standard Operating Procedures (SOPs) for the same is provided in **Appendix 9.**
Residual impact significance	-----

Acoustic Environment	
Context and receptor	• The likely sources of noise during the operation phase of the 220/132 kV GIS substation at Rowta are limited to intermittent maintenance and repair activities. • Continuous operational activities of the substation such as electricity transmission through transformers and switchgear do not generate significant noise. A receptor-based impact assessment identifies the presence of multiple **sensitive receptors** within a 500-meter radius of the substation site. These include residential houses and socially significant structures such as temples, schools, and religious institutions, as listed below:

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The project site is not located within or adjacent to any Protected Area (PA), Eco-Sensitive Zone (ESZ), or Critical Habitat, indicating low ecological sensitivity but moderate social sensitivity due to the presence of vulnerable receptors.
</td></tr>
<tr><td>Embedded measures</td><td>• Conduct noisy maintenance and repair activities during daytime (7 AM – 6 PM) only.
• Since GIS equipment is enclosed and generates low noise, no major noise barriers are generally required.
• Landscaping, including planting and maintaining vegetation around the substation boundary, is already incorporated in the project design to provide natural sound buffering and aesthetic screening.</td></tr>
<tr><td>Impact Significance</td><td>During regular operation, proposed substation does not produce substantial noise, as transformers and switchgear operate silently or within permissible limits. Occasional noise from routine maintenance, such as use of power tools or vehicle movement, is infrequent and short-term. Since the substations are enclosed within boundary walls and designed to comply with noise control norms, the magnitude of impact on the surrounding acoustic environment is small. Despite the presence of sensitive receptors, due to low-frequency and low-intensity activities, the receptor sensitivity is also low. Hence, the overall impact significance is assessed as negligible.</td></tr>
<tr><td>Additional mitigation measures</td><td>No additional mitigation measures suggested.</td></tr>
<tr><td>Residual impact significance</td><td>---</td></tr>
</table>

Visual Impacts	
Context and receptor	The footprint of the proposed substation comprises of about 3.89 ha land. The substation is located on adjacent to the Rowta-Udalguri Road (SH-10) in Phuhurabari Village. The substation will be constructed in the premise of existing 132/33 kV Rowta GSS after demolishing the existing old quarters and cutting trees. The visual impacts will be perceived by two types of receptors, as: • Residents and habitations within the project footprint and surrounding area who will have a permanent line of sight to the substation infrastructure. • Motorists and pedestrians using the adjacent SH-10, who will have a temporary view of the substation as they pass by.

Visual Impacts	
Embedded measures	• The substation is being developed within an existing AEGCL facility, minimizing new land disturbance and maintaining visual continuity. • Old, dilapidated staff quarters will be removed, improving overall site aesthetics. • Landscaping is an integral part of the project design; plantation of native tree species and ornamental shrubs around the substation boundary will provide visual screening and improve aesthetics. • Use of a compound wall and perimeter fencing to shield internal components from direct public view.
Impact Significance	As the substation is being developed within the existing AEGCL premises, visual changes are largely consistent with the current land use. The demolition of old quarters and integration of landscaping and boundary walls will enhance visual aesthetics over time. Receptors such as nearby residents and road users will experience either limited or transient views. Therefore, the **magnitude** of visual impact is assessed as ***small*** and the receptor **sensitivity** as ***low***. Consequently, the overall impact **significance** on the visual environment is assessed as ***negligible***.
Additional mitigation measures	• Design and install aesthetically designed entrance and signage that aligns with the surrounding rural landscape. • Implement vertical and horizontal greening on boundary walls (e.g., creepers or green mesh). • Engage local community or local forest department to assist in selecting appropriate native species for plantation. • Maintain green belt regularly to ensure it remains effective as a visual barrier. • Install minimal, shielded lighting fixtures to avoid light pollution and glare during night-time operation.
Residual impact significance	---

6.4.2 Impact on Ecological and Biological Environment

The construction and operation of the proposed 220/132 kV Gas-Insulated Substation (GIS) will require the use of approximately 3.89 hectares of land within the existing premises of the 132/33 kV Rowta Grid Substation. Although the site is located in a semi-developed area adjacent to SH-10 in Phuhurabari Village, the subproject will involve clearance of vegetation and removal of a trees. This chapter assesses the potential impacts on the local biological environment—including flora, fauna, and ecological features—and outlines measures to minimize or mitigate any adverse effects.

A. Impacts during Pre-Construction and Construction Phase

Impacts due to Vegetation Clearance	
Context and Receptor	Vegetation clearance will occur during the initial phase of site preparation for the proposed 220/132 kV GIS substation and associated infrastructure such as internal roads and equipment foundations. • A total of 151 trees representing 33 species are proposed for removal within the project footprint. Of these: • 97 trees from 14 species fall under Schedule-I and Schedule-II of the *Assam Trees Outside Forest (Sustainable Management) Rules, 2022* and are exempted from prior felling permission. The remaining 54 trees from 19 species, including one endangered and one near-threatened species, require prior approval from the Forest Department. AEGCL has submitted the formal application to the Dhansiri Forest Division, and approval is expected following regulatory due diligence. The vegetation present, although planted and located within a previously developed substation campus, supports functional ecological roles: • Provides nesting and roosting sites for resident bird species. • Offers canopy, fruit, and nectar sources for pollinators, frugivores, and arboreal fauna. Although the area is not classified as a Protected Area, Eco-Sensitive Zone, or Critical Habitat, the vegetation holds local ecological value, especially for common avifauna and insect pollinators.
Embedded Measures	• Tree cutting will be limited to only those strictly necessary for construction and safety clearances. • Prior permission for tree felling will be obtained from the Concerned Forest Department. • Landscaping is integrated into the project design to restore green cover and visual appeal.
Impact Significance	Although 151 trees are proposed to be cut within the substation footprint, the vegetation is largely planted and situated within an already developed substation campus, which does not fall within or adjacent to any designated Eco-Sensitive Zone (ESZ) or Critical Habitat. This context along with the absence of high-value ecological corridors or protected areas reduces the overall ecological risk. However, the affected tree species provide important ecological functions, including habitat, food sources, and shelter for birds, pollinators, and small terrestrial fauna. The presence of one endangered and one near-threatened species, and the removal of trees known to support nesting, roosting, and foraging, elevates receptor sensitivity. The implementation of embedded mitigation measures, such as restricting tree felling to essential areas, securing mandatory permissions, and a planned landscaping strategy to restore habitat value, helps to reduce the scale and duration of adverse effects. Considering these factors, the **magnitude** of impact is assessed as ***medium***, with a ***medium*** receptor **sensitivity** due to the presence of common avifauna and small terrestrial species. Hence, the overall impact **significance** is considered ***moderate***.
Additional mitigation measures	• Topsoil from cleared areas will be preserved and reused for landscaping and plantation activities. • Avoid felling endangered and near-threatened species during peak breeding or flowering seasons. • Undertake compensatory afforestation as mandated by regulations under supervision of Forest Department. • Plantation of nectar- and fruit-bearing native species to restore habitat value for pollinators and

Impacts due to Vegetation Clearance	
	birds. • Engage with the Forest Department or a local NGO to ensure the survival of planted saplings and monitor growth for a minimum of 3 years. • Creation of green buffer zones around the substation to serve as refuge for displaced fauna and enhance biodiversity.
Residual Impact Significance	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 unchanged, i.e., ***moderate***.

Impacts due to Construction Activities	
Context and Receptor	Construction activities for the proposed 220/132 kV GIS substation including excavation, movement of machinery, labor influx, and increased anthropogenic presence have the potential to disturb local habitats and species. Specific concerns include: • Excavation for foundations and ancillary civil works may directly impact burrowing fauna and small terrestrial mammals. • Soil disturbance may alter soil structure and chemistry, affecting microhabitats and nearby plant species. • Noise and vibration from construction equipment, transport vehicles, and manual labor can stress fauna and disrupt their natural behavior such as foraging, mating, nesting, and migration. • The temporary presence of laborers may cause additional pressure on the surrounding biological environment due to: ▪ Increased foot traffic in adjacent areas, ▪ Generation of domestic waste that may attract scavengers or degrade habitats, ▪ Unauthorized collection of firewood, timber, or non-timber forest products ▪ Potential disturbance to local fauna through chasing, feeding, or harming animals. • During site visit and community consultations, no sightings of significant wildlife were observed or reported. Common domestic animals (cattle, goats, dogs, cats) are frequently seen, and avifauna is limited to resident birds like mynas, bulbuls, pigeons, crows, and sparrows. Occasional monkey and snake sightings were reported but are infrequent. • The project site is not located within or adjacent to any Protected Area (PA), Eco-Sensitive Zone (ESZ), or Critical Wildlife Habitat as notified under the Wildlife (Protection) Act, 1972.
Embedded Measures	• Construction activities are confined to the designated site footprint to minimize habitat disturbance. • Machinery and labor movement is restricted to approved access roads and work zones. • Basic sanitation and solid waste collection facilities are to be provided at labor camp or worksite.
Impact Significance	The **magnitude** of impact from construction activities is considered ***medium***, given the localized nature of the disturbance, potential for noise, vibration, and anthropogenic pressure, and temporary land disturbance. The receptor **sensitivity** is ***low***, as the site is not located within or near any Protected Area, Eco-Sensitive Zone, or Critical Habitat, and the surrounding biodiversity primarily comprises common resident fauna and domesticated species. Due to the absence of sensitive or threatened species and the implementation of embedded mitigation measures—such as restricting activities to designated areas, providing sanitation facilities, and minimizing off-site disturbances—the overall impact **significance** is assessed as ***minor*.**
Additional mitigation measures	• Avoid construction during early morning and late evening hours to reduce disruption to crepuscular fauna. • Sensitization of workers through environmental awareness programs about the importance of local biodiversity and prohibited actions (e.g., harming or feeding wildlife). • Prohibition of use of open fires and prevent fuelwood collection from nearby vegetation. • Laborers will be instructed to avoid contact with local wildlife and not engage in hunting or tree cutting. • Implementation of solid waste and wastewater management protocols at labor camps and construction sites to avoid indirect impacts on surrounding fauna.

Impacts due to Construction Activities	
Residual Impact Significance	The implementation of the above mitigation measures will substantially reduce ecological impacts during construction. However, some residual impacts particularly due to noise, human presence, and machinery movement are unavoidable. These are expected to be minor and localized, with temporary disturbance to flora and fauna. Overall, the residual impact significance remains **minor**, considering the absence of critical habitats.

B. Impacts during Operation Phase

Impacts on biological environment at operation stage	
Context and Receptor	During the operation phase, the substation becomes a controlled and secured facility with restricted access. Routine activities include equipment monitoring, periodic maintenance, and site management. The substation infrastructure is located on previously cleared and developed land, and the human presence is significantly reduced compared to the construction phase.
Embedded Measures	• The substation design includes a compact GIS system that generates minimal noise, reducing disturbance to nearby fauna. • Landscaping with native vegetation is integrated into the subproject. • Access to the substation is restricted and controlled to minimize human disturbance to surrounding habitats. • Vegetation maintenance will be conducted regularly to prevent overgrowth within the site boundary.
Impact Significance	Given that the substation is located on already cleared and developed land and operational activities involve minimal noise, low human presence, and restricted access, the **magnitude** of impact is ***small***. The surrounding biological environment primarily includes common species with no known critical or sensitive habitats, indicating ***low*** receptor **sensitivity**. With embedded mitigation measures such as the use of low-noise GIS equipment and native landscaping, the overall impact **significance** during the operation phase is ***Negligible***.
Additional mitigation measures	• Enhancement of landscaping efforts by planting additional native species around the substation boundary to improve habitat quality and act as a natural noise and visual buffer. • Wherever feasibly use of fully shielded, motion-sensor lighting to minimize light pollution and reduce disturbance to nocturnal fauna. • Scheduling of vegetation trimming and grass cutting outside of sensitive periods such as bird breeding seasons to protect ground-nesting species. • Conducting periodic environmental awareness training for operational and maintenance staff to promote biodiversity conservation practices.
Residual Impact Significance	----

6.4.3 Impact on Occupational Health and Safety

A. Impacts during Construction Phase

Impacts on Occupational Health and Safety during Construction stage	
Context and receptor	• The construction of the 220/132 kV GIS substation will involve working at heights (e.g., on gantries, structures, and towers), posing significant fall risks. • The site contains 43 nos. of abandoned staff quarters, Old Resident Engineer's Office, Store room, a security barrack and a Temple, which will be demolished as part of site clearance. Visual inspection during the baseline survey confirmed that these structures do not contain asbestos-containing materials (ACMs) or any other hazardous substances. • Commissioning activities will involve working near or on energized equipment and live power lines, creating a risk of electric shock and electrocution. • Civil works, including excavation for foundations, carry risks of trench collapse, falling objects, and equipment-related injuries. • The use of heavy construction machinery (cranes, concrete mixers, dumpers) increases the risk of accidents and physical injuries due to equipment malfunction, collision, or improper handling. • Welding, cutting, and grinding activities during steelwork may expose workers to burns, eye injuries, and inhalation of metal fumes. • Slip, trip, and fall hazards may increase during the monsoon season due to muddy surfaces and water accumulation. • Handling of construction materials such as cement, chemicals (e.g., solvents, paints), and fuel can pose health risks from exposure, skin contact, and inhalation. • Noise and vibration from equipment may cause hearing damage or long-term occupational stress if not controlled. • Extended exposure to high temperatures, especially in the summer, can result in heat stress, dehydration, and fatigue. • Inadequate sanitation, poor housekeeping, and lack of protective gear may lead to communicable diseases, infections, and general deterioration in worker health.
Planned measures	• Only trained and experienced workers will be deployed for specialized tasks. • Pre-job safety briefings will be conducted to inform workers about activity-specific hazards and precautions. • Erection of steel structures will be performed by workers using safety harnesses, lifelines, and fall arrest systems. • Local community members will be restricted from entering construction zones. • Construction zones will be clearly marked, barricaded, and access controlled. • Use of personal protective equipment (PPEs).
Impact Significance	The **magnitude** of occupational health and safety impacts during substation construction is assessed as ***medium***. This is due to the inherent risks associated with working at heights, exposure to live electrical components, heavy lifting, handling of hazardous materials such as cement and welding equipment, and increased likelihood of slip and trip hazards, especially during the monsoon season. The receptor **sensitivity** is ***high***, as construction workers are directly exposed to these risks and any lapse in safety can result in serious injury or even fatality. Considering the medium magnitude of risks and high sensitivity of the workforce, the overall **significance** of the impact is assessed as ***Major***.
Additional mitigation measures	• During peak summer months, work will be scheduled during cooler hours to prevent heat-related illnesses. • Concrete mixing to be carried out in a manner that minimizes dust generation. • A fully equipped First-Aid Box to be maintained at the construction site. • Emergency contact numbers and directions to the nearest hospital to be prominently displayed. • EPC contractor will implement a Health and Safety (H&S) Plan and conduct H&S training for all workers. • H&S performance will be monitored regularly through audits. • Workers will be kept informed about H&S achievements and updates.

Impacts on Occupational Health and Safety during Construction stage	
Residual impact significance	With implementation of comprehensive occupational health and safety measures—including worker training, proper use of PPE, site-specific safety planning, health monitoring, and emergency preparedness—the risks to workers can be significantly minimized. However, due to the dynamic nature of construction activities and the potential for human error or non-compliance, some residual risk remains. Therefore, even after mitigation, the residual impact is assessed as ***moderate***, requiring continued vigilance and monitoring throughout the construction period.

B. Impacts during Operation Phase

Impacts on Occupational Health and Safety during Operation stage	
Context and receptor	During the operation stage, the 220/132 kV GIS substation will be managed by AEGCL. Although the substation will have restricted access and operate under controlled conditions, several occupational health and safety risks are still present for operation and maintenance personnel. These include: • Risks of electrical hazards such as arc flash, electrocution, or contact with energized components during maintenance or equipment failure. • Possibility of transformer explosion or fire due to overheating, oil leak, or equipment malfunction. • Risks associated with SF_6 (sulfur hexafluoride) gas leakage from GIS equipment, which can pose asphyxiation hazards in confined spaces and contributes to greenhouse gas emissions if released. • Potential for slips, trips, and falls during maintenance work, especially near cable trenches, equipment platforms, or during rainy conditions. • Emergency response risks in case of natural disasters (e.g., flooding or earthquakes) that may affect substation integrity.
Planned measures	• Only trained and authorized personnel are allowed to enter the substation premises. • A fully equipped and firefighting system will be installed, with fire extinguishers, fire alarms, and suppression systems as per safety norms. • The Gas Insulated Substation (GIS) is designed to minimize exposure to live parts and SF_6 gas leakage risk through enclosed compartments and pressure monitoring systems. • Danger signs and warning labels will be affixed near high-voltage equipment and control rooms. • Basic emergency response and evacuation plans will be in place, and emergency contact numbers will be displayed prominently.
Impact Significance	The **magnitude** of impact during the operation stage is considered ***medium***. While the frequency of worker presence is relatively lower than during construction, the consequences of potential hazards—such as transformer explosions, electrical shocks, GIS gas leakage, or arc flashes—can be severe if unmitigated. These risks are intrinsic to high-voltage installations and maintenance activities, particularly in GIS substations where SF_6 gas leakage poses additional asphyxiation and environmental hazards. The receptor **sensitivity** is ***medium*** because the affected individuals are trained operational staff exposed to high-voltage equipment, hazardous gases, and confined operational environments. Their roles inherently involve exposure to critical safety risks. Considering the medium magnitude of impact and medium receptor sensitivity, the overall impact **significance** is assessed as ***Moderate***.
Additional mitigation measures	• Standard Operating Procedures (SOPs) for all routine and emergency Operation & Maintenance (O&M) activities at the substation will be prepared and implemented in accordance with the Safety Manual on Transmission System, AEGCL, dated May 12, 2014 (*https://www.aegcl.co.in/wp-content/uploads/2020/12/Safety_Manual_AEGCL.pdf*). • A proper lock-in lock-out (LOTO) protocol will be followed during any repair, maintenance, or servicing activities on substation or transmission infrastructure to ensure safety from accidental energization. • All occupational incidents and accidents will be recorded in a systematic manner, including near-miss events. • For any incident or accident, a detailed root cause analysis (RCA) shall be carried out, and corrective/preventive actions will be taken accordingly.

Impacts on Occupational Health and Safety during Operation stage	
	• Periodic safety training and mock drills for all operational staff, including emergency response to electrical accidents, fires, and gas leaks. • Mandatory use of personal protective equipment (PPE) such as insulated gloves, arc-flash protective suits, helmets, safety goggles, and shoes for maintenance personnel. • Strict procedures for monitoring, handling, and recycling SF_6 gas using leak detection sensors and recovery units. • Preventive and predictive maintenance schedules for transformers, switchgear, and protection systems to reduce malfunction risks. • On-site availability of first-aid kits and trained first responders; nearest hospital contact details displayed. • Installation and regular testing of lightning arrestors and surge protection devices. • Periodic audits of safety systems and performance, with corrective actions implemented promptly. • A transparent system for reporting and investigating near-misses, unsafe conditions, or incidents.
Residual impact significance	With the implementation of mitigation measures the residual impact is reduced to ***Minor***. While some level of occupational risk remains due to the nature of the work, these are manageable through monitoring, training, and preventive practices.

6.4.4 Impact on Socio-economic Environment

A. Impacts during Pre-construction and Construction Phase

Socio-economic Impact on local community due to construction of the proposed 220/132kV Rowta Grid Substation	
Context and receptor	Since the proposed 220/132kV Rowta Grid Substation will be constructed within the existing premises of AEGCL, which is already owned by the utility, there will be no requirement for additional land acquisition. As a result, there will be no displacement or relocation of individuals, households, or communities, and no loss of private assets or livelihoods. This eliminates the need for any resettlement or compensation measures, significantly reducing the potential for land-related disputes or social conflict. This greatly minimizes the potential for adverse social impacts. Currently, four AEGCL staff members are temporarily residing in the staff quarters located within the premises designated for the construction of the 220/132 kV GIS substation at Rowta. These individuals are adult personnel directly employed by AEGCL and are staying without their families. During consultations held on 08/07/2025 with the Residential Engineer and the staff residing on-site, it was confirmed that no children or family members are present within the premises. The potential risks related to child labour were also discussed, and the Residential Engineer assured that strict compliance with child labour laws will be maintained throughout the project implementation.
Mitigation Measures	No major mitigation measures are required as the proposed Grid Substation will be constructed entirely within land already owned by AEGCL. To facilitate the construction activities and ensure safety, the temporarily residing staff will be relocated to rented accommodations nearby during the construction phase. Following project completion, new staff quarters will be built within the premises and allocated for permanent housing. These relocation and housing arrangements have been discussed with and agreed upon by the concerned individuals during consultations on 08/07/2025. This planned approach ensures minimal disruption to the staff and avoids any adverse social impact or labor-related concerns.
Impact Significance	Considering that the site is already under AEGCL and the construction is confined within an existing substation complex, the **magnitude** of the impact on local community due to construction of the proposed 220/132kV Rowta Grid Substation is assessed as *small with* **sensitivity** on receptor is accessed as ***low***. According to the Impact Significance Assessment Matrix, a combination of a ***small*** magnitude of impact with **low** receptor sensitivity leads to the conclusion that the overall **significance** of the impact is ***negligible.***
Additional mitigation measures	As the impact significance is negligible, no additional mitigation measures have been identified for this impact.
Residual impact significance	No residual impact significance is anticipated.

Impact on cultural, religious, or heritage structures due to construction of the proposed 220/132kV Rowta Grid Substation	
Context and Receptor	There are no significant cultural, religious, or designated heritage structures located within or in the immediate vicinity of the proposed Rowta 220/132 kV substation site. However, a small temple dedicated to Lord Shiva is located within the substation premises. This temple was originally constructed for use by AEGCL staff residing in the now-abandoned staff quarters. Currently, it is maintained by non-residential AEGCL staff. During a consultation held on 24th January 2025 & 08th July 2025, it was confirmed by AEGCL staff that they have no objection to relocating the temple to a suitable location within the substation campus to allow for the construction works. In addition, nearby community members were also consulted regarding the proposed relocation of the temple, and they expressed no objection to the

Impact on cultural, religious, or heritage structures due to construction of the proposed 220/132kV Rowta Grid Substation	
	plan, acknowledging that the temple lies within AEGCL's premises and serves internal staff. The consultation also addressed the presence of a sacred tree within the substation boundary, which may need to be removed during construction. AEGCL staff confirmed they have no objection to its removal, and it was also noted that the outside community is unaware of the tree's existence, as it lies entirely within the secure project area. Therefore, no objections were received from the public regarding its removal.
Mitigation Measures	To facilitate the construction of the Rowta 220/132 kV GIS substation, the existing Lord Shiva temple located within the project site will be relocated within the substation campus in a respectful and culturally sensitive manner. Similarly, a sacred tree present within the substation boundary will be removed only after following appropriate cultural protocols. Both actions will be undertaken with full respect for local customs and sentiments, and necessary rituals or community acknowledgements will be facilitated as needed during implementation. Moreover, no known archaeological or heritage sites are present within the proposed substation area, there remains a remote possibility of chance finds during excavation or construction activities. In the event that any artifacts, structures, or other materials of potential archaeological significance are discovered, all construction work in the immediate vicinity will be halted immediately. The relevant cultural heritage authorities will be notified, and the site will be secured to prevent disturbance. Work will only resume once a qualified expert assesses the find and appropriate measures are taken in accordance with national regulations and heritage protection guidelines. Project personnel will be trained on the chance finds procedure as part of their environmental and social awareness training. This precautionary approach ensures that any unexpected discoveries are handled responsibly and in compliance with applicable laws.
Impact Significance	The **magnitude of impact** is considered **Medium**, given the internal, non-public nature of the affected religious site and the consensus-based approach to its relocation. The **receptor sensitivity** is also **low**, as the temple is used only by AEGCL personnel, and no external religious or cultural dependency exists. According to the **Impact Significance Assessment Matrix**, a combination of **medium magnitude** and **low receptor sensitivity** leads to the conclusion that the overall significance of impact on cultural, religious, or heritage structures is **Minor**.
Additional mitigation measures	To ensure the respectful handling of cultural and religious elements within the Rowta 220/132 kV GIS Substation site, several additional mitigation measures will be implemented. During the transition phase, workers and contractors will be oriented and sensitized on the importance of local cultural and religious values. Additionally, an accessible Grievance Redress Mechanism (GRM) will be in place to address any concerns raised by staff or nearby residents regarding cultural or social impacts. These measures will ensure that the project proceeds in a way that respects community sentiment, supports social harmony, and upholds cultural integrity.
Residual impact significance	The residual impact significance is expected to remain negligible

Impacts Due to Migrant Labour	
Context and Receptor	The construction of the 220/132kV Rowta Grid Substation is expected to create short-term employment opportunities for the local population, particularly in unskilled and semi-skilled roles such as site clearing, material handling, and basic construction support. The use of local labor not only supports livelihood generation in the surrounding communities but also fosters positive relationships between the project and local stakeholders. However, in instances where the contractor engages migrant labor from outside the area, certain social impacts may arise. These include potential strain on local infrastructure and services, cultural or social tensions between local residents and migrant workers, and increased demand for basic amenities such as water, sanitation, and housing.

Impacts Due to Migrant Labour	
Mitigation Measures	To minimize potential social impacts from the engagement of migrant labor, the contractor will ensure proper planning and management of the workforce. Adequate temporary facilities for accommodation, water supply, sanitation, and waste management will be provided. To reduce the risk of cultural or social tensions, awareness programs will be conducted on community relations, local customs, and respectful behavior. All workers will undergo orientation on gender-based violence (GBV), sexual exploitation and abuse (SEA), and child protection. A Code of Conduct will be established and signed by all workers, clearly outlining expectations for appropriate behavior. A grievance redress mechanism will also be in place to address any concerns raised by local communities or workers. These measures will help ensure social harmony, worker welfare, and community safety throughout the project.
Impact Significance	The potential social impact from the engagement of migrant labor is assessed to be **Small** as mostly local labour will be use and the labour influx will be minimum. Moreover, as the labor camp will be constructed within the existing AEGCL boundary, the risk of interaction-related tensions with nearby communities is significantly reduced thus receptor sensitivity maybe considered as **Low.** According to the Impact Significance Assessment Matrix, a combination of a ***small*** magnitude of impact with **low** receptor sensitivity leads to the conclusion that the overall **significance** of the impact is ***negligible***
Additional mitigation measures	The contractor will be required to submit a monthly Environmental and Social (E&S) monitoring report, which will also include compliance with labor camp maintenance as per IFC performance standards **(Appendix 10)**, including hygiene, waste disposal, safety, and living conditions. A separate Labor Grievance Register will be maintained to document and address any labor-related complaints.
Residual impact significance	The residual impact significance will remain negligible

Impact on Community Health and Safety	
Context and Receptor	The risk to the health and safety of the local community during the construction phase of the proposed 220/132kV Rowta Grid Substation may arise from several activities, including the generation of construction waste, dust and noise emissions, accidental spillage of hazardous materials such as oils, and the movement of vehicles and equipment that could lead to traffic-related accidents or injuries, particularly if community members are present near the construction site. Additionally, the site contains 43 nos. of abandoned staff quarters, Old Resident Engineer's Office, Store room, a security barrack and a Temple, which will be demolished as part of site clearance. Visual inspection during the baseline survey confirmed that these structures do not contain asbestos-containing materials (ACMs) or any other hazardous substances. However, as the substation will be constructed entirely within the existing secured premises of AEGCL and community access will be restricted. This significantly reduces the likelihood of direct exposure to construction-related hazards.
Mitigation Measures	To ensure community health and safety during the construction of the 220/132 kV Rowta Grid Substation, a comprehensive set of mitigation measures will be implemented. Access to the construction site will be strictly regulated through fencing, deployment of security personnel, and installation of warning signage to prevent unauthorized entry. The movement of heavy vehicles will be limited to a maximum speed of 20 km/hr in proximity to schools, colleges, hospitals, and other busy areas. Additionally, transportation of construction materials will be scheduled to avoid peak school and office hours, specifically from 7:30 AM to 9:30 AM and 2:00 PM to 3:00 PM IST. Dust suppression will be carried out through regular water sprinkling, and materials will be transported in covered trucks. Noisy construction activities will be restricted to daylight hours (6 am to 6 pm IST) in compliance with noise regulations to minimize disturbances to the local population. The demolition of any abandoned structures will follow the Generic Construction and Demolition Waste Management Plan outlined in **Appendix 7.** The EPC contractor will estimate the quantity of demolition waste in advance and ensure its transportation along designated routes to prevent road

Impact on Community Health and Safety	
	damage. Moreover, during a stakeholder consultation with the Municipal Board of Udalguri on 08/07/2025, the Board advised identifying a suitable local landfill site. In the absence of one, they agreed to allow use of their existing landfill, subject to a formal request. Additionally, topsoil will be preserved for reuse in landscaping or greenbelt development, and construction materials will be stored within the designated project area to avoid impacts on adjacent land. Public awareness campaigns and emergency preparedness measures will also be put in place to ensure the safety of nearby communities and effective environmental management during the construction phase.
Impact Significance	The construction of the substation may pose potential risks to community health and safety, primarily due to increased movement of heavy vehicles and machinery, noise and dust generation, demolition of existing structures, and potential unauthorized access to the construction site. These activities can result in road safety concerns, minor respiratory issues, and accidental injuries if not properly managed. Thus, the Magnitude of Impact is assessed as Medium. However, as the substation site is located within the secured boundary of AEGCL and away from densely populated areas, the overall risk to nearby communities is considered **low**. According to the Impact Significance Assessment Matrix, a combination of a **medium** magnitude of impact with **low** receptor sensitivity leads to the conclusion that the overall **significance** of the impact is ***Minor.***
Additional mitigation measures	Periodic community consultations will be held to address concerns proactively, and a community grievance mechanism will be established to ensure timely resolution of any health or safety-related complaints.
Residual impact significance	The residual impact significance will remain negligible

B. Impacts during Operation Phase

Impact on Community Health and Safety	
Context and receptor	During the operations phase, the substation is expected to have minimal direct impact on community health and safety, as it will be a secured facility with restricted access to authorized personnel only. Potential risks include electrical hazards, such as accidental contact with high-voltage equipment, and noise from transformers and other operational equipment to the near-by community.
Planned /Implemented Mitigation Measures	To ensure community safety during operations, the substation will maintain strict access controls with secure fencing and surveillance to prevent unauthorized entry. Clear warning signs about electrical hazards will be prominently displayed. Regular maintenance and inspection of equipment will be conducted to minimize noise and prevent electrical faults or leaks. Emergency response plans will be established and coordinated with local authorities. Additionally, ongoing community awareness programs will inform residents about safety precautions and whom to contact in case of emergencies, ensuring a safe environment around the substation throughout its operational life.
Impact Significance	The impact on community health and safety is considered **Negligible** as during the operations phase movement of heavy vehicles and machinery, noise and dust generation will be limited. Moreover, due to the controlled and secure nature of the substation site within the existing AEGCL boundary. Restricted access, robust safety protocols, and regular equipment maintenance significantly reduce the risk of accidents or exposure to electrical hazards for the surrounding community. Noise levels are expected to be low and within permissible limits, further minimizing disturbance. These factors collectively ensure that the substation's operation poses **Low** health or safety risks to nearby residents during the operations phase. According to the Impact Significance Assessment Matrix, a combination of a ***negligible*** magnitude of impact with **low** receptor sensitivity leads to the conclusion that the overall **significance** of the impact is ***negligible.***

Impact on Community Health and Safety	
Additional mitigation measures	To further reduce potential risks to community health and safety, the project will undertake health and safety awareness programs for the local community, with a focus on electrical safety and emergency preparedness. Special awareness campaigns will be organized in nearby schools to educate children about potential hazards associated with the substation, including clear guidance on do's and don'ts during emergencies. The local community will also have access to the project's established grievance redress mechanism, ensuring concerns are addressed promptly. In addition, periodic engagement with community representatives will be conducted to reinforce safety protocols and share updates. Emergency contact information will be publicly displayed around the facility, and mock drills may be organized in collaboration with local authorities to enhance community preparedness. These measures aim to build awareness, ensure transparency, and promote long-term safety and trust between the project and surrounding communities.
Residual impact significance	Post the implementation of the mitigation measures, the impact significance is expected to be reduced to negligible.

Chapter 7: Environmental and Social Management Plan (ESMP) & Monitoring Plan (ESMoP) and Budget

7.1 Environmental and Social Management Plan

This chapter outlines the Environmental and Social Management Plan (ESMP) developed to address the identified impacts of the project. It also details the administrative framework required to ensure the implementation of mitigation measures and the monitoring of their effectiveness. The comprehensive Management Plan is presented below.

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
During Pre-Construction Phase[10]								
1.	Site selection, Survey, Alternate analysis	• AEGCL's own existing location will be selected to eliminate land acquisition, thereby reducing the potential impact and the need for resettlement. • Mapping of elevation, slope, and land features for substation layout planning. • Identification of soil types and stability for determining appropriate foundation design. • Marking zones for digging of pits for	Substation land	• The selected location for the 220/132 kV Rowta Substation within the existing AEGCL 132/33 kV Substation premises eliminates the need for land acquisition and avoiding issues related to resettlement or displacement. However, there are four numbers AEGCL staff currently residing in 2 numbers of the staff quarters which will be demolished, a small temple dedicated to Lord Shiva, and a sacred tree is located within the substation premises. Moreover,	• Temporary rented accommodation to be provided during construction to AEGCL Staffs staying in the Quarters and ensure timely completion of new staff quarters for permanent relocation. • Relocation of the temple respectfully within the substation campus in consultation with AEGCL staff and nearby community members, observing appropriate rituals & cultural practices. • To mitigate this risk due to public access to construction site, secure	PIU /EPC Contractor	PMC, PIU & PMU (AEGCL)	Once during substation siting survey and design

[10] *All clearances/permits will be obtained prior to construction commencement*

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		equipment, buildings, and support structures. • Selection of locations within the site for safe storage of construction materials without impacting vegetation or drainage. • Identification and tagging of trees that may require felling due to construction needs. • Survey of existing buildings/structures for potential demolition. • Identification of routes within the site for construction traffic and equipment movement.		public access to the construction site may pose safety risks to the nearby community. • Marking of 151 trees resulting in loss of habitat for birds, insects, reptiles, and small mammals. • Disruption of microhabitats and nesting sites, reducing local ecological diversity. • Survey of 43 abandoned quarters and associated buildings along with a temple will generate dust, noise, and debris. • Initial land preparation and marking may disturb natural contours and cause erosion.	fencing and controlled access measures will be implemented around the construction site. • Avoid felling endangered and near-threatened species during peak breeding or flowering seasons and removal of the sacred tree respectfully following consultation, and if culturally required, conduct appropriate rituals prior to removal. • Felling limited to essential trees; prior approval to be obtained from Forest Department. • Undertake compensatory afforestation as mandated by regulations under supervision of Forest Department. • Plantation of native, nectar- and fruit-bearing species to restore habitat value at post construction stage. • For plantation maintenance and monitoring for at least 3 years post-plantation.			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					• Topsoil from cleared areas to be preserved and reused for plantation and landscaping. • Execution as per Construction and Demolition (C&D) Waste Management Plan (**Appendix 7**). • Regular sprinkling of water during demolition and clearing to minimize dust. • Construction-related activities confined within the project boundary; surrounding agricultural or ecologically sensitive land to be avoided.			
2.	Development of baseline	• Collection of air, surface water, groundwater, soil, and noise samples at receptor level.	In the vicinity of Substation Land (500 m)	• Minor and temporary disturbance to local soil or vegetation at sampling points. • Temporary noise from sampling equipment or movement of monitoring team. • Possible minor disturbance to local residents or fauna due to sampling activities.	• Sampling to be conducted using standard protocols with minimal disturbance to the site. • Restoration of any disturbed soil or vegetation after sampling. • Information to local residents or stakeholders prior to sampling.	EPC Contractor (through NABL accredited /PCB (Assam) approved laboratories)	PMC, PIU & PMU (AEGCL)	Witness during sampling
3.	Substation Layout & Design and	• Development of benches inside the substation through	Substation site	• Disturbance of soil layers leading to erosion and siltation risks during	• Carrying out site grading and bench development using slope stabilization	EPC Contractor	PMC, PIU & PMU (AEGCL)	Regular monitoring during the

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
	site preparation	strategic cutting and filling to allow equipment placement and voltage-level segregation. • Conducting detailed topographic survey and preparation of a Site Grading Plan. • Designing internal roads, pathways, and entry/exit points for smooth vehicular and personnel movement. • Planning stormwater drainage, sumps, and trenches to prevent flooding during monsoon. • Designing cable trenches and earthing grid layout to ensure operational safety and prevent electrical hazards. • Strategic placement of firewalls and fire extinguishing systems, including		excavation and embankment activities. • Dust generation due to clearing, grading, and vehicular movement, affecting air quality. • Potential alteration in local hydrology due to modification of natural drainage paths. • Generation of noise and vibration from heavy machinery and compaction activities, potentially disturbing nearby communities or wildlife. • Soil compaction reducing infiltration capacity and hindering future landscaping potential. • Risk of stagnant water formation due to inadequate grading, promoting mosquito breeding. • Safety concerns due to the use of excavation equipment, deep pits, and height work during fencing and layout implementation.	techniques such as gabions, toe walls, and proper compaction. • Installation of temporary silt fences, sediment traps, and stormwater diversion channels to prevent erosion and sediment discharge into surrounding land. • Designing stormwater drainage aligned with the natural flow direction and ensure regular maintenance to prevent clogging. • Maintain construction machinery to reduce noise emissions; restrict operation hours (6 am to to 6 pm) minimize community disturbance. • Spray water on unpaved roads and exposed surfaces during dry periods (December to April) to reduce airborne dust. • Stockpiling of excavated topsoil separately for reuse in green belt development and erosion control.			layout and design phase

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		access for firefighting vehicles. • Designating and integrating green spaces and buffer zones to improve visual impact and promote ecological balance. • Installation of perimeter fencing or compound wall for asset protection and safety. • Felling of trees due to construction needs. • Potential demolition of existing structures.		• Construction workers may place pressure on local resources and services. • Felling of 151 nos. of native trees resulting in removal of vegetation and habitat loss. • Disturbance to microhabitats and nesting sites. • Disturbance due to the generation of dust and debris from potential demolition of 43 nos. of existing structures and a temple.	• Provide clear signage and fencing at excavation sites and ensure workers are trained in safety protocols and equipped with PPE. • Worker accommodation and facilities will be provided within substation construction site. • Avoid felling endangered and near-threatened species during peak breeding or flowering seasons. • Felling limited to essential trees; prior approval to be obtained from Forest Department. • Undertake compensatory afforestation as mandated by regulations under supervision of Forest Department. • Plantation of native, nectar- and fruit-bearing species to restore habitat value at post construction stage. • Relocation of the temple respectfully within the substation campus in consultation with AEGCL staff and nearby			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					community members, observing appropriate rituals & cultural practices. • Standard demolition practices will be employed to manage debris and dust as per Construction and Demolition (C&D) Waste Management Plan as provided in **Appendix 7**.			
4.	Sizing of Equipment, Type and Capacity	• Choosing transformers, breakers, isolators, etc., based on voltage, current, and system configuration. • Designing equipment placement and spacing with proper electrical clearances and ease of operation. • Grounding and Earthing Design – Designing the earthing system to safely dissipate fault currents and ensure personnel safety. • Provision for Expansion – Reserving space and	Substation land	• Land Disturbance & Excavation Impacts – Large equipment may require deep or extensive foundations, potentially altering soil stability and topography. • Increased Oil Storage Risk – Sizing of oil-filled transformers may lead to increased risk of spillage, fire hazard, and contamination if containment is not adequate.	• Avoidance of unnecessary excavation to reduce soil erosion, and prevent sediment runoff into nearby areas. • Inclusion of impervious oil containment pits with adequate storage capacity to capture the full volume of oil. These pits will be lined with oil-resistant, non-permeable materials and equipped with oil-water separators to manage potential transformer oil leakage or spillage. • Optimization of Equipment Placement to ensure minimum land use with compact and safe placement while adhering to electrical clearances.	EPC Contractor	PMC, PIU & PMU (AEGCL)	Regular monitoring

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		planning layout to accommodate future capacity additions.						
Facilities Set-up								
5.	Temporary Worker Camps	• Establishment of temporary shelters and kitchens for workers. • Use of water for drinking, cooking, bathing, and washing. • Generation of domestic wastewater and sewage. • Disposal of kitchen waste and solid non-biodegradable waste (plastic, packaging, etc.). • Storage and disposal of construction-related waste within or near the camp. • Burning of waste or biomass for cooking. • Collection and use of firewood or timber from nearby areas. • Hunting, poaching, or fishing by workers for	Worker Camp	• Soil and water contamination due to uncontrolled waste disposal. • Groundwater depletion or pollution from untreated sewage. • Loss of local flora and fauna due to poaching and wood harvesting. • Risk of human-wildlife conflict. • Vector-borne diseases (e.g., malaria, dengue) from poor drainage or stagnant water. • Air pollution from burning of waste and biomass. • Health risks for workers due to unhygienic conditions and lack of medical access. • Social tensions with host communities due to cultural insensitivity, competition over local resources, or misconduct.	• Labour camps to be sited with the premise of Subproject site and approved by PIU/PMC as per the IFC performance standards **(Appendix 10).** Provision of adequate sanitation facilities (1 toilet per 10 workers) with wastewater treatment systems (e.g., bio-toilets or soak pits), and installation of fire-fighting equipment (such as fire extinguishers and sand buckets) at strategic locations within worker camps to ensure hygiene and fire safety compliance. • Establishment of a waste management system including segregation, collection, and safe disposal. • Prohibition of hunting, poaching, and collection of firewood through clear code of conduct.	EPC Contractor	PMC, PIU & PMU (AEGCL)	Regular monitoring, at least bi-weekly, during the construction period.

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		personal consumption. • Noise, dust, and light pollution from camp operations. • Interaction with local communities. • Construction of temporary sanitation facilities (pit latrines, soak pits, etc.). •		• Visual and noise disturbance to nearby residents and wildlife. • Increased fire risk due to unsafe cooking or electrical practices.	• Provision of clean energy sources (e.g., LPG) for cooking. • Ensure clean drinking water supply. • Monthly health check-ups and access to first-aid facilities in the camp. • Monthly training of workers on hygiene, sanitation, and respectful behavior towards local communities. • construction workers will adhere to a strict Code of Conduct, including zero tolerance for gender-based violence (GBV). • GRM will include a clear procedure for receiving and addressing grievances from laborers, with a dedicated grievance register for laborers. • Use of proper drainage systems to avoid waterlogging and breeding of mosquitoes. • Regular cleaning and disinfection of the camp area. • Installation of signage and safety warnings in local			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					languages and ensure emergency contact numbers are displayed. • Ensure camp lighting is downward-directed and not excessive to reduce impact on fauna			
6.	Procurement of construction materials from Borrow areas and quarries. Transportation and unloading of material at site, storage and workshop	• Identification and operation of borrow areas and quarries (in coordination with regulatory authorities). • Extraction and transportation of sand, aggregates, stones, and earth materials to site. • Site preparation for material storage, workshop and maintenance areas, including additional vegetation clearance and tree cutting. • Construction of temporary sheds for storage of construction materials, oils, fuels, lubricants, paints, chemicals, etc.	• Borrow areas and quarry sites. • Construction site, Stores, machine shops	• Land degradation due to excavation in borrow areas and establishment of storage/workshop facilities. • Additional Tree cutting and vegetation clearance resulting in loss of habitat for local flora and fauna. • Soil and water contamination from improper storage of oils, chemicals, paints, lubricants, and workshop wastewater. • Increase in dust, noise, and vibration levels due to material transport and unloading activities. • Risk of accidents or disruption to community due to increased traffic and use of narrow roads.	• Preparation and implementation of a Borrow Area and Quarry Management Plan as per regulatory guidelines. • Use of approved/authorized borrow areas and licensed quarries. • Avoidance of sourcing material from ecologically sensitive zones, forests, or near water bodies. • Storage of construction materials, chemicals, and fuels in paved, bunded areas with roofing and proper labelling. • Construction of soak pits or oil/grease traps to manage workshop and storage yard effluents. • Installation of firefighting equipment and sand buckets at workshops,	EPC Contractor	PMC, PIU & PMU (AEGCL)	Continuous monitoring during procurement and transportation of construction materials

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		• Setup of on-site workshop for activities like steel cutting, welding, fabrication. • Unloading of heavy equipment and materials using cranes and trailers. • Fuel storage and refuelling areas established near workshop zones. • Temporary access road creation or use of village roads for material transportation.		• Generation of solid and hazardous waste (e.g., scrap metal, used oil filters, containers, etc.). • Fire hazard due to improper storage of flammable materials and welding activities. • Erosion and runoff risks from disturbed lands and absence of proper drainage. • Nuisance and safety risks to local communities due to poor site management. • Lose of crop for the temporary access road creation for material transportation.	stores, and refuelling stations. • Organising fire safety training for workers and assign emergency response personnel. • Provision of PPE to workers engaged in cutting, welding, and handling chemicals/fuels. • Ensuring proper signage, lighting, and safety barriers around storage and unloading areas. • Preparation and implementation of a Traffic Management Plan, mapping sensitive locations and providing alternate routes and speed restrictions. • Ensuring all transport vehicles meet pollution control norms and have valid fitness certificates. • Strict prohibition of additional vegetation clearance. • Regular collection and disposal of solid and hazardous waste through authorized vendors and preparation and			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					• Design storage zones with stormwater runoff management and spill containment features. • Prior consents and Compensation will be provided as per the entitlement matrix of the ESMPF documents for any lose of crop & zirat.			
During Construction Phase								
7.	Excavation, RCC, Foundations, Control Room, Pathways, Earthing & Switchyard Structures	• Excavation of pits for foundations of equipment, transformers, gantry and switchyard structures, and the control room building using excavators and manual methods. • Bending, placing, and fixing of steel reinforcements at foundation sites followed by pouring reinforced cement concrete (RCC) for structural stability of foundations, control rooms, and trenches. • Construction of the control room	Substation land	• Risk of soil, surface water, and groundwater contamination due to accidental fuel or oil leaks from machinery and improper chemical storage or disposal. • Excavation and stockpiling of soil may lead to sediment-laden runoff during rains, impacting drainage systems, aquatic habitats, and soil stability, especially on sloped terrain. • Generation of construction debris (concrete, metal, packaging waste), and risks associated with improper disposal	• Stabilization of excavated areas through compacting and backfilling. Avoid excavation during heavy rains and cover exposed soil with tarpaulins or vegetation. Use silt fences, sediment traps, and bunds to prevent runoff and erosion. • Proper drainage to avoid waterlogging. Designated areas for equipment washing with wastewater collection. Segregate construction waste and dispose of it in designated, approved landfills or recycling facilities. Store and reuse topsoil for landscaping.	EPC Contractor	PMC, PIU & PMU (AEGCL)	Regular monitoring during constructio n

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		building, cable trenches, cable trays, drainage systems, internal roads, pathways, and foundation pillars. • Installation and earthing of switchyard structures, transformers, and associated electrical equipment following safety standards. • Use of diesel-powered equipment like excavators, concrete mixers, vibrators, and transport trucks during construction. • Temporary stacking of excavated soil near construction areas and re-use or disposal. • Installation of cable trays and ducts in prepared trenches across the substation site. • Transportation of construction		affecting land and water quality. • Unmanaged disposal of excess soil or muck may block natural drains or alter the natural slope, leading to localized flooding or soil degradation. • Generation of dust during excavation, concreting, and transportation, along with emissions from diesel engines. Noise from mixers, vibrators, and machinery can disturb nearby communities and wildlife. • Increased dust and noise levels may cause respiratory issues and general discomfort to nearby residents, especially vulnerable groups like children or the elderly. • Workers face risks such as manual handling injuries, falls, dust inhalation, exposure to hazardous substances,	• Regular maintenance of machinery to prevent leaks and emissions. Use of low-emission. equipment where possible. Sprinkle water on exposed soil to suppress dust, cover stockpiles, and conduct air and noise quality monitoring in sensitive areas. • Development and implementation of an OHS Management Plan. Ensure the availability and use of PPEs (helmets, gloves, safety shoes, masks, ear protection). Conduct regular training on health, safety, emergency response, and electrical safety. Provide first-aid kits, fire extinguishers. • Erection of fencing and warning signage around hazardous zones. Restriction of public access to the site. Appointment of a community consultation officer and maintenance of a grievance redressal mechanism. Scheduling high-noise or high-traffic			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
		materials and heavy machinery across often unpaved or sloped terrain.		electrical hazards, and fire risks during welding, cutting, or equipment testing. • Construction activities may increase traffic congestion on local roads, pose risks of road accidents, and obstruct public access routes. • Potential for conflicts between migrant laborers and host communities, including risks of gender-based violence (GBV), sexual exploitation and abuse (SEA), and cultural misunderstandings. • Possibility of wildlife encounters and accidental discovery of archaeological or culturally significant artifacts.	activities during times that minimize community disturbance (6 am to 6 pm) • Preparation and enforcement of a Traffic Management Plan in consultation with local authorities. Deployment of flagmen and signage around construction zones. Schedule material transport during non-peak hours and maintain alternate pedestrian routes and emergency access. • Storage of fuel and chemicals in secure, bunded areas on impermeable surfaces. Training of workers in spill response and ensure spill kits are available. Prohibit refuelling on bare soil and conduct regular inspections. • Orientation of migrant laborers on local norms and behavioral expectations. Implementation of a Code of Conduct for workers. Establishment of a labour			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					grievance redressal committee and enforcement of Gender Action Plan to address GBV/SEA risks. Conduct monthly health check-ups and awareness sessions. • In case of wildlife sightings, halt work and contact the Forest Department for rescue. • If any archaeological artifacts or culturally significant materials are discovered during construction activities, immediately suspend work in the affected area and promptly notify the district administration and relevant heritage authorities for further guidance and protection measures.			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
Erection								
8.	• Transportation of Power Transformer • Unloading and Erection of Power Transformer • Erection of Substation Bus Bars and Bus Couplers • Installation of Transformer Bays, Line Bays, and Terminal Gantries • Transformer Oil Filling • Storage and Handling of Battery Water, Battery Banks, and Chemicals • Internal Wiring and Connectivity in Control Room Panels • Storage and Management	• Moving the heavy power transformer to the substation site using flatbed trailers over existing roads and bridges. • Safely unloading the transformer upon arrival and erecting it on the designated transformer bay with appropriate lifting equipment. • Installing and connecting bus bars, bus couplers, and related bus items to establish electrical pathways. • Setting up the transformer bays and line bays, as well as erecting incoming and outgoing line terminal gantries. • Filling transformers with insulating oil as part of their commissioning and operational readiness.	• Access routes to the substation site • Substation site including transformer bays, battery room, switchyard, control room, and storage areas	• Injuries or fatalities due to lack of PPE, untrained personnel, unsafe erection procedures. • Soil and water contamination from spills of transformer oil, fuels, chemicals, battery water. Air pollution and greenhouse gas emissions from SF6 leaks. Fire hazards from short circuits or overloaded electrical connections. • Potential for conflicts between migrant laborers and host communities, including risks of gender-based violence (GBV), sexual exploitation and abuse (SEA), and cultural misunderstandings	• Plan transportation during low traffic hours to minimize community disruption. • Mandatory use of full Personal Protective Equipment (PPE) for all site workers at all times, including helmets, gloves, safety boots, eye protection, and high-visibility clothing. • Conduct safety inductions and regular training sessions emphasizing safe lifting, rigging, and electrical work procedures. • Ensure qualified and experienced personnel operate cranes, rigging, and electrical installations. • Construct concrete, covered and bunded pads for storage of transformer oils, fuels, battery water, and chemicals to prevent soil contamination and runoff. • Store fuel and hazardous materials away from worker camps and public	EPC Contractor	PMC, PIU & PMU (AEGCL)	Regular monitoring

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
	of SF_6 Gas Cylinders	• Proper storage and management of battery water, battery banks, and other chemical substances required at the site. • Establishing electrical connections and wiring inside the control room panels for different bays and equipment. • Safe storage, handling, and monitoring of SF6 gas cylinders used in circuit breakers and switchgear.			areas, clearly marked with hazard signs and fire protection measures. • Regularly inspect and maintain firefighting equipment onsite, including extinguishers, fire blankets, and alarms. • Implement electrical protection systems (e.g., circuit breakers, relays) and conduct routine testing. • Store SF_6 gas cylinders in a well-ventilated, secure area with restricted access. • Regularly inspect gas handling equipment for leaks using detection instruments. • Train personnel on SF6 handling protocols and emergency response in case of leakage. • Maintain detailed logs of SF6 inventory, usage, and leak incidents to track and minimize emissions. • Orientation of migrant laborers on local norms and behavioral expectations.			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					Implementation of a Code of Conduct for workers. Establishment of a labour grievance redressal committee and enforcement of Gender Action Plan to address GBV/SEA risks. Conduct monthly health check-ups and awareness sessions • Coordinate closely with local authorities and environmental agencies for compliance and emergency support.			
Post-Construction and Commissioning Phase								
9.	• Charging of power transformer and providing auxiliary power supply • Installation of communication systems and power line carrier communication • Connection and termination of incoming	• Erection, oil filling, and commissioning of the power transformer • Installation of connectivity and internal wiring in control room panels • Connecting jumpers and spacers between incomer lines and substation bus bars, transformers, isolators, current transformers, potential	• Switchyard area for transformer erection and charging activities • Control room and switchyard for communication and wiring tasks	• Oil leakage from transformers may contaminate soil and groundwater. • Improper slope management and blocked drains can lead to soil erosion and increased surface runoff. • Leftover construction materials and debris can pollute the surroundings and hinder vegetation growth. • Risk of fire, explosion, or electric shock from	• Construction of concrete-lined containment pits around transformer foundations to collect leaked oil and prevent soil and water pollution. • Implementation of slope stabilization techniques, clearing all blockages in drainage paths, and restoration of topsoil after construction. Development of green belts with native vegetation to improve soil binding and ecological balance.	EPC Contractor, PIU AEGCL	PMC & PMU (AEGCL)	Continuous monitoring during the commissioning phase, followed by periodic checks (e.g., quarterly) during the operational phase

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
	transmission lines into substation equipment	transformers, and circuit breakers • Installation of accessories on power cables • Restoration of disturbed soil, slope stabilization, development of green belt • Testing and commissioning of all substation systems	• Entire substation premises for line connection, restoration work, and green belt development	improper transformer installation or oil leaks. • Injuries or accidents during installation of communication equipment and electrical components due to poor safety practices. • Potential risks include electrical hazards, such as accidental contact with high-voltage equipment, and noise from transformers and other operational equipment to the near-by community.	• Ensure post-construction site cleaning, safe disposal of waste, and implementation of a landscaping plan for vegetation recovery. • Maintaining functional fire-fighting systems at site, conduct regular safety inspections, and ensure only trained personnel handle high-risk activities. • Enforce strict safety protocols such as use of personal protective equipment, work permits, lockout/tagout systems, and clearly marked danger zones. • To ensure community safety during operations, the substation will implement strict access controls, secure fencing, and surveillance to prevent unauthorized entry. Warning signs about electrical hazards will be clearly displayed. Regular equipment maintenance will minimize noise and prevent faults. Emergency			

Sl. No.	Project Activity	Tasks	Location	Potential Impacts	Mitigation Measures	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
					response plans will be coordinated with local authorities, and as and when require community awareness programs will be conducted to educate residents on safety measures and emergency contacts.			

7.2 Environmental and Social Monitoring Plan

In tandem with the Environmental and Social Management Plan (ESMP), the systematic and timely monitoring of real-time environmental and social data is indispensable for a comprehensive understanding of a project's impact and the effectiveness of mitigation measures. This ESMoP is designed to facilitate the timely collection and analysis of pertinent data, ensuring that the implementation of the ESMP remains responsive and adaptive throughout the project's entire lifecycle.

Environmental & Social Component	Project stage	Parameters to be monitored	Location	Standards	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
1. Air Quality	A. Pre-construction stage	PM_{10}, $PM_{2.5}$, CO, SO_2, NO_2, O_3, and NH_3 along with Meteorological parameters like- temperature Humidity, wind speed, wind direction etc.	Inside the substation location and nearby community.	National Ambient Air Quality Standards (NAAQS), CPCB	EPC Contractor by CPCB/SPCB approved or NABL Accredited laboratory	PMC, PIU & PMU (AEGCL)	Once
	B. Construction Stage						Twice a year (Pre-monsoon and Post monsoon)
	C. Operation Stage (Commissioning Stage)						Once
2. Water Quality (Both Surface Water and Ground Water)	A. Pre-construction stage	As per IS: 10500 (PH, Colour, Odour, Taste, TDS, Conductivity, Turbidity, BOD, COD, Total Hardness, Alkalinity, Nitrate, Sulfate, Fluoride, Chlorine, Arsenic, Copper, Cadmium, Lead, Iron, Zinc, Coliform, E. coli.	Nearest downstream spring and handpump within the Substation Location	As per IS: 10500	EPC Contractor by CPCB/SPCB approved or NABL Accredited laboratory	PMC, PIU & PMU (AEGCL)	Once
	B. Construction Stage						Twice a year (Pre-monsoon and Post monsoon)
	C. Operation Stage (Commissioning Stage)						Once
3. Noise	A. Pre-construction stage	Noise level (dB level) On hourly basis for 24 hours	Office of the Circle Inspector- 80m from the proposed substation site. (Considering the	As per CBCB and WHO guidelines	EPC Contractor by CPCB/SPCB approved or NABL Accredited laboratory	PMC, PIU & PMU (AEGCL)	Once
	B. Construction Stage						Twice a year (Pre-monsoon and Post monsoon)

Environmental & Social Component	Project stage	Parameters to be monitored	Location	Standards	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
	C. Operation Stage (Commissioning Stage)		nearest sensitive receptor)				Once
4. Soil	A. Pre-construction stage	PH, Moisture, Conductivity, Oxidation Reduction Potential, Nitrogen, Phosphorous, Sulphate, Chloride, Total Organic Carbon, Nitrate, Arsenic, Cadmium, Lead, Iron, Zinc, Copper, Total Coliform.	Substation Location	As per CBCB and IS guidelines	EPC Contractor by CPCB/SPCB approved or NABL Accredited laboratory	PMC, PIU & PMU (AEGCL)	Once
	B. Construction Stage						Twice a year (Pre-monsoon and Post monsoon)
	C. Operation Stage (Commissioning Stage)						Once
5. Traffic	A. Pre-construction stage	Number & type of vehicles being used for procurement of construction materials and supply items	At identified sensitive location/ stakeholders as, mapped in the Traffic Management Plan	Record keeping of vehicles used to identify increased traffic load in localities	EPC Contractor	PMC, PIU & PMU (AEGCL)	Continuous activity
	B. Construction Stage			Logbook for in-out time of vehicle on site	EPC Contractor	PMC, PIU & PMU (AEGCL)	Continuous activity
	C. Operation Stage (Commissioning Stage)			Maintenance of Logbook for in-out time of vehicle on site	PIU (AEGCL)	PMU (AEGCL)	Continuous activity
7. Carcass	A. Pre-Pre-construction stage	Visual inspection for substation location	Substation location	Reporting to concerned forest/wildlife authority for identification of species. Record to be maintained for number of carcasses	EPC Contractor, PIU AEGCL	PMU, AEGCL	Continuous activity
	B. Construction stage	Visual inspection for substation location	Substation location		EPC Contractor	PMC, PIU & PMU (AEGCL)	Continuous activity
	C. Operation Stage	Visual inspection for substation location	Substation location		PIU (AEGCL)	PMU (AEGCL)	Continuous activity
8. Grievance Mechanism	A. Pre-construction stage	Formation of Grievance Redressal Committee	All Project Locations	Notification of formulation of GRM and GRC and display of	EPC Contractor, PMC, PIU and PMU	PIU & PMU (AEGCL)	Continuous activity
	B. Construction Stage	Working files of GRC and GRM records			EPC Contractor	PMC, PIU & PMU (AEGCL)	Continuous activity

Environmental & Social Component	Project stage	Parameters to be monitored	Location	Standards	Implementing Responsibility	Monitoring Responsibility	Monitoring Frequency
	C. Operation Stage (Commissioning Stage)	Working files of GRC and GRM records		GRM procedure in project locations	EPC Contractor	PMC, PIU & PMU (AEGCL)	Continuous
9. Stakeholder Engagement	Pre-construction stage	Mapping of stakeholders	Substation location	Consultation record with mapped stakeholders (minutes of Consultation and attendance sheet)	PIU (AEGCL)/PMU/ PMC	AEGCL-PMU/ AEGCL Field officials & PMC	Continuous activity
	B. Construction stage	Listing of identified stakeholders	Substation location	Consultation record with mapped stakeholders (minutes of Consultation and attendance sheet)	Contractor/PMC/AEGCL	AEGCL-PMU/AEGCL Field officials & PMC	Continuous activity
	C. Operation Stage	Identified stakeholders at project pre construction and construction stage	Substation location	Consultation record with mapped stakeholders (minutes of Consultation and attendance sheet)	AEGCL Field Officers	AEGCL- PMU/ AEGCL Field officials & PMC	Continuous activity

7.3 Budget for ESMP Implementation

The implementation of the Environmental and Social Management Plan (ESMP) for the 220/132kV Rowta Grid Substation has been strategically designed with a focus on cost-effectiveness and sustainability. The financial planning under the ESMP is based on a "least-cost" approach, ensuring that mitigation measures are applied efficiently without compromising environmental and social integrity. The adherence to this plan involves incurring essential expenditures that are crucial for minimizing potential environmental and social risks. Failure to allocate these resources could lead to significant negative impacts, including the degradation of the local biophysical environment and adverse consequences for the surrounding communities. The cost estimates have been developed following a thorough assessment of potential impacts across all project phases—pre-construction, construction, and operation and incorporate essential components such as environmental monitoring, capacity building, awareness programs, and training. The detailed cost breakdown presented in **Table 18**. This ensures that the financial resources are not only adequate but also targeted toward the most critical environmental and social safeguards, thereby supporting the project's overall sustainability and compliance with regulatory and community expectations.

Table 18 : ESMP Implementation Budget

Sl. No.	Description	Quantity	Unit	Rate (in INR)	Amount (in INR)
A.	***Environmental Monitoring (Pre-construction Stage)***				
1	Air Quality	1	No.	21,440	21,440
2	Water Quality (Surface and Ground water both)	1	No.	25,360	25,360
3	Noise Levels	1	No.	7,000	7,000
4	Soil Quality	1	No.	12,300	12,300
Sub-Total Cost					**66,100**
B.	***Environmental Monitoring (Construction Stage)***				
1	Air Quality (Twice a year for 3 year)	6	No.	21,440	1,28,640
2	Water Quality (Twice a year for 3 year)	6	No.	25,360	1,52,160
3	Noise Levels (Twice a year for 3 year)	6	No.	7,000	42,000
4	Soil Quality (Twice a year for 3 year)	6	No.	12,300	73,800
Sub-Total Cost					**3,96,600**
C.	***Environmental Monitoring (Operation Stage)***				
1	Air Quality	1	No.	21,440	21,440
2	Water Quality (Surface and Ground water both)	1	No.	25,360	25,360
3	Noise Levels	1	No.	7,000	7,000
4	Soil Quality	1	No.	12,300	12,300
Sub-Total Cost					**66,100**
D.	***Capacity building (Training/ Workshops) and Health Awareness Camp***				
1	Training on Implementation of ESMP for PIU (Once per year for 3 years) EPC contractors: (Twice per year for 3 years)	9	No.	2,00,000	18,00,000
2	Health & Safety Awareness Camp: Pre-Construction- Once, Construction- 2 times / year for 3 years, Operation- Once	8	No.	50,000	4,00,000
3	Training on Implementation of GRM and Gender Action Plan for PIU and EPC (Bi-annually for 3 years)	6	No.	20,000	1,20,000

Sl. No.	Description	Quantity	Unit	Rate (in INR)	Amount (in INR)
4	Training on Occupation Health and Safety for PIU and EPC (Quarterly for 3 years)	12	No.	20,000	2,40,000
					25,60,000
E.	***BOQ items***				
1	SF_6 retrieving arrangement as per site requirement.	1	LOT	5,00,000	5,00,000
2	Personal protective equipment's (Hard hats (with full/partial brims as necessary) Safety glasses with side shields. Face masks/shields. Suitable footwear (safety/steel-toed boots, rated dielectric footwear) Insulating gloves (rated, used along with leather/cloth linings for shock protection)), Plantation (Landscaping) as per site requirement.	1	LOT	5,40,672	5,40,672
Sub-Total Cost					**10,40,672**
Total Cost (A+B+C+D+E)					***41,29,472***
Contingency					***1,41,325***
Grand Total					***42,70,797***

Chapter 8: Climate Risk and Vulnerability Assessment

8.1 Introduction

This climate risk and vulnerability assessment has been prepared for the proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta, Assam in accordance with the Asian Infrastructure Investment Bank's (AIIB) *Methodology for Assessing the Alignment of AIIB Investment Operations with the Paris Agreement* (2023)[11]. The purpose of Climate Risk and Vulnerability Assessment (CRVA) is to examine climate and other hazards that pose risks to subproject activities, assets, and beneficiaries; assess the sensitivity of subproject components to climate conditions; and identify adaptation options that can be integrated into project design, assuming they are technical feasible and economically viable.

8.2 Methodology

The Climate Risk and Vulnerability Assessment (CRVA) methodology primarily relied on desk reviews of existing literature on climate change projections for the region, vulnerability assessments of the power transmission sector, and relevant adaptation studies. It also incorporated project-specific design documents to ensure a comprehensive evaluation. The assessment leveraged climate data from the World Bank's Climate Change Knowledge Portal (CCKP)[12,13], which provides modelled projections based on various emission scenarios and Shared Socioeconomic Pathways (SSPs)[14]. These projections are derived from the Coupled Model Intercomparison Projects (CMIP), a global climate modeling initiative under the World Climate Research Program. Specifically, CMIP6 supports the findings of the IPCC's Sixth Assessment Report[15]. Additionally, an overview of natural hazards and risks at the subproject location was obtained using Think Hazard[16], a web-based rapid screening tool. This tool enables non-specialists to assess potential disaster impacts by providing a general hazard assessment for a given location. It categorizes hazard levels as low, moderate, or high, helping to evaluate climate-related risks and inform adaptation strategies to enhance the resilience of power transmission infrastructure. However, the hazard levels as shown do not replace the need for detailed natural hazard risk analysis and/or expert views and advice that could be considered in project design and implementation to promote disaster and climate resilience.

8.3 Limitations

Despite widespread recognition of climate change impacts, addressing them through climate proofing remains a complex challenge. The intricate ways in which climate change manifests, along with uncertainties in defining climate risks and vulnerabilities, make it difficult to implement effective measures. Additionally, gaps in essential information resources further hinder efforts to integrate climate resilience into regional investment projects. There is no clear and universally adopted methodology to model the adverse effects of climate change and its integration in infrastructure design procedures.

As the climate change adaptation and mitigation measures for the subproject are based primarily on desk reviews of the project design documents, there will certainly be a large number of important qualification and limitation issues affected by deficient assessments of climate risks and vulnerabilities that impact the

[11] https://www.aiib.org/en/about-aiib/who-we-are/partnership/_download/Methodology-for-Assessing-the-Alignment-of-AIIB-Investment-Operations-with-the-Paris-Agreemement.pdf
[12] https://climateknowledgeportal.worldbank.org/country/india/climate-data-historical
[13] https://climateknowledgeportal.worldbank.org/country/india/climate-data-projections
[14] https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_TS.pdf
[15] https://www.ipcc.ch/assessment-report/ar6/
[16] https://thinkhazard.org/en/report/17578-india-assam-darrang

interpretation and application of mitigation and adaptation measures in terms of appropriateness and robustness of climate proofing.

8.4 Climate variability, Future Climate Projections and Natural Hazards in Assam

Assam is prone to natural hazards such as cyclonic storms, floods, landslides, river erosions, earthquakes etc. as listed in the Assam State Disaster Management Plan (2022, Vol. I). Heavy torrential rainfall is common in Assam, which often results in flooding along the Brahmaputra River. The exposure to such hazards is sometimes aggravated by earthquakes as Assam is in one of the most seismically active regions in the World. Climate change could impact all the outputs and activities under the subproject, including the sub-station infrastructure, associated transmission line infrastructure and other facilities. This section reviews historical information on and projections of climate variability and change, as well as the incidence of geophysical and other events in Assam and Rowta, Udalguri District (26°43'25.64"N, 92°11'23.77"E) where the newly proposed 220/132 kV (2X160 MVA) GIS Substation (Package A) under Phase II of AISTSEP will be located.

The IPCC Sixth Assessment Report introduces Shared Socioeconomic Pathways (SSPs) to assess future climate scenarios based on emissions, mitigation efforts, and socioeconomic factors such as population growth, urbanization, education, land use, and economic development. The projections for Assam are based on the SSP2-4.5 scenario, which represents a "middle of the road" scenario in which CO_2 emissions hover around current levels before gradually declining in the mid-21st century but do not reach net-zero by 2100. Under this scenario, global temperatures are projected to increase within a very likely range of 2.1°C to 3.5°C by the end of the century.

Table 19 : Shared Economic Pathways

SSP No.	Scenario (Likelihood)	Estimated Warming, °C		Very Likely Range, °C
		(2041–2060)	(2081–2100)	(2081–2100)
SSP1-1.9	Very low GHG emissions: CO_2 emissions cut to net zero around 2050	1.6	1.4	1.0 – 1.8
SSP1-2.6	Low GHG emissions: CO_2 emissions cut to net zero around 2075	1.7	1.8	1.3 – 2.4
SSP2-4.5	Intermediate GHG emissions (likely): CO_2 emissions around current levels until 2050, then falling but not reaching net zero by 2100	2.0	2.7	2.1 – 3.5
SSP3-7.0	High GHG emissions (unlikely): CO_2 emissions double by 2100	2.1	3.6	2.8 – 4.6
SSP5-8.5	Very high GHG emissions (highly unlikely): CO_2 emissions triple by 2075	2.4	4.4	3.3 – 5.7

°C = degree Celsius, CO_2 = carbon dioxide, GHG = greenhouse gas, SSP = Shared Socioeconomic Pathway
Source: World Bank Climate Change Knowledge Portal

8.4.1 Rise in Temperature

Assam has a temperate, tropical monsoon rainforest climate with the highest temperature of 35°C –39°C in summer and the lowest temperature of 5°C–8°C in winter. Temperatures are moderate in spring (March–April) and autumn (September–October). Long-term temperature trends in Assam, projected using the World Bank's Climate Change Knowledge Portal (CCKP), are likely to be continuous increase, although at a slower rate. The SSP2-4.5 projections of temperature and rainfall extracted here for the state of Assam for a few selected temperature indicators of interest are as follows: (i) maximum of daily max temperature and (ii) days with heat index >35°C **(Table 20)**. The projections show that the state will experience high extreme temperatures above

35°C. Furthermore, the annual number of extreme hot days will increase from 18 days to 50 days on average in successive decades as a result of climate change.

Table 20: Projections of Selected Temperature Indicators (Reference Period 1995–2014)

Scenarios	2020–2039	2040–2059	2060–2079	2080–2099
	(a) Projected Average Single-day Maximum of Daily Maximum Temperatures, °C 50th percentile, median (10th to 90th percentile range)			
SSP2-4.5	37.66 (34.52 – 40.65)	38.4 (35.13 – 41.74)	39.19 (35.74 – 42.50)	39.87 (36.38 – 42.98)
	(b) Projected Hot Days with Heat Index, Tmax >35°C, days 50th percentile, median (10th to 90th percentile range)			
SSP2-4.5	17.95 (2.10 – 44.22)	26.43 (4.61 – 59.97)	38.67 (7.43 – 71.02)	49.99 (11.90 – 79.69)

Source: World Bank Climate Change Knowledge Portal

8.4.2 Precipitation and Flooding

Assam experiences heavy rainfall and high humidity. Its climate is characterized by heavy monsoon downpours, which reduce summer temperatures, and enable formation of foggy nights and mornings in winter. Over 70% of the precipitation occurs during June–September. Rainfall is moderate in spring (March–April) and autumn (September–October). Assam lies in the middle of the Brahmaputra and Barak basins. Due to their geo-climatic conditions, the Brahmaputra and Barak River basins in Assam are susceptible to flooding. In particular, the Brahmaputra Valley in Assam is one of the most hazard-prone regions of the country, with more than 40% of its land (3.2 million hectares) vulnerable to flooding, accounting for 9.4% of India's total flood-prone area.

Flood hazards in the state are due to a blend of numerous natural and anthropogenic factors. Floods are caused by the runoff of extremely heavy rainfall during monsoons and high sediment loads from upper watersheds that are geologically unstable and degraded because of deforestation and changing land use. Floods combined with river erosion has significant impacts. Moreover, frequent floods occur in the Brahmaputra basin because of the unique physiographic setting characterized by the limited width of the valley and the abruptly flattened gradient, together with the high-water yield, leading to tremendous drainage congestion. **Table 21** shows the average largest 1-day precipitation and the projected days with precipitation >20 mm.

Table 21: Projections of Selected Precipitation Indicators (Reference Period 1995–2014)

Scenarios	2020–2039	2040–2059	2060–2079	2080–2099
	(a) Projected Average Largest 1-day Precipitation, mm 50th percentile, median (10th to 90th percentile range)			
SSP2-4.5	73.89 (31.68 – 145.90)	74.19 (31.71 – 151.45)	79.62 (32.17 – 170.32)	80.99 (31.96 – 167.65)
	(b) Projected Days with Precipitation >20 mm, days 50th percentile., median (10th to 90th percentile range)			
SSP2-4.5	23.89 (4.27 – 63.21)	25.72 (5.27 – 63.34)	25.85 (5.79 – 65.27)	25.6 (6.06 – 61.22)

mm = millimeter, SSP = Shared Socioeconomic Pathway
Source: World Bank Climate Change Knowledge Portal

The above precipitation projections of selected indicators for Assam show a gradual increase in the average largest 1-day precipitation as well as the number of days with precipitation over 20 mm in successive decades as a result of climate change. Besides, an overwhelming number of climate literatures assert that more frequent

heavy to extreme precipitation events can be expected with climate change. Such increase in the intensity of heavy rainfall events is expected to result in flooding.

8.4.3 High winds and cyclonic storms

According to the Wind Hazard Map of Assam featured in the Vulnerability Atlas of India (3rd Edition) by BMTPC, Udalguri district falls under the Very High Damage Risk Zone-B for wind hazards. These classifications reflect the regions' vulnerability to moderate to severe wind events, especially during the pre-monsoon and monsoon seasons when convective storms are common. The Basic Wind Speed (Vb) in the proposed area ranges from 7 m/s to 55 m/s, underscoring the importance of incorporating wind-resistant features in structural design. The projected change in days without noticeable wind (i.e., days when the mean wind speed is below 1 m/s) can be used as an indicator for future cyclone and wind hazard estimation. under the SSP2-4.5 scenario, cyclonic risks and impacts in Rowta, Udalguri district of Assam are considered high.

8.4.4 Earthquakes

Earthquakes are one of the most destructive natural hazards in the seismically active Assam. According to data of the Global Seismic Hazard Assessment Programme, Assam lies in a region with high to very high seismic hazard risk. It has experienced several devastating earthquakes in the past, resulting in a large number of deaths and severe property damages.

Active seismicity in the region has caused extensive landslides, rock falls on the hill slopes, ground subsidence and earth fissures in the valley, and changes in the course and configuration of river tributaries and the Brahmaputra mainstream. These changes, especially in the river morphology, have a significant impact on the hydrologic regime. Assam falls in the severe seismic Zone V of the Bureau of Indian Standards. Except for a few southern districts, most districts in Assam lie in the Brahmaputra River Valley, whose northern and eastern parts are bounded by the Himalayan Frontal Thrust. The Himalayas rose because of continent–continent collision between the Indian and the Eurasian plates. The arc of the Lohit and Naga Thrusts also lies in the eastern part of Assam, which poses an additional seismic threat. The earthquakes of Magnitude 6 and above measured during instrumental period in Assam are presented in **Table 22**.

Table 22: Earthquake Hazard History of Assam State (M>6.0)

Date	Epicenter	Latitude	Longitude	Origin Time	Magnitude
10th January 1869	9.4 Km North of Kumbhir (Assam)	25.00 N	93.00E	11:45 UTC	7.5
21st January 1941	Near Tezpur, Assam	26.50 N	92.50E	02:30:16.0 UTC	6.5
23rd October 1943	13.6 kms East of Hojai (Assam)	26.00 N	93.00E	17:23:17 UTC	7.2
31st December 1984	SSE of Silchar (Assam)	24.64 N	92.89E	23:33:37 UTC	6.0

Source: Assam State Disaster Management Plan, 20022 (Volume 1)

Table 23: Some of the recent earthquakes

Date	Epicenter	Latitude	Longitude	Origin Time	Magnitude
9th December 2004	Silchar Region, Assam	24.710 N	92.523E	08:49:00 UTC	M 5.4
19th August 2009	Assam Region	26.556 N	92.470E	10:45:13 UTC	M 5.0
30th December 2011	Central Assam region			15:14:00 UTC	M 3.6
25th September 2018	Barpeta			03.47 UTC	M 4.3
27th April 2019	Tejpur			06.27 UTC	M 4.8
13th November 2019	Diphu			13.10 UTC	M 4.7
8th February 2020	Abhayapuri			12.47 UTC	M 5.0

Date	Epicenter	Latitude	Longitude	Origin Time	Magnitude
3rd October 2020	Hajo			15.36 UTC	M 4.2
10th December 2020	Goalpara			16.56 UTC	M 4.3
17th February 2021	Dhekiajuli			12.24 UTC	M 4.7
28th April 2021	Tejpur			02.21UTC	M 6.4

8.4.5 Landslides

Landslides are a sudden, short-lived geomorphic event that involves a rapid-to-slow descent of soil or rock in sloping terrains when the stability of the slope changes from stable to an unstable condition. A change in the stability of a slope can be caused by a number of factors, acting together or alone, including excessive precipitation or human activities, such as deforestation or development. Assam is located on the Himalayas which was recently founded in the mountain history, and is therefore seismically very active and geologically unstable.

Nevertheless, due to low slope gradients, landslide hazard risk in Rowta, Udalguri District appears to be low. Reduced rainfall, higher temperatures, and higher evaporation are likely to lead to drier catchment conditions which are not conducive to landslips (landslides are normally triggered by slope wetness).

8.4.6 Lightning Strikes

Lightning is one of the most capricious and unpredictable characteristics of a thunderstorm, no one can guarantee an individual or group absolute protection from it. Assam has been experiencing a significant number of lightning strikes in recent times, leading to concerns about public safety and infrastructure damage. Given the unpredictable nature of lightning and its severe consequences, it is crucial for adherence to safety guidelines during storms, and support ongoing efforts to enhance resilience against such natural disasters.

8.5 Impacts of Climate Hazards and Adaptation Options

Following are the climatic hazards along with remedial measures adapted for substation at design stage under Phase II of AIIB funded AISTSEP.

8.5.1 Temperature Rise

Impact: A rise in temperature can significantly impact power substations by reducing equipment efficiency, increasing the risk of failures, and shortening the lifespan of critical components. High temperatures can cause overheating in transformers, circuit breakers, and other electrical equipment, leading to insulation degradation, increased resistance, and potential breakdowns. Overheated transformers may experience oil degradation, reducing their cooling capacity and increasing the likelihood of faults. Additionally, excessive heat can cause metal expansion, leading to lose connections and increased electrical losses.

Adaptation: To mitigate the impact of rising temperatures several cooling systems, such as forced air ventilation are adopted to help regulate transformer and switchgear temperatures in GIS substations. High-temperature-resistant materials, such as advanced insulation and heat-resistant conductors, improve durability. Smart grid technology, including real-time temperature monitoring and predictive maintenance, allows for proactive adjustments to prevent overheating. Enhanced grounding and fire protection systems further safeguard against thermal stress-related failures. These adaptations collectively enhance substation resilience against rising temperatures and climate change challenges for this subproject.

8.5.2 Flood

Impact: Flooding can have severe impacts on power substations, leading to widespread power outages, equipment damage, and safety hazards. When floodwaters inundate a substation, they can short-circuit electrical components, corrode metal parts, and contaminate insulation materials, reducing their effectiveness. Transformers, circuit breakers, and switchgear may fail, requiring costly repairs or replacements. Additionally, prolonged exposure to water can compromise structural integrity and increase the risk of electrical fires or explosions. Flood-induced power disruptions can also affect critical infrastructure such as hospitals, water treatment plants, and communication networks, amplifying the overall impact on communities.

Adaptation: Most of the substation locations including Newly proposed 220/132 kV (2X160 MVA) GIS Substation at Rowta (Package A) under Phase II of AISTSEP are away from flood prone area. For low lying substation locations, the area/critical equipment (transformers and control panels) levels are raised sustainably to avoid logging of water. Installing water-resistant barriers and drainage systems will reduce the risk of water infiltration. During preparation of contour plan, Finished Ground Level (FGL) is fixed by considering the Highest Flood level (HFL) data of that area.

8.5.3 High winds and cyclonic storms

Impact: High winds and cyclonic storms pose significant risks to power substations, leading to widespread disruptions and damage. Strong winds can topple transmission towers, uproot poles, and bring down power lines, causing short circuits and outages. Flying debris can strike critical equipment like transformers, circuit breakers, and insulators, leading to mechanical failures and fires. Heavy rainfall and storm surges associated with cyclones can flood substations, damaging electrical components and causing prolonged power failures.

Adaptation: GIS (Gas-Insulated Switchgear) substations are used wherever necessary as they are more resilient than AIS (Air-Insulated Switchgear). Structural reinforcements, such as wind-resistant fencing, reinforced concrete walls, and storm-rated roofs, help protect critical equipment from debris and extreme wind forces. Secure anchoring of transformers, breakers, and other components prevents displacement or damage. Additionally, robust grounding and lightning protection systems help mitigating the electrical hazards caused by storm-induced faults. Vegetation management around substations further reduces the risk of falling trees or debris impacting infrastructure.

8.5.4 Earthquakes

Impact: Earthquakes can have severe impacts on power substations, leading to widespread power outages and infrastructure damage. Strong ground shaking can cause structural failure of transformers, circuit breakers, and busbars, while soil liquefaction can destabilize foundations. Seismic forces may also damage insulators, control panels, and transmission lines, disrupting electricity supply to homes, businesses, and critical facilities. Additionally, fires or explosions may occur due to oil leaks from damaged transformers, further escalating the risks.

Adaptation: When selecting the most suitable method for retrofitting and enhancing the lateral load-resisting capacity of structures, it is essential to consider the entire system, including site characteristics, foundations, and both structural and non-structural components, as per IS 1893 (Part 1): 2002. Notably, evaluating geotechnical properties, soil conditions, and foundation types plays a crucial role in determining the most effective retrofitting approach.

While situated in Seismic Zone V, AEGCL incorporates earthquake-resistant design principles in its substations to ensure structural integrity and operational reliability during seismic events. Substations are designed following the seismic zoning criteria outlined in the Bureau of Indian Standards (IS 1893) and site-specific seismic hazard assessments. Key measures include the use of reinforced concrete foundations, base isolation systems where necessary, and flexible connections in equipment to absorb ground motion without damage. Structures such as control buildings, gantries, transformers, and switchgear are engineered with ductile detailing and seismic anchorage to reduce the risk of tipping or displacement. Equipment layout also considers separation gaps to prevent pounding during quakes.

8.5.5 Landslides

Impact: Landslides can have a devastating impact on power substations by causing structural damage, equipment failure, and service disruptions. When a landslide occurs near or within a substation, it can bury electrical equipment, displace transmission towers, and damage foundations, leading to power outages and costly repairs. Soil movement can also compromise underground cables, disrupt grounding systems, and increase the risk of short circuits or electrical faults. In extreme cases, landslides may make substations completely inoperable, requiring extensive rebuilding efforts.

Adaptation: The proposed substation is located on stable ground, away from known landslide-prone areas. However, proper slope stabilization techniques, such as retaining walls, terracing, and soil nailing, can help to prevent soil movement. Additionally, adequate drainage systems, including surface water diversion channels and subsurface drainage will reduce water accumulation that may trigger landslides. Foundations are also reinforced with deep piling or rock anchors to enhance stability.

8.5.6 Lightning Strikes

Impact: Lightning strikes can have severe impacts on power substations, potentially causing equipment damage, power outages, and safety hazards. When lightning directly strikes a substation or induces high-voltage surges through transmission lines, it can damage transformers, circuit breakers, insulators, and other critical components. These surges may lead to insulation breakdown, short circuits, or even fires, resulting in costly repairs and prolonged downtime. Additionally, repeated lightning strikes can degrade equipment over time, reducing the reliability of the power grid.

Adaptation: To mitigate the impact of lightning strikes in power substations, several design adaptations are implemented to enhance protection and ensure system reliability. Lightning arresters are installed at key points to divert high-voltage surges safely into the ground, preventing damage to sensitive equipment. Grounding systems with low-resistance earthing help dissipate lightning energy efficiently, reducing the risk of insulation failure and electrical faults. Shielding methods, such as overhead ground wires or lightning masts, are strategically placed to intercept strikes before they reach critical infrastructure. Additionally, surge protection devices are integrated into control and communication circuits to prevent transient overvoltages from affecting sensitive electronic systems. Proper insulation coordination and the use of bushings with high dielectric strength further enhance resilience.

8.5.7 Other Hazard: Use of Sulphur Hexafluoride (SF_6)

Gas insulated systems are now a major component of power transmission and distribution networks all over the world. GIS is used above 132kV, having all components interconnected and insulated via compressed SF_6 (i.e., circuit breakers, disconnections, grounding switches, bush bars, potential transformers, power transformers,

cable insulation). Due to compactness and steel shielding structures of GIS substation, it offers significant savings in land use, aesthetically acceptable, have relatively low radio and audible noise emissions.

Impact: Sulfur Hexafluoride (SF6) is considered one of the most potent greenhouse gases, its relative contribution to global warming is currently considered small (only 0.01%) due to its low overall emission levels, despite having a very high Global Warming Potential (GWP) which is around 23,900 times that of carbon dioxide (CO_2); meaning that even a small amount of SF_6 has a significantly larger impact on warming compared to the same amount of CO_2. SF_6 decomposes under electrical stress in GIS substation forming toxic by-products that are a health threat for working personnel in the event of exposure.

Adaptation: SF_6 retrieving arrangement, advanced sealing techniques, real-time gas monitoring, and regular maintenance to detect and repair leaks promptly. Additionally, improved gas recycling and recovery systems help capture and reuse SF_6, preventing unnecessary emissions. Regulations and industry standards also promote responsible handling and disposal, ensuring that SF_6 emissions are minimized throughout the lifecycle of GIS equipment.

8.6 Climate Risk Screening and Assessment

An assessment of natural hazards and risks at the subproject location was conducted using **Think Hazard**, a web-based rapid screening tool. Designed for non-specialists, this tool provides a general hazard evaluation for a specific location, categorizing risk levels as low, moderate, or high. The tool applies an Exposure-Impact-Adaptive capacity framework to characterize risks. By identifying potential disaster impacts, it supports the assessment of climate-related risks and informs adaptation strategies to strengthen the resilience of power transmission infrastructure.

According to the Think Hazard web-based tool, the subproject site at Rowta is exposed to multiple climate and geophysical risks. The river flood hazard is classified as high, with potentially life-threatening floods anticipated at least once every decade. Extreme heat hazard is also high, with severe heat stress events expected at least once within the next five years. Additionally, the project location has experienced geophysical hazards in the past and is expected to experience these in the future with high intensity, frequency, or duration. These ratings are based on climate information drawing on global, quality-controlled data sets from the Climate Change Knowledge Portal (CCKP). The detailed Rapid Assessment Report is attached as **Appendix 11.**

8.7 Conclusion

The subproject exemplifies a forward-thinking approach to infrastructure development, integrating robust engineering standards and climate-resilient materials to ensure long-term durability. Designed to withstand Assam's challenging tropical climate and seismic activity, it incorporates structural reinforcements, corrosion-resistant materials, and advanced insulation for enhanced stability and efficiency. While future climate variations present ongoing challenges, the project's adaptability, proactive monitoring, and commitment to resilience will ensure its sustained reliability. By prioritizing safety and environmental considerations, this infrastructure stands as a testament to sustainable and future-ready development.

Chapter 9: Institutional Arrangement for Monitoring and Reporting

9.1 Introduction

AEGCL is both the Executing Agency (EA) and Implementation Agency (IA) for the project. **The Project Management Unit (PMU)** at HQ will be headed by Chief General Manager (PP&D) and act as Project Director for the Project under overall supervision of Managing Director; AEGCL, who will be assisted by corresponding personnel from various functions – Administration and Finance, Projects Planning and Design, Procurement and contracts, and Environment & Social Staff of PMU.

Project Implementation Units (PIUs) at field level, will be headed by the Deputy General Manager of respective T&T Circles and act as Project Authority. Whereas at divisional level, the project will be headed by Assistant General Manager (AGM) and act as Project Manager under the super supervision of the respective Project Authority (DGM).

The environment and social specialist of PMU looks into the environmental and social issues related to the transmission lines and sub-station establishments and its functionalities. For implementation of the AIIB funded project, the AEGCL will hire project management Consultant (PMC) for technical and managerial inputs.

Table 24: Institutional Arrangement for E&S compliance Monitoring

Assam Electricity Grid Corporation Limited*	
Project Management Unit (PMU)	1. Chief General Manager (PP&D) cum Project Director. 2. Chief General Manager (O&M) for LAR, CAR and UAR. 3. General Manager, (EAP) HQ 4. DGMs (EAP) HQ 5. AGMs (EAP) (4) 6. Environmental & Social Specialist (2+2) 7. Concerned DMs/AMs 8. Concerned JMs
Project implementation Umit (PIU)	1. General Manager for LAR, CAR and UAR T&T Zone. 2. Deputy General Manager cum Project Authority– T&T Circle 3. Assistant General Manager cum Project Manager (Divisional Officers) 4. Designated officers (DM/AM) to look after E&S Components.
Project Management Consultants (PMC)	1. Team Leader (1) 2. Environmental Expert (1) 3. Social Expert (1) 4. Health Safety Officer (1) 5. E&S Support staff (3+3)
Contractor**	1. Project Manager 2. Community Consultation Officer 3. Health and Safety Officer (HSE) 4. Environmental Officer

** The nominated officers for all levels are full time basis for the entire project duration.*

*** The staffing pattern will be complied with by the concerned EPC contractor upon completion of the contract signing with AEGCL which is unddr process.*

Roles and Responsibilities

I. Project Management Unit (PMU)

The Project Management Unit (PMU), led by the Project Director, will include two Environmental and two Social Safeguard Specialists responsible for overseeing all environmental and social (E&S) aspects of the project. Their key responsibilities include reviewing and finalizing the Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Plan (ESMP), Resettlement Plans (RPs), and Indigenous Peoples Plans (IPPs); monitoring E&S compliance during project execution; and preparing semi-

annual and annual E&S compliance reports for AIIB. The E&S staff will also coordinate with the Project Management Consultant (PMC), EPC contractors, and government agencies to ensure necessary clearances and proper integration of safeguard provisions in contract documents. They will provide guidance to PIUs and contractors, monitor implementation of mitigation measures, and conduct E&S compliance training for all relevant staff.

II. Project Implementation Unit (PIU)

At the PIU level, the Deputy General Manager will serve as the Project Authority, with the Assistant General Manager (AGM) at the divisional level acting as the Project Manager. Designated officers (DM/AM) will be responsible for managing environmental and social (E&S) components and ensuring compliance with AIIB policies. E&S Officers at the divisional level will implement E&S policy guidelines, coordinate with contractors, conduct environmental and social surveys to mitigate adverse impacts, liaise with local authorities for necessary approvals, and carry out site visits to prepare compliance reports.

III. Project Management Consultant (PMC)

The Project Management Consultant (PMC) will provide technical support to the PMU in managing environmental and social (E&S) safeguards. This includes preparing and implementing subproject-specific ESIAs, ESMPs, Resettlement Plans (RPs), and Indigenous Peoples Plans (IPPs), as well as conducting public consultations and community engagement. Environmental and Social Experts within the PMC will ensure compliance with AIIB policies, integrate climate change mitigation measures into project design, review contract documents for ESMP adherence, and prepare compliance reports. They will also deliver capacity-building and E&S training programs for PMU, PIU, and contractor personnel.

IV. EPC Contractor

The contractor is responsible for implementing the Environmental and Social Management Plan (ESMP) and meeting all related environmental and social requirements. This includes preparing and executing the Contractor's ESMP, conducting baseline environmental and social studies, obtaining necessary statutory clearances, organizing public consultations, addressing grievances, and ensuring workers' health and safety through regular training programs. The Contractor's Environmental and Social (E&S) Officer will oversee ESMP implementation, maintain environmental records, ensure regulatory compliance, conduct safety training, and regularly report on ESMP progress and compliance issues.

9.2 Monitoring of ESMP and ESMoP Compliance

To ensure strict adherence to environmental and social standards, the project must be implemented in full compliance with the Environmental and Social Management Planning Framework (ESMPF), the Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP), and all other Bank-approved instruments. Compliance must also align with the environmental and social obligations outlined in the project's Legal Agreements.

9.2.1 Key Monitoring requirements

The Project Management Unit (PMU) of AEGCL, supported by the Project Management Consultant (PMC), will oversee the environmental and social (E&S) compliance of contractors and site engineers. Their core responsibilities include:

- Ensuring full compliance with the ESMPF, ESIA-ESMP, and legal agreements.
- Conducting regular environmental monitoring of air quality, noise levels, soil, and water during all project phases—pre-construction, construction, and operation.
- Identifying non-compliance issues and implementing timely corrective actions.
- Documenting all monitoring activities and corresponding corrective measures.
- Submitting periodic environmental and social performance reports to the AIIB, with a minimum frequency of once per year.

9.2.2 Monitoring Activities by PMU and PMC

Monitoring efforts will be carried out through coordinated supervision and reporting. Activities include:

- Supervising implementation of E&S safeguard measures across project sites.
- Verifying the availability of all required environmental permits and clearances.
- Monitoring environmental parameters including water, air, noise, soil quality, traffic disruptions, and livelihood impacts.
- Enforcing occupational health and safety (OHS) standards to protect workers and local communities.
- Conducting stakeholder consultations, grievance redressal, and impact mitigation for affected persons.
- Ensuring restoration of livelihoods affected by the project to pre-project levels.
- Preparing regular progress and compliance reports for submission to the funding agency.
- Tracking overall safeguard implementation and outcomes.

Environmental quality assessments will be carried out at three stages—baseline (pre-construction), construction (quarterly), and post-construction—covering all active project locations.

9.2.3 Contractor Compliance Requirements

The contractor (L1) must obtain approval for their Contractor's Environmental and Social Management Plan (C-ESMP) from AIIB before initiating any civil works. Submissions must be reviewed by the PMC and the PMU E&S staff. Key compliance deliverables include:

- Traffic Management Plan: Minimizing disruptions and social impacts on local communities.
- Water Resource Protection Plan: Safeguarding drinking water sources from contamination.
- Wastewater Management Plan: Ensuring safe treatment and disposal, including installation of septic tanks.
- Environmental Monitoring Reports: Submission of pre-construction, construction, and post-construction lab test results (with calibration certificates, photos, and analysis), approved by PMC and AEGCL.
- Boundary Marking and Protection Strategy: Preventing offsite environmental and social impacts.
- Consent and Permit Strategy: Securing all regulatory approvals prior to activities such as quarrying or use of borrow pits.
- GBV/SEA Prevention Plan: Implementing measures to prevent, monitor, and respond to gender-based violence and sexual exploitation and abuse.

9.3 Reporting Line

The mitigation measures outlined in the ESIA/ESMP specific to construction shall be integrated into civil works contracts, and the contractors bear primary responsibility for their implementation. Additionally, contractors must regularly submit monthly Environmental & Social progress reports to the PMC/PMU detailing the execution of ESMP measures. The PMC and PMU – AEGCL is tasked with reporting biannually to AIIB E&S experts on the

progress achieved regarding ESMP activities and milestones. These progress reports will furnish comprehensive information, including descriptions of implementable activities and their status, identification of responsible parties overseeing implementation, and the provision of project management schedules, timeframes, and associated costs. The illustration of reporting line is provided in **Figure 16.**

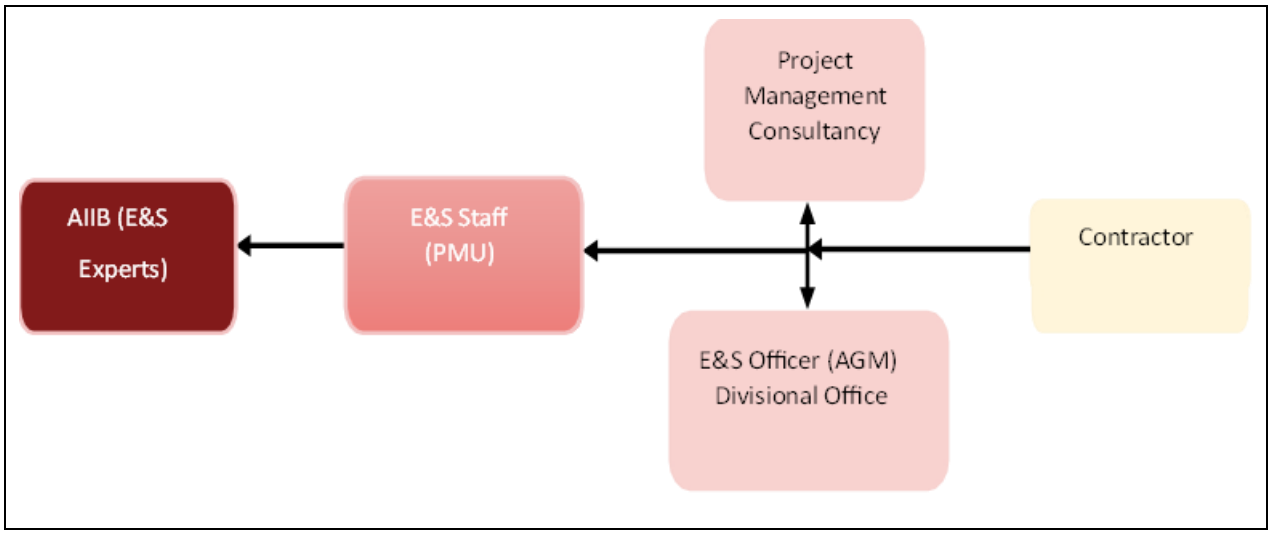


Figure 16 : Reporting line flow-chart

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

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 E&S 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.

9.4 Training Programme and Capacity Building

As per the approved Environmental and Social Management Plan Framework (ESMPF) for Phase-II of the AISTSEP, a series of training programs will be conducted to enhance the capacity of relevant stakeholders. These trainings will focus on the implementation of the Environmental and Social Management Plan (ESMP) and Contractor Environmental and Social Management Plan (CESMP), Health and Safety awareness, implementation of the Grievance Redress Mechanism (GRM), and Occupational Health and Safety (OHS).

The trainings will be provided to the Environment and Social (E&S) officials of EPC contractors and Project Implementation Unit (PIU) by the E&S experts from the Project Management Consultant (PMC) and the E&S specialists from the Project Management Unit (PMU). In addition, Environment and Social experts, Occupational Health and Safety experts may be hired as necessary to conduct specialized training sessions.

The detailed training schedule is provided below in **Table 25.**

Table 25: Details of Training Programmes

Sr. No.	Types of Training	Number of Training
1	Training on Implementation of ESMP for PIU: Once per year for 3 years and EPC contractors: Twice per year for 3 years	9
2	Health & Safety Awareness Camp: Pre-Construction- Once Construction- 2 times / year for 3 years Operation- Once	8
3	Training on Implementation of GRM and Gender Action Plan (Bi-annually for 3 years)	6
4	Training on Occupation Health and Safety (Quarterly for 3 years)	12

Chapter 10: Stakeholder & public consultation and information disclosure

The Asian Infrastructure Investment Bank (AIIB) emphasizes the importance of transparency and meaningful consultation in its Environmental and Social Framework (ESF). According to the ESF, AIIB requires its clients to engage with stakeholders throughout the project lifecycle, ensuring that consultations are inclusive, accessible, timely, and conducted in an open manner. This process involves providing adequate information that is understandable and readily accessible to stakeholders in a culturally appropriate manner, enabling their views to be considered in decision-making. The ESF also mandates the establishment of project-level grievance redress mechanisms to address concerns promptly and effectively.

In its Environmental and Social Standard 1 (ESS 1), AIIB outlines specific requirements for stakeholder engagement. Clients are obligated to disclose draft environmental and social assessment reports and related documentation early in the project preparation phase. This disclosure must occur in a timely, accessible, inclusive, and culturally appropriate manner, using language(s) understandable to the project-affected people and other relevant stakeholders. The objective is to provide these stakeholders with an opportunity to identify and address the project's environmental and social risks and impacts, including those involving involuntary resettlement, Indigenous Peoples, and community health and safety aspects, so they can provide meaningful inputs into the design and implementation of the project. ESS 2: Involuntary Resettlement emphasizes the importance of engaging affected people to ensure fair compensation and livelihood restoration in case of land acquisition or displacement. ESS 3: Indigenous Peoples requires culturally appropriate consultation and the Free, Prior, and Informed Consent (FPIC) of Indigenous communities when their rights, lands, or resources are impacted.

In line with the AIIB's Environmental and Social Standards, meaningful stakeholder engagement has been conducted throughout project preparation to ensure concerns and suggestions from communities, and other stakeholders are considered. Following section provides an understanding of the key stakeholder groups identified for the project and their key concerns from the project development.

10.1 Stakeholder Identification

A stakeholder is defined as "an individual, group, or organization, who may affect, be affected by, or perceive itself to be affected by a decision, activity, or outcome of a project." "Stakeholder Analysis" is the process of sorting identified stakeholder groups according to their impact on the project and the impact the project will have on them. This information is then used to assess the manner in which the interests of the stakeholders or the project's impact on them should be addressed in the project development plan or its operation. The identification of stakeholders and their inclusion in the decision-making process is thus essential in the process of prioritizing, analyzing and addressing issues; and in creating management systems and strategies to address the concerns/ expectations of various stakeholders.

10.2 Stakeholder Mapping and Analysis

Stakeholder mapping and analysis are critical processes in project planning and implementation, especially for infrastructure projects like the construction of the proposed 220/132KV Rowta substation. It involves systematically identifying all individuals, groups, or organizations that may be affected by or have an influence on the project. Key stakeholders typically include local residents, government agencies, local governing bodies, SHGs, utility service providers, women, and vulnerable groups. Once identified, stakeholders are analyzed based on their level of interest in the project and their potential to influence its outcomes.

The **Table 26** has been used to classify the identified stakeholders (directly or indirectly impacting the Project or being impacted by the project) in accordance to their levels of influence on the Project and the influence of the project on them. The influence and priority have both been primarily rated as:

High Influence: This implies a high degree of influence of the stakeholder/project on the project/stakeholders in terms of participation and decision making or high priority to engage with the stakeholder;
Medium Influence: Which implies a moderate level of influence and participation of the stakeholder/project in the project/stakeholder as well as a priority level to engage the stakeholder which is neither highly critical nor are insignificant in terms of influence.
Low Influence: This implies a low degree of influence of the stakeholder/project on the project/stakeholder in terms of participation and decision making or low priority to engage that stakeholder.

The intermediary categories of low to medium or medium to high primarily imply that their influence and important could vary in that particular range subject to context specific conditions or also based on the responses of the project towards the community.

Keeping this wide scope of inclusion in stakeholder category and the long life of project, it is difficult to identify all potential stakeholders and gauge their level of influence over project at the outset of the project. Therefore, project proponent is advised to consider this stakeholder mapping as a live document which should be revised in a timely manner so as to make it comprehensive for any given period of time.

Table 26 : Stakeholder Consultation Mapping

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
(i) Project-Affected Parties	People living adjacent to substation sites	Potential exposure to construction disturbances (noise, dust, traffic); safety and access concerns.	Public consultations were held with the local community near the proposed 220/132 kV GIS substation site at Rowta on 24th January 2025 and 8th July 2025. These meetings covered several key aspects of the project, including the scope of construction activities, use of land for substation development, potential local employment opportunities, and the respective responsibilities of AEGCL and the EPC contractor. Awareness was raised on the Grievance Redressal Mechanism (GRM) and Gender-Based Violence (GBV) risk mitigation, with a focus on preventive measures, community vigilance, and accessible reporting mechanisms. Discussions also addressed the need to minimize disruptions to nearby educational institutions, ensure safe vehicular movement, and implement effective dust and noise control measures during construction. During the consultation, the E&S and PIU officials of AEGCL also informed the local community about the presence of a Shiv Mandir and a sacred tree located within the AEGCL-owned substation premises, both of which are situated in the area designated for construction activities. It was explained that the Shiv Mandir will be respectfully relocated within the substation boundary, while the sacred tree will need to be removed to facilitate the infrastructure development. The community raised no objections, provided that proper religious rituals and customary practices are observed during both the relocation and removal processes. The project team reaffirmed its commitment to honoring local cultural and religious traditions, which was positively acknowledged by the community members. Furthermore, community members confirmed that the proposed substation land, which is entirely owned by AEGCL and within a secured boundary, is free from any current or past encroachment. This was further validated through	Influence of Stakeholder: Low Influence of Project: Medium/High

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
			physical site verification conducted by project officials. Overall, the local community expressed strong support for the project, appreciating its potential benefits and offering constructive suggestions to enhance safety and promote livelihood opportunities during the implementation phase. Photographs and attendance sheet are appended in **Appendix – 12**	
	Local livestock owner (impact on grazing land -if any)	Impact on grazing land (if any)	During the site visits conducted on 8th July 2025 at Rowta, discussions were held with local livestock owners residing near the proposed substation site. The livestock owners shared that they occasionally accessed the abandoned portion of the substation premises for grazing, but only after obtaining permission from the security personnel. They also confirmed that there is ample alternative grazing land available in the surrounding area, and they do not anticipate any difficulties if the substation premises are fully secured and access is restricted. However, they emphasized the importance of regulated vehicular movement during construction to avoid any accidental harm to livestock that may roam nearby.	Influence of Stakeholder: Low Influence of Project: Low
	AEGCL staff staying in the quarters to be demolish	May required to relocate temporarily due to the demolition of the existing staff quarter	Consultations were conducted on 08/07/2025 with four AEGCL staff members (security personnel) currently residing in the staff quarters earmarked for demolition to facilitate the proposed substation construction. The staff confirmed that their stay is temporary and that they are residing without their families due to the poor condition of the quarters. They are fully aware of the planned demolition and raised no objections to vacating the premises. During the construction period, they plan to arrange rental accommodation in the nearby area. Upon completion of the project, they expect to be relocated to newly constructed staff quarters within the substation premises and the same has been confirmed during consultation with PIU Officials.	Influence of Stakeholder: Low Influence of Project: Medium

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
			Photographs of consultation with AEGCL staffs residing in staff quarters is appended in **Appendix 13** and photgraphs and attendance sheet of consultation with PIU Officials are provided in **Appendix – 20.**	
	Indigenous Peoples (in Schedule VI area)	Cultural and land-use considerations; protection of customary rights.	Consultations were held on 24th January 2025 and 8th July 2025 with Indigenous Peoples residing near the proposed substation site at Rowta, which falls under a Schedule VI district. The discussions focused on potential impacts of the construction, including the likely engagement of some skilled workers from outside the area. It was assured that all necessary measures would be taken to respect local customs and cultural practices during project implementation. Land use for the substation was also discussed, and since the 220/132 kV GIS substation will be constructed entirely within land already owned by AEGCL, the Indigenous Peoples consulted expressed that they do not anticipate any adverse impacts or risks to their community from the project. Photographs and the attendance sheet are appended in **Appendix – 12.**	Influence of Stakeholder: Low Influence of Project: Low
	Local institution (near access roads and within the 500 meter of the construction site)	May face disruption due to transport of materials and workforce movement during construction activity.	On 8th July 2025, stakeholder consultations were held at the Irrigation Office of Mazbat Subdivision and Bhelapara Lower Primary (L.P.) School, both situated near the proposed 220/132 kV GIS substation site at Rowta. As the school was closed for summer vacation, discussions were conducted with the Head Teacher and the village head (Gaon Bura). The meetings were attended by representatives from the PMU's Environment and Social (E&S) team, PIU officials, and personnel from the respective institutions. The project team presented an overview of the substation project, covering its purpose, the implementing agency (AEGCL), funding source, and the expected implementation timeline. Stakeholders at both locations raised key concerns regarding the need for regulated vehicular movement during construction, including strict speed limits and adjusted work	Influence of Stakeholder: Low Influence of Project: Medium

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
			schedules to avoid disruption during school and office hours. At the Irrigation Office, participants stressed the importance of noise control, dust suppression, clear signage, and worker sensitization to ensure public safety and minimize disturbance. Similarly, at Bhelapara L.P. School, which accommodates 37 children aged 3 to 10 years and operates from 7:30 AM to 11:30 AM, the need for enhanced safety measures to protect students during construction was strongly emphasized. All feedback from these consultations has been duly recorded and will be carefully integrated into the project's planning and implementation to minimize social and environmental impacts. Photographs and the attendance sheet are appended in **Appendix – 14.**	
	Government of Assam (Revenue & Land Department)	Land identification and allocation for substations.	Discussions regarding the proposed substation site at Rowta were held with the PIU, AEGCL on 24th January 2025 and 8th July 2025, and with representatives from the Government of Assam (Revenue & Land Department) at the Udalguri Revenue Circle on 8th July 2025. On the same day, the Environment and Social (E&S) officials of the PMU, along with a PIU representative of AEGCL, also conducted a consultation with the village head, Shri Joysankar Deka, and members of the nearby community. It was confirmed that the 3.89 hectare of land owned by AEGCL, located within a secure boundary, designated for the construction of the proposed substation at Rowta, is free from any past or present encroachment. This confirmation was further supported through a physical site verification carried out during the visit. Photographs and the attendance sheet are appended in **Appendix – 15**	Influence of Stakeholder: Medium/High Influence of Project: Low
(ii) Interested Parties/ Influence by the project	Divisional Forest Officer, Dhansiri Forest Division	Regarding tree felling for site clearance	The AEGCL PIU visited the Divisional Forest Officer, Dhansiri Forest Division, on 20th May 2025 to initiate the process for obtaining tree felling permission (communication appended in **Appendix – 16**). A joint site verification and tree marking was subsequently carried out on 5th June 2025. The assessment identified 151 trees from 33 species within the	Influence of Stakeholder: Medium/High Influence of Project: Low

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
			project footprint. Of these, 97 trees from 14 species fall under Schedule-I and Schedule-II of the Assam Trees Outside Forest (Sustainable Management) Rules, 2022, and do not require prior felling permission. The remaining trees will be addressed as per applicable regulations in coordination with the Forest Department.	
	Local law enforcement agencies (Municipality)	Ensuring site security, traffic management and construction demolition dumping area etc. during construction.	A consultation was held with the Municipal Board of Udalguri on 08/07/2025, during which the matter of construction-related waste disposal was raised with the Executive Officer of the Municipal Board. The officer suggested that efforts should first be made to identify a suitable local landfill site in coordination with the Village Head and local community. However, in the event that no appropriate local disposal site is available, the Municipal Board agreed to permit the use of their existing landfill site, located approximately 10.1 km from the proposed substation site. Photographs and the attendance sheet are appended in **Appendix – 17.**	Influence of Stakeholder: Medium/High Influence of Project: Low
	Local SHGs/community organizations	May support or monitor environmental and social performance; act as community liaisons.	On 8th July 2025, a stakeholder consultation was held at Rowta with members of the Naba Jyoti Self Help Group (SHG), a local women's organization. The participants expressed strong support for the proposed 220/132 kV GIS substation project and showed enthusiastic interest in potential unskilled employment opportunities and small business ventures that could emerge during the construction phase. The consultation also served to raise awareness about key social safeguards integrated into the project, including Gender-Based Violence (GBV) risk prevention, the Grievance Redressal Mechanism (GRM), and the Gender Action Plan (GAP), which promotes active participation of women in project-related activities and skills training. The group appreciated these initiatives and expressed their full support for effective GAP implementation, highlighting the importance of ongoing engagement to ensure women benefit equitably from the project.	Influence of Stakeholder: Low Influence of Project: Medium/High

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
			Photographs and the attendance sheet are appended in **Appendix – 18.**	
	Economically weaker people near project areas	May lack capacity to voice concerns; sensitive to price changes or livelihood disruptions.	Consultations were held with economically weaker sections of the local community near the proposed substation site at Rowta on 24th January 2025 and 8th July 2025, in the presence of project officials. During these discussions, community members expressed keen interest in livelihood opportunities associated with the project's construction phase. Several individuals indicated their willingness to engage in unskilled labor, while others shared plans to set up small food and snack stalls to serve workers during both the construction and operational phases of the substation. Their feedback was acknowledged and duly noted for consideration during the implementation stages of the project. Photographs and attendance sheets are appended in **Appendix – 18** and **Appendix – 12.**	Influence of Stakeholder: Low Influence of Project: Medium
(iii) Vulnerable Groups	Women Groups (**Mohila Samiti)**	May face disproportionate impacts from construction or social changes.	On 8th July 2025, a stakeholder consultation was held at Rowta with members of the Rowta Aancholik Mohila Samiti, a local women's group. The participants expressed strong support for the proposed 220/132kV GIS subproject and showed keen interest in accessing unskilled employment and pursuing small business opportunities during the construction phase. The session also aimed to raise awareness about key project components, including Gender-Based Violence (GBV) risk mitigation, the Grievance Redressal Mechanism (GRM), and the Gender Action Plan (GAP), which seeks to enhance women's participation in project activities and capacity-building programs. The women's group appreciated these initiatives and assured their support for the successful implementation of GAP, emphasizing the need for continued engagement to ensure inclusive benefits. The importance of respecting local customs and cultural practices was also discussed and positively acknowledged. Overall, the group welcomed the project's	Influence of Stakeholder: Low Influence of Project: Medium

Category	Stakeholder	Influence of the project on Stakeholder / Influence of the Stakeholder on project	Concerns and expectations from the Project	Influence Rating
			inclusive and participatory approach to community engagement. *Photographs and attendance sheet are appended in **Appendix –18.***	
	Scheduled Tribe and Indigenous communities (Serfanguri)	Culturally sensitive group with protected land and governance rights; requires FPIC consultations.	A consultation was held on 8th July 2025 with Indigenous Peoples residing near the proposed substation site at Rowta, which falls under a Schedule VI area. The discussion focused on the potential impacts of substation construction, including the possible engagement of skilled workers from outside the locality. During the consultation, land use for the proposed 220/132 kV GIS substaion which will be developed entirely within AEGCL-owned land, was also discussed. The Indigenous Peoples present did not foresee any adverse impacts or risks to their community from the project. Specific discussions were also held regarding the relocation of a Shiv Mandir situated within the existing substation boundary and the cutting of a sacred tree to facilitate construction. The community raised no objections, acknowledging that both features are located within AEGCL's premises. However, they recommended that proper rituals be performed prior to any such activity, in accordance with local traditions. These suggestions were acknowledged and will be incorporated into the project's implementation plan to ensure cultural sensitivity and community support. *Photographs and attendance sheet are appended in **Appendix – 12.***	Influence of Stakeholder: Low Influence of Project: Low

10.3 Public Consultation

Public consultation sessions were held on 24th January 2025 and 8th July 2025 near the proposed substation site, with 44 participants including local residents, women's groups, economically disadvantaged and vulnerable individuals. The community expressed strong support for the 220/132 kV GIS substation project, with interest in unskilled jobs and small business opportunities during construction. Awareness was raised on key issues such as GBV risk mitigation, the GRM, and the Gender Action Plan (GAP), which was well received by participants. The importance of respecting local customs was also acknowledged. Overall, the community appreciated the inclusive approach. The consultation questionnaire format is provided in **Appendix – 19** and A summary of community feedback based on the structured questionnaire is provided in **Table 27.**

The consultation provided a platform for community members to voluntarily express their views on the proposed project. Participants shared their feedback openly, discussing potential impacts and offering suggestions for mitigating any adverse effects.

The community expressed strong support for the substation development and welcomed the proposed activities. No significant Social and Environmental concerns were raised during the discussions. Local residents showed keen interest in the project's timely implementation, anticipating improved electricity supply and potential employment opportunities. A summary of the consultation is provided in **Table 27.**

The photographs of stakeholders and public consultation with attendance sheets are provided in **Appendix 12**.

Table 27 : Summary of Public Consultation

Issues Discussed	People's views and perceptions
General Perception	Majority communities were not aware of the proposed set up of substation and associated activities before and came to know about during the consultation. Some others have heard it but not sure about the details of the project components. Almost all the people were positive and supportive towards the construction of proposed substations and associated activities.
Support of local people for the construction of proposed substations and associated activities	Most of the communities expressed their support during implementation of the construction of proposed substation, as it has been perceived to be great potential for the people of the area. They are happy for contribution of Government of India's effort towards better electrification and understand that the proposed substation is ingredient part for the same. They are hopeful to address their electricity problem such as low voltage and irregular power supply would resolve. Most of the communities expressed that there should be no adverse impact due to the project on their safety.
Critical issue and concern by the local people for the substation locations	Most of the communities expressed no critical issues regarding the establishment of the proposed substation.
Project site selection criteria	As the proposed 220/132 kV Rowta substation is located within the premises of the existing 132/33 kV substation, the community did not raise any social or environmental concerns during the consultation process. Some of them suggested that necessary precautions must be taken to ensure safety of people during construction of sub-stations.
Employment potential in the construction of substations	Across the communities, majority felt that, during construction/operation of substations 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. They hoped that instead of hiring people from outside the local people should be given employment. Some others felt that the project will ensure improved and regular power and 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 were 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 were hand pump. The other sources of drinking water were water supply through PHE department and very few numbers of ring well and bore well. Some of the households reported that they experience little scarcity of water during the summer season. In other times, availability of water was good as the water table remained high. However, in few villages people complained about the taste of the drinking water due to high iron content in the water.

Issues Discussed	People's views and perceptions
Negative impact on food grain, availability /land use	As the proposed 220/132 kV Rowta substation is situated within the boundary of the existing 132/33 kV substation, there will be no negative impact on community land use or food grain production.
Will project cause widespread imbalance by cutting fruit and commercial trees in the locality	Approx. 206 trees, including both timber and fruit-bearing varieties, will need to be felled for the construction of the proposed 220/132kV Rowta substation inside the boundary of the existing 132/33 kV substation. These trees are proposed to be felled to allow for site clearance and the commencement of construction activities. No cutting of trees outside the subproject boundary is anticipated.
Will project cause health and safety issues	Most of the communities did not foresee any health or safety issues from the construction of substation. Some of them suggested that necessary precautions must be taken to ensure safety of people during construction of sub- station.
Protected areas	Based on the feedback gathered from the community and the observations made during the visit, it was confirmed that the subproject site is neither located within nor adjacent to any designated Protected Areas (PAs), Eco-sensitive Zones (ESZs), or Critical Habitats.
Will project setting change migration pattern of animals	None of the communities consulted were conscious of the presence of any migrant birds or animals in their localities and nearby proposed substations. They therefore did not foresee any impacts on animals, birds or their habitats from the construction of the proposed substations.
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 Bangalore for security guard and helper jobs; and Gujarat, Maharashtra, Hyderabad etc. for factory jobs. There are few cases of migration to capital cities of north eastern states in search of work.
Perceived benefits from project	Across the community's majority of them viewed that the proposed substation would contribute to minimize the prevailing energy crisis such as load shedding, and low voltage in the region. For some it will improve the rural electrification and provide impetus to open small and medium business units in the area. At community level, the people hoped that project will address the problems of low voltage, and irregular power supply to the households.
Perceived loss	No loss of Land or crop is anticipated for the construction of the proposed substation.

10.4 Continuous Consultation and Participation

Project Management Consultant (PMC), will ensure meaningful and ongoing consultation in line with AIIB requirements. Monthly consultations will be conducted by the PIU, PMC, and the EPC Contractor with local communities near the substation to engage affected persons and other relevant stakeholders, including civil society, and to promote their informed participation.

The consultation process will:

a. Begin at the subproject preparation stage and continue throughout the entire project cycle.
b. Ensure timely disclosure of relevant information in a manner that is accessible, understandable, and inclusive—particularly for women, vulnerable, and disadvantaged groups.
c. Be carried out in a non-coercive and open environment, encouraging free and honest feedback.
d. Be gender-inclusive and responsive, and tailored to meet the specific needs of marginalized groups.
e. Allow for the incorporation of community input into decision-making processes, including project design, mitigation measures, benefit-sharing, and implementation.

The extent and frequency of consultations will be proportional to the project's impact on local communities. All consultations and their outcomes will be documented and reported in the Environmental and Social Monitoring Reports.

Feedback from Project Affected Persons (PAPs) will be collected regularly during consultations. In case of grievances, PAPs may approach the Grievance Redress Committee (GRC) for resolution.

10.5 Public Consultation Information Disclosure

Information disclosure is a fundamental component of the stakeholder engagement process for AIIB-financed projects. It ensures that affected people, interested parties, and the broader public have timely, transparent, and inclusive access to project-related information in accordance with the AIIB Environmental and Social Framework (ESF, 2024) and applicable national laws, including the Right to Information (RTI) Act, 2005). The ESF highlights the importance of early and continuous disclosure to allow stakeholders to understand the potential environmental and social risks and impacts of a project and to contribute meaningfully to decision-making processes. By making relevant documentation—such as Environmental and Social Impact Assessments (ESIAs), Environmental and Social Management Plans (ESMPs), monitoring reports, and updates—readily accessible and understandable, aiming to foster transparency, promote accountability, and build public trust. Disclosure will be conducted in a culturally appropriate manner, using local languages and formats suitable for affected communities, and will also support compliance monitoring and stakeholder feedback mechanisms throughout the project lifecycle.

The final Environmental and Social Impact Assessment (ESIA) and Environmental and Social Management Plan (ESMP) and the semi-annual Environmental and Social Monitoring Reports will be disclosed on the AIIB and AEGCL websites.

Their hardcopies of ESIA-ESMP with executive summary in Assamese language and the semi-annual Environmental and Social Monitoring Reports will be available at the following locations-

i) Project Director cum CGM(PP&D),
Address: 1st Floor, AEGCL, Bijulee Bhawan,
Contact No.: 0361-2739520
Website: www.aegcl.co.in

ii) Project Manager cum AGM, Depota
Address: - 132 kV Depota GSS, AEGCL
Email: agm.depota@aegcl.co.in

The PMC, concern EPC contractor and PIU, officials of AEGCL will ensure that relevant environmental and social information from these documents is made available to affected communities and stakeholders in a timely, accessible, inclusive, and culturally appropriate manner, including translation into local language(s), particularly Assamese.

10.5.1 Tools and Methods for Information Disclosure

AEGCL, with support from PMC and other stakeholders, will use a combination of printed materials and community engagement sessions to share information, ensuring transparency and accessibility:

- Brochures: Containing information on the project, land requirements, compensation entitlements, and assistance packages. To be made available at local offices.
- Posters: Displayed at prominent public places in the project area.
- Leaflets: Distributed within the project impact zone.

- Executive Summary of ESIA/ESMP: Translated into Assamese and made available in, project offices, and on AEGCL's website.

In addition, community consultation meetings will be organized regularly to update communities and other stakeholders on projects environmental and social aspects.

10.5.2 Contribution to Monitoring and Accountability

Transparent disclosure will enhance project governance, accountability, and public trust, and strengthen monitoring indicators. This will support AIIB in assessing compliance with its environmental and social requirements and evaluating project outcomes.

Chapter 11: Grievance Redress Mechanism

The Assam Intra-State Transmission System Enhancement Project (Phase II) aims to strengthen and modernize Assam's electricity transmission infrastructure. Funded by the Asian Infrastructure Investment Bank (AIIB), the project complies with AIIB's Environmental and Social Framework (ESF) and its Policy on the Project-Affected People's Mechanism.

As part of this commitment, an Environmental and Social Management and Planning Framework (ESMPF) has been developed and is publicly available on the Assam Electricity Grid Corporation Limited (AEGCL) website. The ESMPF ensures that the project is implemented in an environmentally and socially responsible manner, prioritizing the concerns of affected communities and stakeholders. To facilitate this, a multi-tiered Grievance Redress Mechanism (GRM) will be established for all subproject components.

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 avoids 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 may not be possible to inform the complainant of the outcome. In this case, the grievance and the proposed resolution will be publicized on site.

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 project 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 log 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 from Tier I (field level)/ to Tier II (PMU level) 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.

11.1 Constitution of Grievance Redressal Committee

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).

As per the Environmental and Social Management and Planning Framework (ESMPF) guidelines, a multi-tiered Grievance Redress Mechanism (GRM) will be established for all subproject components to ensure transparency and accountability. 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.

This structure ensures efficient grievance resolution and supports the smooth implementation of the project.

Following the ESMPF guidelines, **Tier I** and **Tier II** Grievance Redress Committees (GRC) have been established for the **Rowta Substation construction site** to ensure effective grievance resolution, transparency, and accountability. The composition of the Tier I and Tier II GRCs is provided below in **Table 28** and **Table 29** respectively.

Table 28 : Composition of the Tier I GRCs

Sl. No.	Officials nominated		Designation in the Committee
1	Deputy General Manager, Tezpur T&T Circle.	Shri Lohit Krishna Borah	Chairman
2	Sub-District Magistrate/District Revenue Officer	Shri Deepak Bhuyan, ACS, ADC, i/c SDO(C), Bhergaon	Deputy Chairman
3	Assitant General Manager, 132 kV Depota GSS, AEGCL	Sri Bipul Kachari	Member
4	Representative from the autonomous council districts in case of tribal districts	Shri Diganta Baruah, EM, BTR, Kokrajhar	Member
5	Representative of Local Panchayat / Council	Shri Daobaisa Boro, EM, BTR, Kokrajhar	Member
6	Woman Representative of village / Council	Mrs. Arpana Medhi, MCLA, BTR, Kokrajhar (Nominated)	Member
7	Community based organization/ Non-Govt. Organization Representative	Shri Sunil Basumatary	Member

Table 29 : Composition of the Tier II GRCs

1.	Chief General Manager/Project Director	Chairman
2.	General Manager (EAP) HQ	Deputy-Chairman
3.	Stake Holder (from State Govt.)	Member
4.	Deputy General Manager (PMU -AEGCL)	Member
5.	Assitan General Manager (EAP, PMU – AEGCL)	Member
6.	Environmental and Social Specialist–PMU	Member
7.	Team Leader, PMC	Member
8.	E&S Experts, PMC	Member
9.	Representative of EPC contractor (Project Manager- level)	Member

Roles and Responsibilities of Grievance Redressal Committee:

- 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.

11.2 Grievance Redressal Procedures

E&S officers of PMU and PMC shall undertake GRM's initiatives that include procedures of communicating the existence of the GRM, taking/recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders, escalating unresolved issues while paying particular attention to the impacts on vulnerable groups. **Error! Reference source not found. 17** elaborates the procedures.

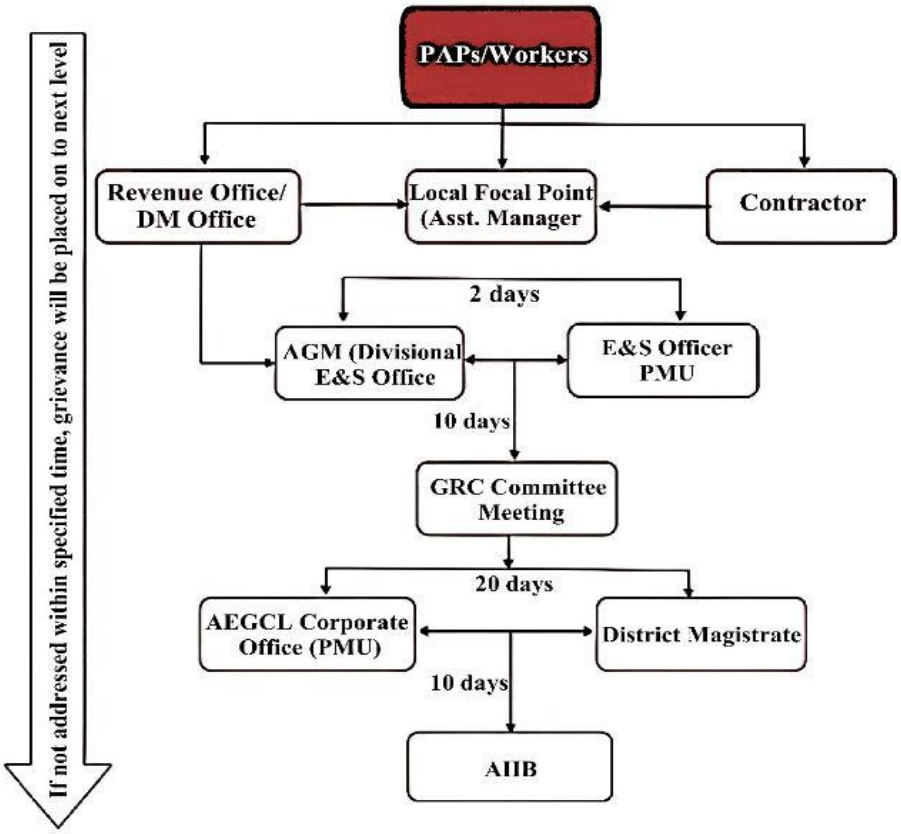


Figure 17 : Grievance Redressal Procedures

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

Note:

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

Complaints 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 GRC (Tier-1) in person or via the phone/WhatsApp. (Dedicated phone number will be assigned)
2. The GRC (Tier 1) member receives the grievances and records the details in the GRM logbook.
3. The GRC (Tier-1) acknowledges the receipt of the grievance and provides a dated proof (official slip, text or WhatsApp message).
4. The GRC (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 GRC (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 GRC (Tier-1) is unable to find a solution, or if the grieved party does not accept the proposition, the GRC (Tier-1) 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.
11. 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.

Table 30 : Most Common Grievances and possible Redressal

Common Grievance Categories	Issues and Likely Solutions
Technical/ Engineering	➢ Design related – Suit the design to the site. Restrict the width according to the available land and modify the design accordingly ➢ 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	➢ 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 barrow pits as per specifications. ➢ Waste Disposal – Dispose of waste at designated places only.
Social	➢ 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/Pandemic issues – Follow the government SoP for these. Conduct awareness campaigns among the communities and workers. ➢ Child labour – Avoid child labour. No children below 14 years on work. No children below 18 years on hazardous work. ➢ Rape / sexual 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	➢ 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	➢ Accidents – Report immediately to PIU/ PMU.

Common Grievance Categories	Issues and Likely Solutions
	➢ 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. ➢ 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	➢ Protective gear – The workers must wear protective gear at all times during the work. The communities must ➢ HIV/AIDS/other Pandemic services – The workers and communities must be educated about these. They should follow the SoP.
Governance	➢ 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.

11.3 Recording, Monitoring, Reporting and Evaluation

The GRM system shall keep a grievance register log. Each grievance will be recorded in the register (**Refer Appendix 21**) with the following information at the minimum:

- Type of grievance;
- Description of grievance;
- Gender-disaggregate data of complainant/grievance;
- Date of receipt acknowledgement returned to the complainant,
- Description of actions taken (investigation, corrective measures), and
- Date of resolution and closure / provision of feedback to the complainant OR Date of escalation to Tier II then;
- Description of actions taken (investigation, corrective measures) by Tier II;
- Date of resolution and closure / provision of feedback to the complainant by Tier II.

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

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

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

DOs and DON'Ts for GRC Members

DOs	DON'Ts
➢ **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.	➢ Intimidate, threat, or harass complaints. ➢ 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.

11.4 The Project-affected People's Mechanism

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***

Chapter 12: Gender Action Plan (GAP)

12.1 Purpose of the GAP

The Gender Action Plan (GAP) for the 220/132 kV (2X160 MVA) GIS at Rowta substation project is designed to ensure that both women and men benefit equitably from the project's interventions. It outlines targeted strategies to reduce gender disparities in access to resources, employment, training, and decision-making opportunities. The project area, located in the Sixth Schedule district of Udalguri, includes Indigenous communities (IP) where women often face significant barriers such as lower literacy rates compared to men, limited participation in formal employment, mobility constraints, and unequal access to energy services and land ownership, as reflected in the 2011 Census data.

Despite these challenges, the project provides a valuable opportunity to promote women's participation in local planning processes, employment in civil works, and capacity building for technical roles. The GAP emphasizes the importance of integrating gender-sensitive actions across all project components—from public consultations to labour engagement and skill development—to ensure that women's voices are heard and their livelihoods are protected or enhanced.

The primary objective of the GAP is to foster inclusive and equitable participation of women throughout the project lifecycle. It seeks to actively involve women in project planning, consultations, and implementation, especially in sectors traditionally dominated by men, such as infrastructure development. The plan promotes women's access to employment opportunities and vocational training arising from the project, contributing to their economic empowerment and social inclusion.

Furthermore, the GAP aims to enhance women's roles in decision-making and leadership within local institutions and community-based platforms. It also prioritizes minimizing any adverse social or economic impacts on women, particularly in cases of livelihood loss or disruption of local services. To strengthen accountability and responsiveness, the plan includes provisions for women's active involvement in the Grievance Redress Mechanism (GRM) by establishing safe, accessible, and dedicated channels for feedback, encouraging women's representation, and ensuring their concerns are effectively addressed.

Overall, the GAP contributes to a gender-responsive and socially sustainable approach to substation development, helping to close existing gender gaps and enhance the long-term social acceptability of the project.

12.2 Gender Analysis

Assam's gender-wise employment and earnings data reveal persistent disparities in economic participation and income between men and women. As per the Census of India 2011, the Worker Participation Rate (WPR) for males in Assam was 53.59%, while for females, it was only 22.46%, with women accounting for just 28.6% of the total workforce. This disparity is further reflected in the classification of work: while 7.03 million men were engaged as main workers, only 1.65 million women had similar full-time employment. In contrast, a substantial 1.78 million women were recorded as marginal workers, suggesting high dependency on seasonal, part-time, or informal jobs without social security.

In Rowta Block, located in Udalguri district under the Bodoland Territorial Region (BTR), gender disparities follow similar trends. The overall literacy rate in Rowta is 68.81%, but female literacy lags at 61.73%, compared to 75.57% for males—indicating a gender literacy gap of 13.84 percentage points (District Census Handbook, Udalguri). Women, particularly from Scheduled Tribe (ST) communities like the Bodos, and Adivasi groups, face structural limitations in accessing formal employment and project-related economic opportunities.

Women's participation in the formal workforce in Rowta Block remains limited, with most engaged in subsistence agriculture, livestock rearing, or unpaid family labor. Land ownership among women is rare, particularly in tribal communities where customary male-dominated structures prevail. Despite the presence of Panchayats, SHGs, and NGOs, gender-inclusive planning is weak, with women's participation often tokenistic. Representation in local governance or project committees is minimal, and skill development programs rarely

reach rural women. Moreover, while energy access is improving, it remains unequal, limiting women's ability to engage in microenterprises, digital education, or value-added production.

Given these barriers, the Rowta 220/132 kV GIS substation project must embed gender-sensitive strategies to ensure that IP women and other vulnerable groups can participate meaningfully and benefit equitably from the project.

12.3 Measures to Address Gender Issues and Action Plan

The Gender Action Plan (GAP) will be implemented throughout all phases of the project to ensure that women in the project area benefit meaningfully and equitably. The GAP emphasizes the importance of engaging women in a free, prior, and informed manner across all activities, from planning and consultation to implementation and monitoring. Specific actions will be undertaken to facilitate women's active participation in the project and to ensure they receive fair access to employment, resources, and decision-making opportunities. These measures also aim to mitigate any potential adverse social and economic impacts, particularly those affecting women due to construction activities, or safety concerns.

To monitor the effectiveness of gender inclusion, several key indicators will be tracked regularly. These include the number of women employed as a percentage of the total workforce involved in construction activities, and the number of women receiving equal wages as their male counterparts for performing similar work. The project will also ensure the provision of basic amenities at construction sites, including safe and separate toilet facilities for women workers. Additionally, an “Internal Complaints Committee” will be established in line with legal provisions to address and register cases of sexual harassment, ensuring a safe and supportive work environment for women. These combined actions will help ensure that gender equity is embedded in project processes and outcomes, while fostering a more inclusive and accountable implementation framework.

Table 31 : Gender Issues and action plan

Issues	Measures	Applicability	Responsible Agency	Monitoring Indicators
A. Women Working in Energy Sector and Construction Site				
Women workforce	Encourage contractors to prioritize the use of local resources and the employment of local workers and to maximize use of women (at least 30%) in labour-based work (wherever feasible)	Construction phase	EPC / PMC/ PIU/ PMU	Minimum 30% of the workforce are women at the construction site
Equal wage	Ensure equal pay for equal work for women and men for all construction and maintenance work. Also, to be included in contractors’ agreement	Construction phase	EPC Contractors/ PMC/ PIU/ PMU	All workers (both women and men doing same work) receive same wage and reflected in payroll.
Employment announcement	Announce employment opportunities and recruitment notices widely, targeted at women as well as men.	Pre-construction phase	EPC contractor	Notice of employment opportunity published in local newspapers/ cable channels/ village panchayet office or Municipality ward offices/ outside the construction site, etc.
Employment Opportunities	Technical training can be provided to the local workforce, especially women for inclusion in operation and maintenance phase.	Operational phase	PIU/PMU	Can target minimum 25 % women

Issues	Measures	Applicability	Responsible Agency	Monitoring Indicators
Availability of basic facilities	Ensure basic facilities (separate toilets, clean water, drinking water facilities, resting place, crèche) are provided for female workers at the construction site.	Construction and Operational phase	To be implemented by the contractors and to be ensured by PMC, PIU and PMU	All facilities available at the construction site and used by the women workers
B. Women Residing in Adjacent Settlements of Project Area				
Livelihood	Preference may be given to women from project affected families to work as unskilled workers (wherever feasible) during the construction phase and they receive equal wage for the work	Construction phase	Contractor and AEGCL	Minimum 30% of the workforce is women
Safety and Security concerns	Establish Internal Complaints Committee for women workers at site as per prevailing law, Code of conduct will be enforced and awareness on GBV.	Construction phase	Contractor	Number of safety and security related complaints registered with GRC.

12.4 Implementation Arrangements

The implementation of the Gender Action Plan (GAP) will be coordinated through a well-defined institutional framework involving key stakeholders at multiple levels. The Project Management Unit (PMU) of AEGCL will hold overall responsibility for GAP execution, with support from the Project Management Consultant (PMC) and EPC contractor. Specific institutional roles will include the designation of Environmental and Social (E&S) officers within both the PMU and PMC to oversee gender-related activities and ensure compliance with GAP commitments. Additionally, the EPC contractor will appoint a dedicated Community Consultation Officer responsible for facilitating inclusive community engagement and ensuring that women's voices are adequately represented during implementation. To strengthen the effectiveness of these arrangements, targeted capacity building will be conducted for all implementing partners, including contractors, field staff, and community liaisons. Training programs will focus on gender-sensitive practices, inclusive communication, equitable benefit-sharing, and grievance handling to ensure that gender considerations are integrated at every stage of the project.

12.5 Monitoring and Reporting

GAP implementation will be systematically monitored and reported through established Environmental and Social (E&S) reporting mechanisms. Gender-related progress and indicators will be incorporated into the quarterly and semi-annual E&S monitoring reports prepared by the Project Management Consultant (PMC). The semi-annual reports will be submitted to AIIB for review and feedback. In addition, EPC contractor will include GAP-related indicators in their monthly E&S progress reports to ensure consistent tracking at the implementation level. Furthermore, the PMC's monthly site visit reports will also include a dedicated section on GAP monitoring to capture field-level observations, progress against targets, and any emerging gender-related issues requiring attention.

Chapter 13: Summary, recommendations and conclusion

The ESIA has assessed overall acceptability of environmental and social impacts likely to arise as a result of construction and operation of 220/132 kV GIS at Rowta under Phase II of AISTSEP project. The proposed subproject is categorised as category B as the social or environmental impacts are assessed as limited, few in number, site specific, largely reversible, and readily addressed through mitigation measures.

The ongoing construction activities will change the baseline conditions to some extent. Mitigation measures for potential impacts on Air, Water, Soil, Noise, Ecology, and Socio-economics have been specified through proper

- Follow up of best practice of public disclosure and grievance management.
- Planning and designing of GIS substation structure, site preparation and access routes for, material transport etc.
- Application of standards for Health and Safety for transformer erection and other equipment installation activities.
- Clearances and permits required for each sub activity

The ESMP provides a delivery mechanism to address potential adverse impacts, to instruct contractors and to introduce standards of good practice to be adopts for subproject activities taken up during construction and operation phases of the project. Regular inspection and monitoring of environmental and social aspects throughout these phases will enhance the effectiveness of the proposed mitigation measures.

APPENDICES

Appendix 1: Rapid Environment and Social Assessment Checklist

Establishment of New 220/132 kV (2 X 160 MVA) GIS Substation at Rowta

Date of Site Visit	24.01.2025
Location	Rowta, Udalguri, Assam
GPS Coordinates	26°43'25.44"N, 92°11'22.17"E

A. Environmental Screening Checklist

Particulars	Yes	No	Remarks
A. Project Siting: Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
1. Cultural heritage site		No	No cultural heritage site was observed during site visit.
2. Legally protected Area (core zone or buffer zone)		No	No protected area was noticed
3. Wetland/ Mangrove/ Estuarine		No	
4. Special area for protecting biodiversity		No	No such special area was observed
B. Potential Environmental Impacts. Will the Project cause?			
1. Impairment on historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?		No	
2. Disturbance to precious ecology (e.g. sensitive or protected areas)?		No	
3. Alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?		No	
4. Deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?		No	
5. Increased air pollution due to subproject construction works/civil works?	Yes		Emissions from construction machineries and vehicles: Construction activities often involve the use of heavy machineries and vehicles such as excavators, bulldozers, and trucks. These machines typically run on diesel or gasoline, which emit pollutants such as nitrogen oxides (NOx), particulate matter (PM), and volatile organic compounds (VOCs) into the air.
6. Noise and vibration due to subproject construction works/civil works?	Yes		Various construction activities like drilling, cutting, hammering and concrete mixing can produce loud noise.
7. Improper sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STI's and HIV/AIDS) from workers to local populations?	Yes		Inadequate sanitation facilities in construction camps and work sites can lead to various health issues. Without proper toilets or sanitation systems, workers may resort to open defecation or use makeshift facilities, increasing the risk of faecal contamination. This can contaminate water sources, soil, and food, contributing to the spread of diseases like diarrhoea, typhoid, and hepatitis A.
8. Creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and other vectors of diseases?	Yes		Mosquitoes and rodents are vectors for various diseases, and their control is essential to prevent the spread of these diseases. Instead of creating

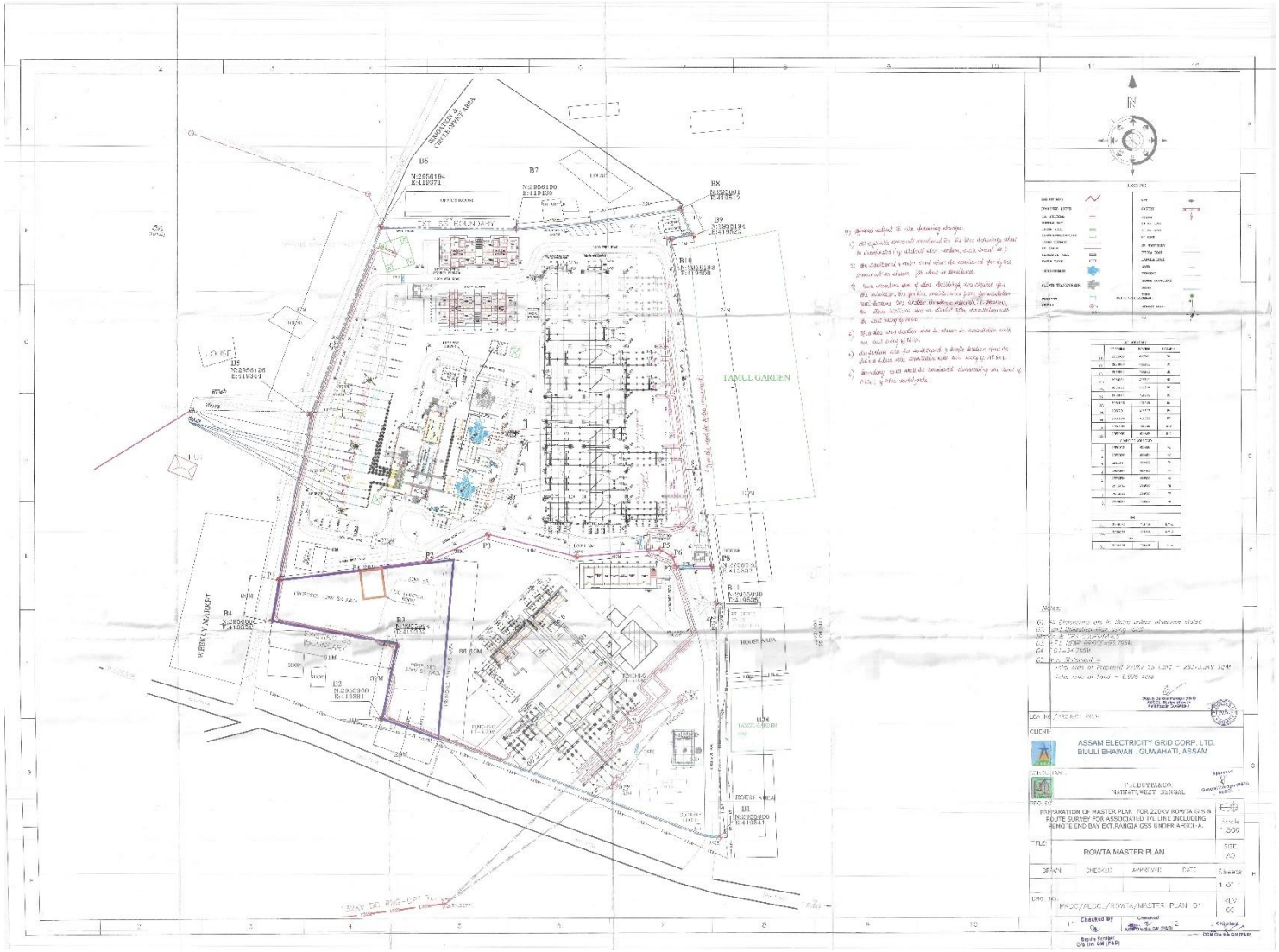
Particulars	Yes	No	Remarks
			breeding habitats, it is advisable to focus on strategies that reduce or eliminate their presence and breeding opportunities.
9. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and Electromagnetic hazards during project construction and operation?	Yes		**Physical Hazards:** • Falls from heights • Struck-by accidents • Caught in-between accidents • Electrocution **Chemical Hazards:** • Exposure to toxic substances • Hazardous material spills **Biological Hazards:** • Infectious diseases • Vector-borne diseases • Electromagnetic Radiation
10. Risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	Yes		During construction and operation activities can pose various risks to community health and safety: • Accidents and explosions • Chemical spills and leaks • Air pollution • Water contamination • Occupational hazards • Noise pollution • Waste generation
11. Community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	Yes		It is essential to identify and mitigate these risks to ensure the well-being of the community. To address these risks, it is crucial to engage in comprehensive risk assessments, involve relevant experts and stakeholders, adhere to applicable safety regulations and standards.
12. Generation of solid waste and/or hazardous waste?	Yes		However, there are a few potential sources of waste associated with electrical substations that should be considered: • Construction and Demolition Waste • Equipment Waste • Maintenance Waste
13. Use of chemicals?	Yes		• Concrete Admixtures • Anti-Corrosion Coatings • Insulating Oils • Sulphur Hexafluoride (SF6) • Fire Suppression Agents • Lubricants • Cleaning Agents
14. Generation of wastewater during construction or operation?	Yes		Both construction and operation of various facilities can generate wastewater

B. Social Screening Checklist

Particulars	Observation
A. Proposed Site Location	
1. Does Land procurement require for the project (for Rowta Substation)	No
2. Landownership of the project area: Govt. / Private lands	AEGCL's own existing land.
3. Does the project require acquisition of land or transfer of Govt. land/structures?	No land acquisition is required, as the proposed substation will be constructed on AEGCL's own existing land. A total of 3.89 Ha is available, which is free from all encumbrances, with no encroachers or squatters present on the site.
4. If yes please mention the area of land, number of affected structures, Households.	NA
5. Present usage of the land parcels is for: Agricultural purposes, Residential purposes, Commercial purposes and other purposes (Indicate)	The proposed land is currently unused and includes abandoned quarters/structures owned by AEGCL.
6. Will the project lead to loss of housing?	No
7. Will the project lead to loss of agricultural land?	No
8. Will the project cause damage to private property/assets? (structures, crops, trees, etc.)	No
9. Will the project lead to loss of common property resources?	No
10. Will the project lead to loss of livelihood – directly or indirectly?	No loss of livelihood anticipated.
11. Does the project require relocation of encroachers / squatters? If yes, please elaborate number and nature, if possible.	No encroachers or squatters was found.
12. Does the project require relocation of community facilities/Govt. establishment or any object that are of religious, cultural and historical significance?	No.
B. Potential Social Impacts- Will the Project cause	
13. Involuntary resettlement of people? (physical displacement and/or economic displacement)	No displacement required
14. Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?	No negative impact on the vulnerable group
15. Will community facilities require relocation?	No
16. Social conflicts if workers from other regions or countries are hired?	EPC contractors will be encouraged to prioritize the engagement of local labor. However, if workers from other regions or countries are employed, there is a potential for social conflicts during construction activities. These issues largely depend on the local context, cultural dynamics, and the manner in which the workforce is managed. Potential social conflicts may include: • Job competition between local and non-local workers. • Disparities in wages and labor conditions. • Tensions arising from cultural or language differences. • Strain on local resources and services.

Particulars	Observation
17. Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?	No
18. Social conflicts relating to inconveniences in living conditions where construction interferes with pre-existing facilities and structures?	No
19. Will a resettlement Action Plan be required?	No
20. Impact on local economy – Fisheries, local tourism related businesses, market places, etc.?	No
21. Livelihood- Direct impact due to loss of land and structures?	Nil
22. Indirect impact due to loss of commercial grounds, market places, places for hawker stalls, etc.?	No loss of commercial land.
23. Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	Low risk; however, any further risk will be minimized through standard safety norms.
24. Other social concerns relating to inconveniences in living conditions in the project areas?	Not anticipated any such inconvenience
25. Social concerns relating to local inconveniences associated with project operation, if any? (e.g. increased volume of traffic, greater risk of accidents, communicable disease transmission)	Not anticipated any such inconvenience
26. Does the project related work affect any objects that are of religious and cultural significance to the IPs?	No
27. Which are the economic activities of IP will be affected by the proposed project development and how?	No IP will be affected
28. Is there a requirement for an in-depth Indigenous people's plan? (IPP)	No land acquisition is required, as the proposed substation will be constructed on AEGCL's own existing land. Hence, no IPP is required for sub-station site.
29. Describe any other impacts that have not been covered in this screening form	For Transmission line route if Indigenous population get affected will require FPIC and IIP.
30. Describe alternatives, if any, to avoid or minimize land acquisition/displacement of people from private or public lands	AEGCL existing land will be used for the proposed Rowta S/S with no encroacher / squatters.

Appendix 2 : Layout Plan for 220/132 Rowta GIS site



Appendix 3 : Environmental, Social, Health & Safety & Audit findings and checklist for the existing 132/33 kV Rowta SS

Name of the Substation: Existing 132/33 kV AIS Substation at Rowta
Audit Conducted By: Environmental and Social Team, PMU, AEGCL
Date of Audit: 08th July 2025
Location: Rowta, Assam

1. Introduction

An Environmental, Social, Health, Safety & Technical (ESHS&T) Audit was conducted at the existing 132/33 kV AIS Substation at Rowta, Assam, owned and operated by AEGCL on 08th July 2025. The objective of the audit was to assess the operational status of the substation against standard norms of environmental compliance, social engagement, technical integrity, and occupational health and safety management.

2. Methodology

The audit was conducted through a structured approach involving a combination of field inspection, staff interactions, and document review. A comprehensive checklist covering general infrastructure, environmental compliance, social safeguards, and health and safety aspects was used to guide the assessment. During the site visit, visual observations were made of critical infrastructure such as transformers, switchgear, earthing systems, drainage, waste management areas, and safety installations. Discussions were held with substation officials to understand day-to-day operations, emergency preparedness, waste disposal practices, and community engagement. The findings were then consolidated and evaluated to determine the overall performance of the substation.

3. Key observations and Findings

The audit of the existing 132/33 kV AIS Substation at Rowta reveals that the substation demonstrates a high level of compliance across technical, environmental, social, and health & safety domains. The facility is operating under the ownership of AEGCL with adequate internal protocols and operational safeguards in place. The summary of the audit findings is presented in Table A and the audit checklist is provided in Table B.

4. Key Strengths Identified

- **Technical Infrastructure**: The transformers, switchgear, and control systems are in excellent condition, with no observable defects or safety risks. Earthing systems are functional and well-maintained.
- **Environmental Safeguards**: Oil spill containment through soak pits is in place; hazardous waste (used oil, batteries) and e-waste are managed through authorized vendors, complying with legal requirements.
- **Social Responsibility**: There is no encumbrance on land, and the site is properly secured. The engagement of local employees reflects a positive impact on the host community. While CSR contributions exist, they are presently informal.
- **Health and Safety Measures**: Fire extinguishers, PPE, and emergency preparedness mechanisms are in place and functioning. Regular safety drills and well-maintained incident logs indicate a proactive safety culture.

Table A: Audit Summary Table – 132/33 kV (Existing) AIS at Rowta

Sl. No.	Criteria	Observations	Remarks
A.	***General Considerations***		
1	Transformer Condition	All transformers in good condition. No leakage, rust, or corrosion.	Satisfactory
2	Switchgear and Panels	Functional, properly labelled, dust- and moisture-free.	Compliant
3	Control Room Structure	No structural cracks or seepage.	Good condition
4	Protection Systems	Relays, isolators, circuit breakers, lightning arresters as per norms.	Adequate
5	Earthing System	Functional earth pits and electrodes.	Compliant
6	Lighting and Security	Adequate lighting. 24x7 armed guard deployed.	Satisfactory
B.	***Environmental Considerations***		
7	Transformer Oil Handling	Soak pit available. No leakage observed.	Compliant
8	Hazardous Waste Management	Used oil stored in drums and auctioned via authorized vendors.	Compliant
9	E-waste & Battery Disposal	Disposed through approved vendors via auction.	Compliant
10	Stormwater & Drainage	Drainage clean and free from oil/chemical residues.	Functional
11	Solid Waste Management	Disposed by local authorities; no visible waste accumulation.	Satisfactory
C.	***Social Considerations***		
12	Land Ownership & Encumbrance	Legally owned by AEGCL; no disputes.	Verified
13	Public Access & Fencing	Fully secured by boundary wall. No public access.	Controlled
14	Community Grievances	No grievances reported.	No issues
15	Local Employment	8–10 out of 15 employees are locals.	Good practice
16	CSR Activities	Staff contribute to local cultural/social events.	Informal contribution
D.	***Health and Safety Considerations***		
17	Electrical Safety Signage	Appropriate signage available and visible.	Adequate
18	PPE Availability & Use	PPEs used by staff; records maintained.	Satisfactory
19	Fire Safety	CO_2/AFFF extinguishers and sand buckets available and within expiry.	Compliant
20	First Aid & Emergency Kit	Kits are well-stocked and accessible.	Compliant
21	Incident Records	Accident/near-miss logs are maintained.	Maintained
22	Emergency Preparedness	Regular evacuation drills conducted.	Good practice

Table B: Audit Checklist for Environmental, Social, Health & Safety Audit of for Existing 132/33 AIS at Rowta

Environmental and Social Audit Checklist for Existing Substations of AEGCL

Name of the Substation	:	132/33 KV Rowta AIS Substation
Audit Date	:	08/07/2025
GPS Coordinates	:	26°43'25.44"N 92°11'22.17"E
Address	:	Rowta

Sl. No.	Criteria	Description	Observations	Remarks
A.	**General Considerations**			
1	Transformer Condition	Physical integrity, oil leakage, signs of rust/corrosion	All the transformers are in good condition. No oil leakage or corrosion was observed	
2	Switchgear and Panels	Panels are properly labelled, functional, and free from dust/moisture	All the switchgear panels are functional and properly labelled.	
3	Control Room Structure	Condition of walls, roof, flooring, ventilation, and damp-proofing. Any water seepage or structural cracks	Control Room structure observed to be in good condition. No water seepage issue observed.	
4	Protection Systems	Presence and operability of relays, isolators, circuit breakers, lightning arresters	The substation has sophisticated Protection system as per the grid rules.	
5	Earthing System	Functional earthing pits and electrodes	The earthing system is in good condition. The earth pit electrodes are fully functional.	
6	Lighting and Security	Adequacy of internal and external lighting, presence of security personnel, boundary wall, CCTV etc.	The switchyard has adequate lighting. The substation is guarded by armed Homeguards 24/7.	

Page 1 of 3

Sl. No.	Criteria	Description	Observations	Remarks
B.	**Environmental Considerations**			
7	Transformer Oil Handling	Containment for oil spills	Both the Power Transformers have oil soak pits for tackling oil spillage issues.	
8	Hazardous Waste Management	Proper storage & disposal of used oil	Used oil is put forth storading in oil drums and are auctioned through approved vendors.	
9	E-waste and Battery Disposal	Authorized disposal	E-waste and discarded batteries are disposed off through auction as scrap material.	
10	Stormwater and Drainage	Site runoff drains are clean, free from oil/chemical contamination	The substation has proper drainage system which are free from oil/ chemical contamination	
11	Solid Waste Management	Segregation (biodegradable and non-biodegradable waste) and disposal	Solid waste disposal work is carried out by local authorities.	
C.	**Social Considerations**			
12	Land Ownership & Encumbrance	Legally owned by AEGCL	AEGCL's own land.	
13	Public Access & Fencing	Site secured from public intrusion	Site is secured from public incursion as the site is completely demarcated by boundary wall.	
14	Community Grievances	Records of issues and resolution	No community grievance has been received so far.	
15	Local Employment	Local staff employed	Yes, local employees have been employed. 8-10 employees are local employees out of total 15 employees.	
16	CSR Activities	Community development support	Monetary contributions are made by the staffs towards local cultural and social events.	
D.	**Health and Safety**			
17	Electrical Safety Signage	Danger, High Voltage and other relevant signs in place	Electrical safety signage boards are erected at available locations at the substation.	
18	PPE Availability & Use	Staffs wear PPEs and records maintained	PPEs are available for the staffs, and all staffs was from PPE kits while on duty	
19	Fire Safety	Availability of fire extinguishers (dry	Adequate fire extinguishers are available at the substation and are regularly refilled. CO_2 and AFFF mechanical types fire extinguishers are available.	

Page 2 of 3

Sl. No.	Criteria	Description	Observations	Remarks
		powder/CO_2), placement as per norms, expiry dates, and fire safety training records		
20	First Aid & Emergency Kit	Availability and accessibility	First Aid and Emergency kit Available.	
21	Incident Records	Maintained accident/near-miss reports	Records are maintained for all accidents.	
22	Emergency Preparedness	Evacuation plans & awareness	Evacuation and safety mock drills are regularly conducted for awareness.	

Auditor		Resident Engineer/Substation In charge	
Name & Designation	Signature	Name & Designation	Signature
Rahul Choudhury, ESS, AEGCL	08/07/2025	Dipankar Sarma, Junior Manager	Resident Engineer (I/C) 132 KV Grid Sub- Station AEGCL,Rowta
Bodhaditya Roy, ESS, PMU, AEGCL	Bodhaditya Roy 08/07/2025		
Dibya Jyoti Barmah, SSS, PMU	08/07/2025		
Subanta Bhattacharjee	08/07/2025		

E&S Safeguard Consultant
AIIB Projects, PMU, AEGCL

Appendix 4: Land Possession Certificate/ Land Allotment Letter

LAND POSSESSION CERTIFICATE

Certified that we the undersigned have reciprocally handed over and taken over possession of the following schedule of the land of Village No. 4 Dharsin khut under Barshi Lajhar Mouza..................

Schedule of the land.

Area of land	: Total 8B-4K-11L.
Dag No.	:- 95 [1B-1K-19L] } 8B-4K-11L (Total) 99 [7B-2K-12L]
Village / Town	: No 4, Dharsin khuta
Mouza	:- Barshi Lajhar
Possession handed over by	:1. Sri H Bora, LM 2. Sri S. Sharma, SK 3. Sri N Ahmed, LM
Possession taken over by	:- S. K. BHOWMIK Resident Engineer 132 KV Grid Sub Stn ASEB, Rowta

Countersigned by...

Extra Asstt. Commissioner
i/c Udalguri Circle
Udalguri.

OFFICE OF THE SUB DIVISIONAL OFFICER:::::::UDALGURI.

NO. 430 Date.- 2/1/86.

Certified that 12B-0K-15 Ls of land covered by dag no.68/75 of village No.4 Dhansirikhuti under Barsilajhar mauza has been proposed for allotment to Rowta Electricity Board and was passed in the Land Settlement Advisory Committee in its meeting held on 14.12.84.

Sr.E.A.C. & Secretary,
Land Settlement Advisory Committee,
Udalguri.

Appendix 5 : Tree enumeration details

Sl. No.	Local Name	Scientific Name	Girth size in (m)
1	Debodaru	*Polyalthia longifolia*	1.1
2	Debodaru	*Polyalthia longifolia*	1.1
3	Debodaru	*Polyalthia longifolia*	1.1
4	Debodaru	*Polyalthia longifolia*	0.9
5	Debodaru	*Polyalthia longifolia*	1
6	Debodaru	*Polyalthia longifolia*	0.9
7	Debodaru	*Polyalthia longifolia*	0.9
8	Debodaru	*Polyalthia longifolia*	1.1
9	Debodaru	*Polyalthia longifolia*	1.4
10	Debodaru	*Polyalthia longifolia*	1.1
11	Debodaru	*Polyalthia longifolia*	1.1
12	Debodaru	*Polyalthia longifolia*	1.5
13	Bakul	*Mimusops elengi*	1.1
14	Bakul	*Mimusops elengi*	2.2
15	Radhasura	*Cassia javanica*	1.2
16	Mugason	*Machilus bombycina*	0.9
17	Thaisuri/Amra	*Spondias pinnata*	1.5
18	Damaru	*Ficus auriculata Lour.*	2.1
19	Krishnasura	*Delonix regia*	0.7
20	Krishnasura	*Delonix regia*	1.2
21	Kodom	*Neolamarckia cadamba*	1.4
22	Kothal	*Artocarpus integrifolia*	0.8
23	Hilikha	*Terminalia chebula*	1.2
24	Teak	*Tectona grandis*	0.9
25	Amlakhi	*Phyllanthus emblica Linn*	1
26	Thaisuri/Amra	*Spondias pinnata*	1
27	Mango	*Mangifera indica*	1
28	Mango	*Mangifera indica*	1
29	Mango	*Mangifera indica*	1.45
30	Mango	*Mangifera indica*	1.2
31	Mango	*Mangifera indica*	1.5
32	Bakul	*Mimusops elengi*	1.5
33	Jalpai	*Elaeocarpus serratus*	1.2
34	Larubandha	*Pterospermum acerifolium*	0.7
35	Larubandha	*Pterospermum acerifolium*	0.6
36	Simalu	*Bombax ceiba*	0.9
37	Jam	*Syzygium cumini*	1.6
38	Ghora Neem	*Melia azedarach*	0.8
39	Hilikha	*Terminalia chebula*	1.4
40	Mango	*Mangifera indica*	1.9
41	Kungala	*Shorea robusta*	2
42	Pakri	*Ficus religiosa*	1.9
43	Korai	*Derris robusta*	1
44	Gamari	*Gmelina arborea*	1.1
45	Khokan	*Duabanga grandiflora*	1
46	Tetoli	*Tamarindus indica*	1.6
47	Odal	*Sterculia villosa*	0.6
48	Simalu	*Bombax ceiba*	4.2
49	Korai	*Derris robusta*	0.7

Sl. No.	Local Name	Scientific Name	Girth size in (m)
50	Korai	*Derris robusta*	0.7
51	Korai	*Derris robusta*	1.5
52	Korai	*Derris robusta*	0.8
53	Korai	*Derris robusta*	0.9
54	Teak	*Tectona grandis*	0.7
55	Kodom	*Neolamarckia cadamba*	1
56	Teak	*Tectona grandis*	0.8
57	Kodom	*Neolamarckia cadamba*	1
58	Jam	*Syzygium cumini*	0.7
59	Bodgos/Bhoja	*Ficus benghalensis*	1.8
60	Korai	*Derris robusta*	0.8
61	Mango	*Mangifera indica*	1.55
62	Mango	*Mangifera indica*	1.2
63	Teak	*Tectona grandis*	2.4
64	Teak	*Tectona grandis*	1.5
65	Teak	*Tectona grandis*	1.7
66	Teak	*Tectona grandis*	1.5
67	Teak	*Tectona grandis*	1
68	Teak	*Tectona grandis*	0.9
69	Teak	*Tectona grandis*	1
70	Teak	*Tectona grandis*	1.1
71	Teak	*Tectona grandis*	0.8
72	Teak	*Tectona grandis*	0.8
73	Teak	*Tectona grandis*	1.6
74	Teak	*Tectona grandis*	1
75	Teak	*Tectona grandis*	0.9
76	Simalu	*Bombax ceiba*	2.2
77	Hongla	*Millettia pinnata*	0.9
78	Hongla	*Millettia pinnata*	0.9
79	Hongla	*Millettia pinnata*	0.6
80	Hongla	*Millettia pinnata*	0.6
81	Hongla	*Millettia pinnata*	1.5
82	Hongla	*Millettia pinnata*	1
83	Siris	*Albizia lebbeck*	0.9
84	Siris	*Albizia lebbeck*	0.7
85	Siris	*Albizia lebbeck*	0.6
86	Siris	*Albizia lebbeck*	0.8
87	Siris	*Albizia lebbeck*	0.7
88	Siris	*Albizia lebbeck*	0.9
89	Siris	*Albizia lebbeck*	0.8
90	Siris	*Albizia lebbeck*	0.9
91	Hongla	*Millettia pinnata*	0.7
92	Bodgos/Bhoja	*Ficus benghalensis*	1.9
93	Mango	*Mangifera indica*	1.1
94	Mango	*Mangifera indica*	1.1
95	Kothal	*Artocarpus integrifolia*	1.2
96	Mandar	*Erythrina variegata*	1.2
97	Kodom	*Neolamarckia cadamba*	2.2
98	Kodom	*Neolamarckia cadamba*	2
99	Kothal	*Artocarpus integrifolia*	1.7
100	Mandar	*Erythrina variegata*	1.8

Sl. No.	Local Name	Scientific Name	Girth size in (m)
101	Mango	*Mangifera indica*	1.6
102	Mango	*Mangifera indica*	1.3
103	Mango	*Mangifera indica*	1.2
104	Mango	*Mangifera indica*	1.4
105	Bel	*Aegle marmelos*	1.2
106	Kothal	*Artocarpus integrifolia*	2
107	Mango	*Mangifera indica*	1.5
108	Mango	*Mangifera indica*	1.3
109	Mango	*Mangifera indica*	0.9
110	Mango	*Mangifera indica*	1.2
111	Gamari	*Gmelina arborea*	0.8
112	Mango	*Mangifera indica*	1
113	Jiya	*Lannea coromandelica*	1.2
114	Mango	*Mangifera indica*	1.8
115	Mango	*Mangifera indica*	1.6
116	kothal	*Artocarpus integrifolia*	1.7
117	Ghora Neem	*Melia azedarach*	0.9
118	Hongla	*Millettia pinnata*	0.9
119	Mango	*Mangifera indica*	1.6
120	Pakri	*Ficus religiosa*	3.6
121	Poma	*Chukrasia velutina*	0.9
122	Krishnasura	*Delonix regia*	1.3
123	Krishnasura	*Delonix regia*	1.3
124	Tita Chopa	*Michelia champaca L.*	0.7
125	Korai	*Derris robusta*	1.2
126	Teak	*Tectona grandis*	1
127	Hilikha	*Terminalia chebula*	1
128	Debodaru	*Polyalthia longifolia*	1.8
129	Debodaru	*Polyalthia longifolia*	1.7
130	Hongla	*Millettia pinnata*	1.2
131	Mango	*Mangifera indica*	1.2
132	Krishnasura	*Delonix regia*	0.9
133	Kadam	*Neolamarckia cadamba*	1.2
134	Mango	*Mangifera indica*	1.3
135	Mango	*Mangifera indica*	1.2
136	Mango	*Mangifera indica*	2
137	Kothal	*Artocarpus integrifolia*	1.5
138	Krishnasura	*Delonix regia*	2.4
139	Hongla	*Millettia pinnata*	1
140	Korai	*Derris robusta*	0.8
141	Korai	*Derris robusta*	0.9
142	Korai	*Derris robusta*	0.9
143	Korai	*Derris robusta*	0.9
144	Korai	*Derris robusta*	0.9
145	Korai	*Derris robusta*	1.2
146	Hongla	*Millettia pinnata*	0.7
147	Hongla	*Millettia pinnata*	0.9
148	Korai	*Derris robusta*	1
149	Hongla	*Millettia pinnata*	1
150	Simalu	*Bombax ceiba*	0.9
151	Korai	*Derris robusta*	0.9

Appendix 6 : Environmental and Social Exclusion List as per AIIB ESF, 2024

Environmental and Social Exclusion List

The Bank will not knowingly finance Projects involving the following:

1. Forced labor[i] or harmful or exploitative forms of child labor.[ii]

2. The production of, or trade in, any product or activity deemed illegal under national laws or regulations of the Member in whose territory the Project is located, or international conventions and agreements, or subject to international phase out or bans, such as:

   2.1. Production of, or trade in, products containing polychlorinated biphenyl (PCBs).[iii]

   2.2. Production of, or trade in, pharmaceuticals, pesticides/herbicides and other hazardous substances subject to international phase outs or bans (Rotterdam Convention, Stockholm Convention).[iv]

   2.3. Production of, or trade in, ozone depleting substances subject to international phase out (Montreal Protocol).[v]

3. Trade in wildlife or production of, or trade in, wildlife products regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).[vi]

4. Transboundary movements of waste prohibited under international law (Basel Convention).[vii]

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[i] Forced labor means any work or service not voluntarily performed that is exacted from an individual under threat of force or penalty (including any kind of forced or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements, or labor by trafficked persons).

[ii] For purposes of this List, harmful or exploitative forms of child labor means the employment of children under the age of 18 for work which by its nature or the circumstances in which it is carried out is likely to jeopardize their health, safety or morals. However, if the laws or regulations of the country in which the Project is located provide, in conformity with the International Labour Organization's Minimum Age Convention, 1973, that children at least 16 years of age may be employed for such work on condition that their health, safety and morals are fully protected and that they have received adequate specific instruction or vocational training in the relevant branch of activity, then child labor means employment of children for work that does not comply with these laws and regulations.

[iii] PCBs: Polychlorinated biphenyls are a group of highly toxic chemicals. PCBs are likely to be found in oil-filled electrical transformers, capacitors and switchgear dating from 1950 to 1985.

[iv] United Nations Consolidated List of Products whose Consumption and/or Sale have been Banned, Withdrawn, Severely Restricted or not Approved by Governments; Convention on the Prior Informed Consent Procedures for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention); Stockholm Convention on Persistent Organic Pollutants; World Health Organization Recommended Classification of Pesticides by Hazard. A list of pharmaceutical products subject to phase outs or bans is available at https://www.who.int/medicines/areas/quality_safety/safety_efficacy/pharm_restrictions/en/. A list of pesticides, herbicides and other hazardous substances subject to phase outs or bans is available at http://www.pic.int/TheConvention/Chemicals/AnnexIIIChemicals/tabid/1132/language/en-US/Default.aspx

[v] Ozone Depleting Substances (ODSs): Chemical compounds which react with and deplete stratospheric ozone, resulting in the widely publicized "ozone holes." The Montreal Protocol on Substances that Deplete the Ozone Layer lists ODSs and their target reduction and phase out dates. A list of the chemical compounds regulated by the Montreal Protocol, which includes aerosols, refrigerants, foam blowing agents, solvents and fire protection agents, together with details of signatory countries and phase out target dates, is available from the United Nations Environment Programme, https://ozone.unep.org/treaties/montreal-protocol

[vi] The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). A list of CITES listed species is available from the CITES secretariat, https://www.cites.org/eng/disc/species.php

[vii] Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, see http://www.basel.int

5. Production of, or trade in, weapons and munitions, including paramilitary materials.

6. Production of, or trade in, alcoholic beverages, excluding beer and wine.[viii]

7. Production of, or trade in, tobacco.[ix]

8. Gambling, casinos and equivalent enterprises.[x]

9. Production of, trade in, or use of asbestos fibers, whether or not bonded.[xi]

10. Activities prohibited by legislation of the Member in whose territory the Project is located or by international conventions relating to the protection of biodiversity resources or cultural resources, such as, Bonn Convention, Ramsar Convention, World Heritage Convention and Convention on Biological Diversity.[xii]

11. Commercial logging operations or the purchase of logging equipment for use in primary tropical moist forests or old-growth forests.

12. Production or trade in wood or other forestry products other than from sustainably managed forests.

13. Marine and coastal fishing practices, such as large-scale pelagic drift net fishing and fine mesh net fishing, harmful to vulnerable and protected species in large numbers and damaging to marine biodiversity and habitats.

14. Shipment of oil or other hazardous substances in tankers that do not comply with IMO requirements (IMO, MARPOL, SOLAS and Paris MOU).[xiii]

15. Thermal coal mining, coal-fired power and heating plants or Projects that are functionally related to coal.[xiv]

[viii] This does not apply to Clients who are not substantially involved in these activities. Not substantially involved means that the activity concerned is ancillary to the entity's primary operations.

[ix] This does not apply to Clients who are not substantially involved in these activities. Not substantially involved means that the activity concerned is ancillary to the entity's primary operations.

[x] This does not apply to Clients who are not substantially involved in these activities. Not substantially involved means that the activity concerned is ancillary to the entity's primary operations.

[xi] In special circumstances, if necessary to enable a Client to transition from the use of bonded asbestos to alternative materials, the Bank may agree with the Client on a reasonable transition period, provided that the asbestos content of the materials being used is less than 20 percent. Projects involving disposal of asbestos are not prohibited, provided a suitable asbestos management plan is adopted for such disposal.

[xii] Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) - https://www.cms.int/; Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention) - https://www.ramsar.org/; Convention Concerning the Protection of the World Cultural and Natural Heritage - https://whc.unesco.org/en/convention/; Convention on Biological Diversity - https://www.cbd.int/

[xiii] Noncompliance with International Maritime Organisation (IMO) requirements: tankers that do not have all required International Convention for the Prevention of Pollution from Ships (MARPOL) or International Convention for the Safety of Life at Sea (SOLAS) certificates (including, without limitation, International Safety Management Code compliance), tankers banned by the Paris Memorandum of Understanding on Port State Control (Paris MOU), and tankers due for phase out under MARPOL regulation 13G. No single hull tanker over 25 years old should be used. http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Prevention-of-Pollution-from-Ships-(MARPOL).aspx

[xiv] Projects functionally related to coal means associated facilities that are dedicated to enable the mining and use of coal or projects that would not be carried out without dedicated coal-based power supply. In order to assist Clients to reduce their coal use, the Bank may support Projects that aim at early retirement of coal plants, replacement of coal with lower-carbon fuel sources, or Projects for decommissioning, remediation, and redevelopment of affected coal facility sites and communities.

Appendix 7 : Construction & Demolition Waste Management Plan

1. Objectives

- To ensure safe demolition of existing structures
- To minimize environmental, social, and health impacts
- To comply with national, state, and AIIB/IFC regulations
- To promote reuse, recycling, and proper disposal of debris

2. Pre-Demolition Actions

Sl. No.	Activity	Responsibility	Timeline
1	Conduct structural and environmental audit	PMC/EPC	Pre-demolition
2	Disconnect utilities (electricity, water, telecom, etc.)	Contractor	1 week before
3	Inform and relocate any occupants (if any)	PIU / Social Expert	Prior to work
4	Identify hazardous materials (asbestos, paint, etc.)	PMC/Contractor	Pre-demolition
5	Obtain approval from concerned local authorities	Contractor	Prior to work
6	Conduct stakeholder consultations	PIU/PMC	Pre-demolition

3. Demolition Strategy

- **Type**: Manual + Light Machinery (to reduce vibration, noise)
- **Safety Measures**:
  - Barricading with warning signage
  - Dust suppression by water spraying
  - PPE for all workers (helmet, gloves, masks, boots etc.)
  - Emergency protocols and first aid setup
- **Method**: Sequential top-down approach (roof → walls → foundation)

4. Waste Quantification & Categorization

Sl. No.	Material	Estimated Volume	Reuse/Recycling Plan
1	Brick, concrete, mortar	To be determined	Crushed & reused as subbase
2	CGI sheets/roofing	To be determined	To be reused/recycled
3	Timber	To be determined	Salvaged for reuse
4	Steel rods	To be determined	Sold to authorized recycler
5	Hazardous waste, if any (paint, insulation)	To be determined	As per Hazardous Waste Rules
6	Mixed debris & dust	To be determined	Sent to Concerned local authorities-approved landfill

5. Storage, Transport & Disposal

- On-site storage: Designated, covered area for 7 days max
- Transport: In covered trucks to avoid spillage
- Disposal facilities:
  - Inert waste → Municipal dumping site (with concerned local authority approval)
  - Recyclables → Registered recycling units
  - Hazardous waste → Authorized disposal agency (If any)

6. Documentation & Monitoring

- Daily waste logs (type, quantity, location)
- Waste tracking register with transportation receipts
- Monthly summary reports submitted to PMU/PIU
- Monitoring of Worker health and safety

7. Roles & Responsibilities

Sl. No.	Stakeholder	Role
1	EPC Contractor	Execute demolition & manage waste
2	PMC	Supervision & compliance verification & reporting
3	PIU (AEGCL)	Coordination with local bodies
4	Concerned local authorities	Final disposal site approval & compliance

Appendix 8 : List of Structures to be demolished

List of Structures to be Demolished in 132/33kV Grid Substation, AEGCL, Rowta

Sl No.	Name/Category	Type	Quantity(Nos.)
1	R.E Office	Assam Type	1
2	Store	Assam Type	1
3	Security Barrack	Assam Type	1
4	Quarter	Unknown	2
5	Quarter	Type-III	1
6	Quarter	Type-IV	7
7	Quarter	Type-V	10
8	Quarter	Type-VI	14
9	Quarter	Unknown	2
10	Quarter	Unknown	2
11	Quarter	Unknown	5

20/02/25

Assistant General Manager
Type-1 Grid Sub-Station
AEGCL, Depota

Appendix 9 : Standard Operating Procedure (SOP): Handling of Municipal Solid Waste and Hazardous Waste, Including Spill Response

1. Purpose

To ensure safe and environmentally sound handling, storage, and disposal of Municipal Solid Waste (MSW) and Hazardous Waste (HW) generated during the operation of substations in compliance with relevant environmental regulations, and to establish an effective emergency spill response mechanism.

2. Scope

This SOP applies to all operational staff of substations (both AIS and GIS) involved in handling solid and hazardous waste, including housekeeping and maintenance personnel.

3. Responsibilities

Role	Responsibilities
Substation In-Charge	Overall supervision of waste management and compliance with applicable regulations.
EHS Officer / Designated Staff	Daily implementation, monitoring, training, reporting, and emergency response.
Housekeeping Personnel	Proper segregation, collection, and storage of MSW.
Technical Staff	Safe handling, labelling, and temporary storage of hazardous waste.

4. Waste Classification and Segregation

A. Municipal Solid Waste (MSW) Categories

Type	Bin Colour	Examples
Biodegradable	Green	Food waste, garden waste, paper
Recyclable	Blue/White	Plastics, metals, packaging materials
Inert Waste	Black or labelled bin	Ash, dust, broken glass
Non-recyclable contaminated MSW	Red/Yellow	Soiled cloth, oily PPE, tissue, sanitary items

B. Hazardous Waste in Substations

Waste Type	Source	Handling/Storage
Used transformer oil	Transformer maintenance	Store in labelled leak-proof barrels with secondary containment
Contaminated oil rags and filters	Maintenance activities	Collect in red-lidded bins; treat as hazardous
Lead-acid batteries	DG sets, backup systems	Store in cool, ventilated area; send to CPCB-authorized recyclers
Used containers of paints, lubricants	Civil/electrical maintenance	Triple rinse or return to suppliers if allowed
SF_6 gas leakage	GIS Substations	Leak detection monitoring; cylinder refilling by licensed vendor
E-waste	Relays, panels, switches	Segregate and send to registered e-waste recyclers

5. Collection and Storage

A. MSW Collection

- Waste collected daily using labelled containers.
- Avoid open dumping or littering within premises.
- Storage bins must be closed, non-leaking, and cleaned regularly.

B. Hazardous Waste Storage

- Use impervious floors and secondary containment trays.
- Maintain hazard labels (e.g., flammable, toxic) on all containers.
- Keep Material Safety Data Sheets (MSDS) at the storage location.
- Maintain a register for quantity, date of generation, and disposal.

6. Transportation and Disposal

A. MSW

- Hand over segregated MSW to local municipal authority.
- Keep receipts for verification and reporting.

B. Hazardous Waste

- Store temporarily for up to 90 days.
- Dispose of via CPCB/SPCB authorized handlers only.
- Used oil must be sent to registered re-refiners or recyclers.
- Batteries should be returned to dealer or manufacturer.

7. Emergency Spill Response

In Case of Spills (e.g., oil, SF_6, battery acid):

i. Alert nearby personnel and evacuate if needed.
ii. Don PPE – gloves, goggles, boots, apron, respirator (if required).
iii. Contain the spill using absorbents (sand, sawdust, commercial spill kits).
iv. Prevent spread – block drains, ditches.
v. Clean up solid/liquid using appropriate methods.
vi. Collect contaminated material in red bags/containers and label as hazardous.
vii. Decontaminate area with disinfectant/neutralizer.
viii. Report the incident to the Substation In-Charge and record in accident register

8. Training and Awareness

- All substation staff must be trained annually on:
  - MSW segregation
  - Hazardous waste handling
  - Use of PPE
  - Spill containment and cleanup
- Display color-coded signage and Do's & Don'ts prominently.

9. Record Keeping

Maintain the following:

- Daily waste logbook
- Hazardous waste manifest and inventory
- Disposal receipts from authorized handlers
- Spill incident reports
- Training attendance sheets

10. Prohibited Practices

- Burning of waste inside or near substation
- Mixing hazardous waste with general waste
- Storage of waste beyond regulatory limits
- Unauthorized disposal or sale of used oil, batteries, or e-waste

Appendix 10 : IFC Benchmark Standards for Workers Accommodation

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 standards[7] 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.

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 standards[9] 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.

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

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 accomodation 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 11 : Climate and Disaster Risk Screening for 220/132 kV Rowta GIS

Summary Climate and Disaster Risk Screening Report

1. Exposure of the project location: This step assesses the current and future exposure of the project location to relevant climate and geophysical hazards as an aggregate.

Exposure Rating

High

Climate and geophysical hazards that are likely to be relevant to the project location both in present and in the future

- Extreme Temperature
- Extreme Precipitation and Flooding
- Strong Winds
- Geophysical Hazards

2. Impacts on the project's physical infrastructure and assets: This step assesses the current and future impacts of identified climate and geophysical hazards on the project's physical infrastructure and assets as currently designed.

Impact Rating

Moderate

Relevant project subsectors

- Transmission & Distribution
- Energy Efficiency in Heat & Power

3. Modulation of risks by the project's development context: This step assesses how the project's soft components as currently designed, together with the project's broader development context, modulate potential impacts from climate and geophysical hazards. This step also considers particularly vulnerable groups, namely women, migrants and displaced populations.

Modulation of risks by the project's soft components

Reduce Risk

Selected soft components

- Energy, Laws, regulations, Policy analysis and development
- Strategic Energy System Planning
- Feasibility, Design Studies
- Capacity Building, technical Assistance and Outreach
- Institutional Strengthening,Training,Knowledge Exchange

Modulation of risks by the project's development context

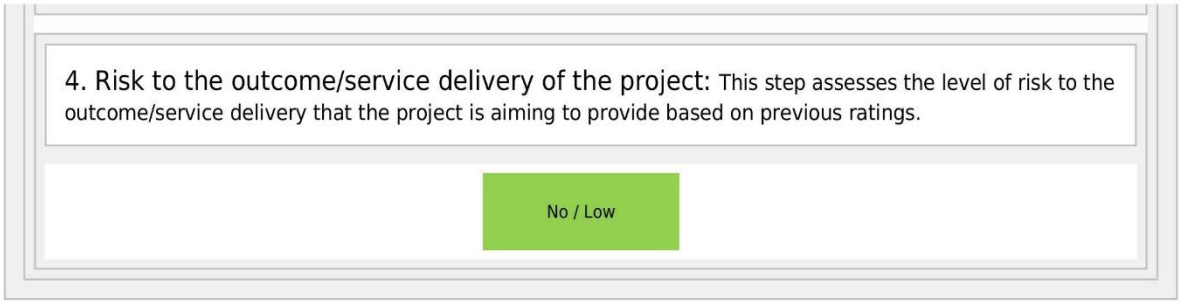
Reduce Risk

Women identified as particularly vulnerable to impacts from climate and geophysical hazards

Yes

Components designed to help alleviate the risks to women from climate and geophysical hazards

Yes


4. Risk to the outcome/service delivery of the project: This step assesses the level of risk to the outcome/service delivery that the project is aiming to provide based on previous ratings.
No / Low

Notes from the Screening Process

1. Exposure of the project location

Exposure Rating	High

This step provides information on exposure to climate and geophysical hazards at the project location. **The Exposure rating is High.The project location has experienced climate and geophysical hazards in the past and is expected to experience these in the future with high intensity, frequency, or duration.** The rating is based on climate information drawing on global, quality controlled data sets from the Climate Change Knowledge Portal. It is useful, for example to understand the temperature range and the rate of annual or decadal increase in a region; or precipitation patterns for historical and future time frames and seasonality shifts. Understanding the trends of hazards is important as they act individually and collectively on project components/subsectors.

TThe following guiding questions were used to assess exposure:

- What have been the historical trends in temperature, precipitation and drought conditions?
- How are these trends projected to change in the future in terms of intensity, frequency and duration?
- Has the location experienced strong winds and/or geophysical hazards in the past that may occur again in the future?
- Will the location be exposed to sea level rise and storm surge in the future?

User Notes: As per the Think Hazard web-based tool, the subproject site at Rowta faces multiple climate and geophysical risks. The river flood hazard is high, with potentially life-threatening floods expected at least once every 10 years, while extreme heat hazard is also high, with severe heat stress events likely at least once in the next five years. Additionally, wildfire hazard is classified as high, with over a 50% chance of encountering extreme fire weather conditions annually. The site also has a medium earthquake hazard, with a 10% probability of significant seismic activity in the next 50 years.

2. Impacts on the project's physical infrastructure and assets

Impact Rating	Moderate

This step provides an indication of the potential impacts of climate and geophysical hazards on the project's physical infrastructure and assets as currently designed under relevant subsectors. **The Impact rating is Moderate.Climate and geophysical hazards are likely to impact the structural integrity, materials, siting, longevity and overall effectiveness of your investments..** The impact rating is based on the exposure rating and the understanding of the project's sensitivity by the user. Please note that for this step the tool is helping judge the effect these impacts may have on the investment, and the ability of the project to sustain and enhance physical infrastructures and assets under a changing climate. Understanding where risks may exist and identifying where further work may be required to reduce or manage these risks can help inform the process of dialogue, consultation and analysis during project design.

The following guiding questions were used to assess impact:

- Have recent trends and projected changes in climate and geophysical hazards affected your project's infrastructure and activities as currently designed?
- Are project designs appropriate given recent trends in climate hazards?
- Do the investments in infrastructure design standards “lock in” certain decisions for decades to come
- Have future maintenance costs been adequately factored into the project design??

User Notes: The sub-project have been designed with robust engineering standards, ensuring resilience against Assam’s tropical climate and geophysical conditions. With materials like galvanized steel, epoxy coatings, and climate-proofing measures, the project is well-equipped to withstand high humidity, corrosion, and extreme weather.

While situated in Seismic Zone V, the infrastructure incorporates structural reinforcements to enhance stability. Additionally, advanced insulation, surge protection, and wind-resistant designs further strengthen its reliability.

Though future climate variations such as intensified rainfall, rising temperatures, and extreme weather events pose potential challenges, the project’s solid foundation, adaptability, and commitment to safety position it well for long-term sustainability and efficiency. With continuous monitoring and proactive upgrades, this infrastructure will remain a reliable

and climate-resilient asset for years to come.

3. Modulation of risks by the project's soft components and development context

This step provides information on how the potential impact on key components/subsectors due to exposure from hazards is modulated by the project's soft components and broader development context. In doing this, this step also takes into account particularly vulnerable groups including women, migrants and displaced populations.

Modulation of risks by the project's soft components

Reduce Risk

This rating reflects how the project's soft components (enabling and capacity building activities) can modulate risks. The right kind of capacity building measures could increase preparedness and long-term resilience and reduce risk.

User Notes: The integration of soft components in the project plays a crucial role in mitigating climate and geophysical risks by enhancing preparedness, resilience, and adaptive capacity. Through comprehensive training, awareness programs, and capacity-building initiatives, field staff and stakeholders can be better equipped to manage extreme weather events, flooding, and seismic risks. Effective early warning systems, improved maintenance protocols, and climate-resilient operational strategies can further reduce vulnerabilities. Additionally, gender considerations are critical, as women often face disproportionate impacts from climate-induced hazards due to socio-economic dependencies on natural resources. Recognizing this, the project includes components aimed at addressing gender-specific vulnerabilities, ensuring equitable access to energy resources and economic opportunities. By fostering inclusivity and integrating climate adaptation measures, the project strengthens resilience not only for infrastructure but also for communities, including vulnerable groups such as migrants and displaced populations who may be disproportionately affected by climate and geophysical challenges.

Modulation of risks by the project's development context

Reduce Risk

This rating reflects how the larger development context, including sector context and other social, economic and political factors can modulate risks.

User Notes: *No notes added*

4. Risk to the outcome/service delivery of the project

Outcome/Service Delivery Rating	No / Low

This step provides an indication of the level of risk to the outcome/service delivery that the project is aiming to provide. **The risk to the outcome/service delivery of your project is No / Low.** This rating is derived from hazard information, subject matter expertise, contextual understanding of the project, and modulated on the basis of the

project's soft components and broader development context. Keep in mind that in considering resilience measures for risk management, each element of risk should be taken into account, not just the collective risk rating at the outcome/service delivery level.

User Notes: *No notes added*

Guidance on Managing Climate Risks through Enhanced Project Design

By understanding which of your project components are most at risk from climate change and other natural hazards through initial screening, you can begin to take measures to avoid impacts by:

- Enhancing the consideration of climate and disaster risks early in project design.
- Using your risk screening analysis to inform follow-up feasibility studies and technical assessments.
- Encouraging local stakeholder consultations and dialogue to enhance resilience measures and overall success of the project.

Table 1 provides some general guidance based on the risk ratings for Outcome/Service Delivery, and Table 2 lists some climate risk management measures for your consideration. Visit the "Screening Resources" section of the landing page for additional guidance and a list of useful resources

Note: Please recall that that this is a high-level screening tool, and that the characterization of risks should be complemented with more detailed work.

Table 1: General Guidance Based on Risk Ratings for Exposure, Impact and Outcome/Service Delivery

Insufficient Understanding	Gather more information to improve your understanding of climate and geophysical hazards and their relationship to your project.
No/Low Risk	If you are confident that climate and geophysical hazards pose no or low risk to the project, continue with project development. However, keep in mind that this is a high-level risk screening at an early stage of project development. Therefore, you are encouraged to monitor the level of climate and geophysical risks to the project as it is developed and implemented.
Moderate Risk	For areas of Moderate Risk, you are encouraged to build on this screening through additional studies, consultation, and dialogue. This initial screening may be supplemented with a more detailed risk assessment to better understand the nature of the risk to the project.
High Risk	For areas of High Risk, you are strongly encouraged to conduct a more detailed risk assessment and to explore measures to manage or reduce those risks.

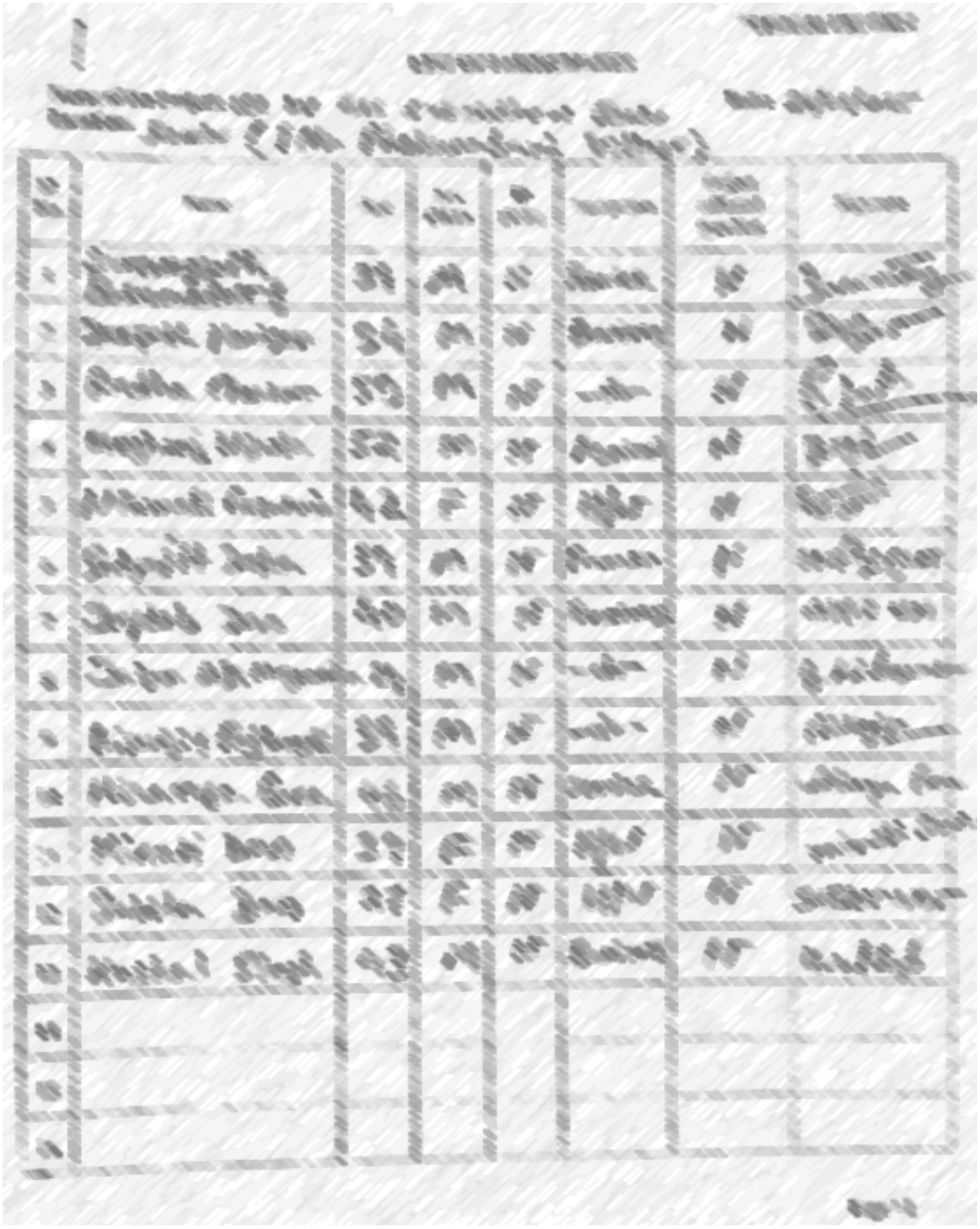
Table 2: Types of Climate Risk Management Measures for Typical energy Projects

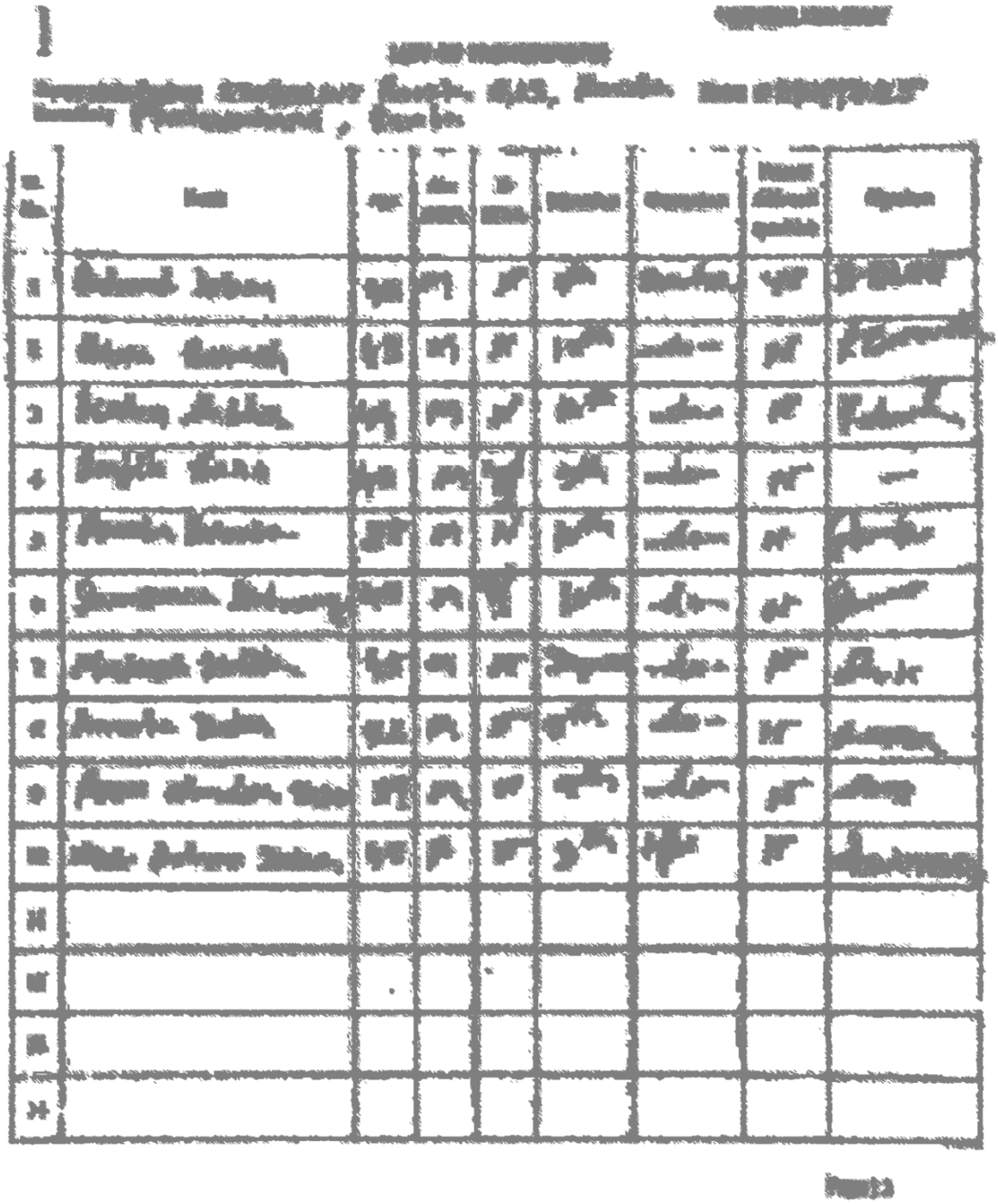
OBJECTIVE	EXAMPLES
Accommodate/Manage	• Develop redundant structures or services that can be relied upon if structures fail • Plan back-up power systems for treatment and pumping facilities • Increase inspection frequency to ensure structures are enduring climate change pressures • For transmission and distribution where higher winds are expected, adopting higher design standards for distribution poles; in the case of increased temperatures, putting in place of more effective cooling systems for substations and transformers • Setting up rapid emergency repair teams to repair damaged facilities quickly

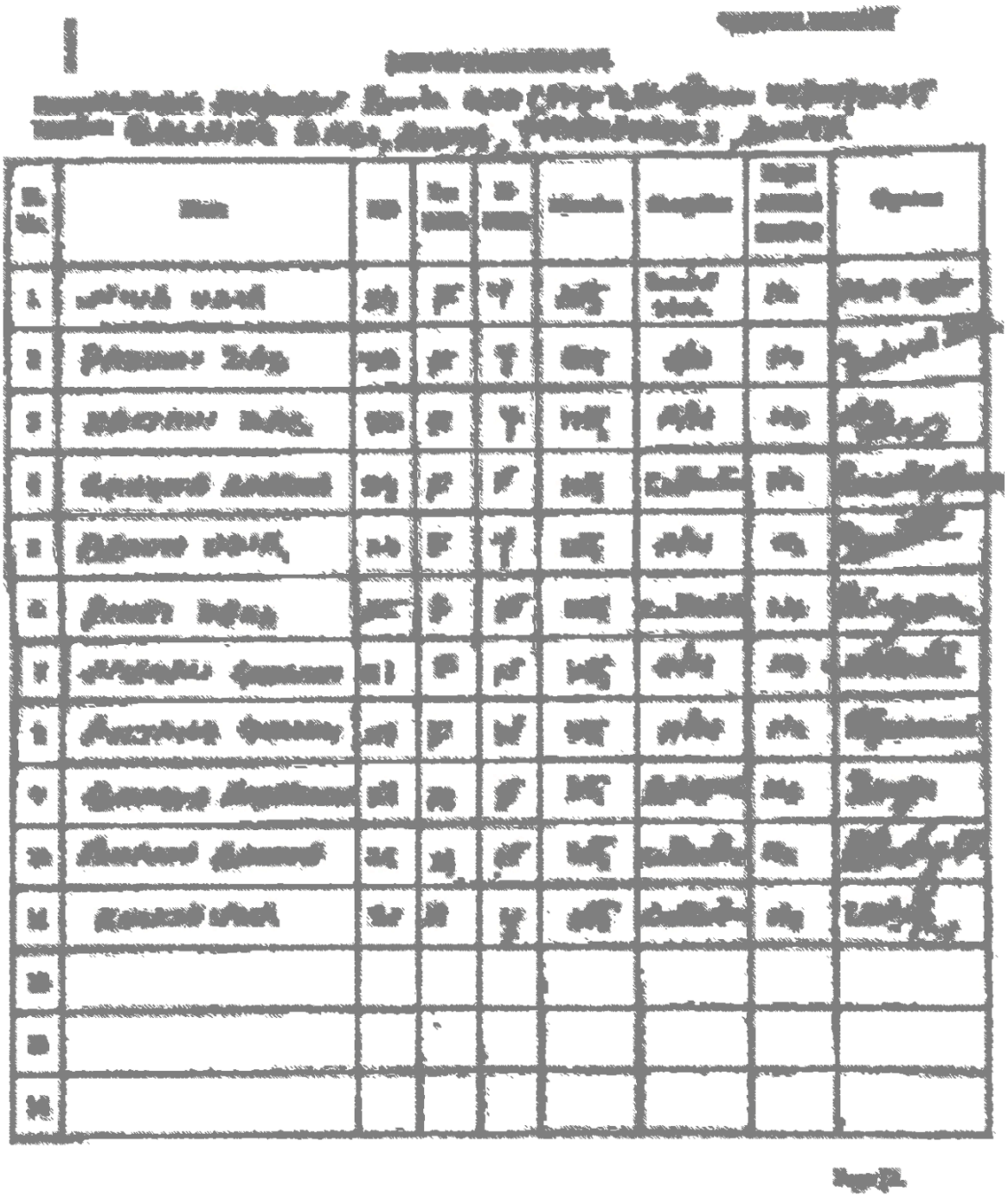
Protect/Harden	• Upgrade existing cooling systems for thermal power • Designing facilities to be waterproofed where increased flooding is expected • Add reinforcements to walls and roofs • Build dikes to contain flooding • Incorporate structural improvements to transmission • For existing hydro infrastructure, operational changes to optimize reservoir management and improve energy output by adapting to changes in rainfall or river flow patterns • For hydropower, restored and better-managed upstream land, including afforestation to reduce floods, erosions and mudslides for a better protection of existing infrastructure • Increase drainage of energy facilities • Employ more robust specifications allowing structures to withstand more extreme conditions (such as higher wind or water velocity) • Design turbines and structures better able to handle increased wind speed and gusts
Retreat/Relocate	• Integrate sea level rise projections and storm surge in coastal siting • Relocate or refit extremely vulnerable existing infrastructure • For hydropower, where water flows changes are expected, consider diverting upstream tributaries, building new storage reservoirs and installing turbines better suited to expected conditions • For transmission & distribution, specifying redundancy in control systems, multiple T&D routes, relocation and underground distribution for protection against adverse conditions may be considered.
Build information collection and management systems	• Strengthen climate information systems, building on existing regional and national networks • For hydropower, strengthen hydrologic forecasting and coordinate power planning and operations with other water-use projects • For electricity end-use, putting in place mandatory minimum energy performance standards for buildings, manufacturing facilities and energy-intensive appliances • Build capacity of national governments to harmonize data across regions • Putting in place more robust operational and maintenance procedures
Strengthen policies, planning and systems	• Integrate climate change and disaster management planning • Improve coordination of policies and programs across government agencies to address the additional pressures imposed by climate change • Foster integrated resource management with agriculture and water • Put in place policies and enforceable regulations to improve energy security, decentralized local planning and generation • Improve forecasting of demand changes and supply-demand with climate change • Improved land-use planning so future power infrastructure is in less vulnerable areas

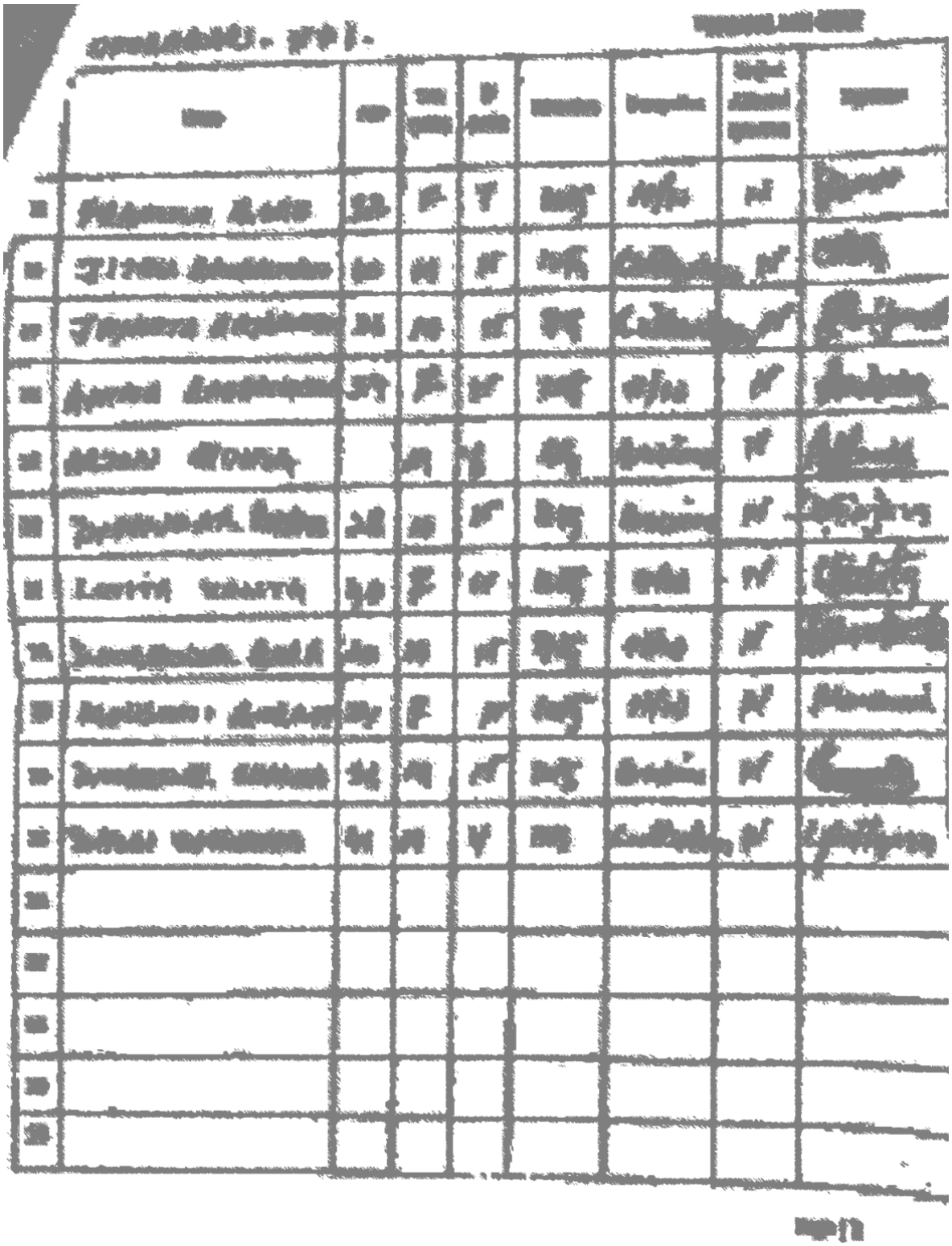
Sources: USAID Climate Risk Screening and Management Tools: Infrastructure, Construction and Energy Annex; ADB Guidelines for Climate Proofing Investments in Energy

Appendix 12 : Attendance Sheet and Photographs of Public Consultation for 220/132 kV Rowta GIS





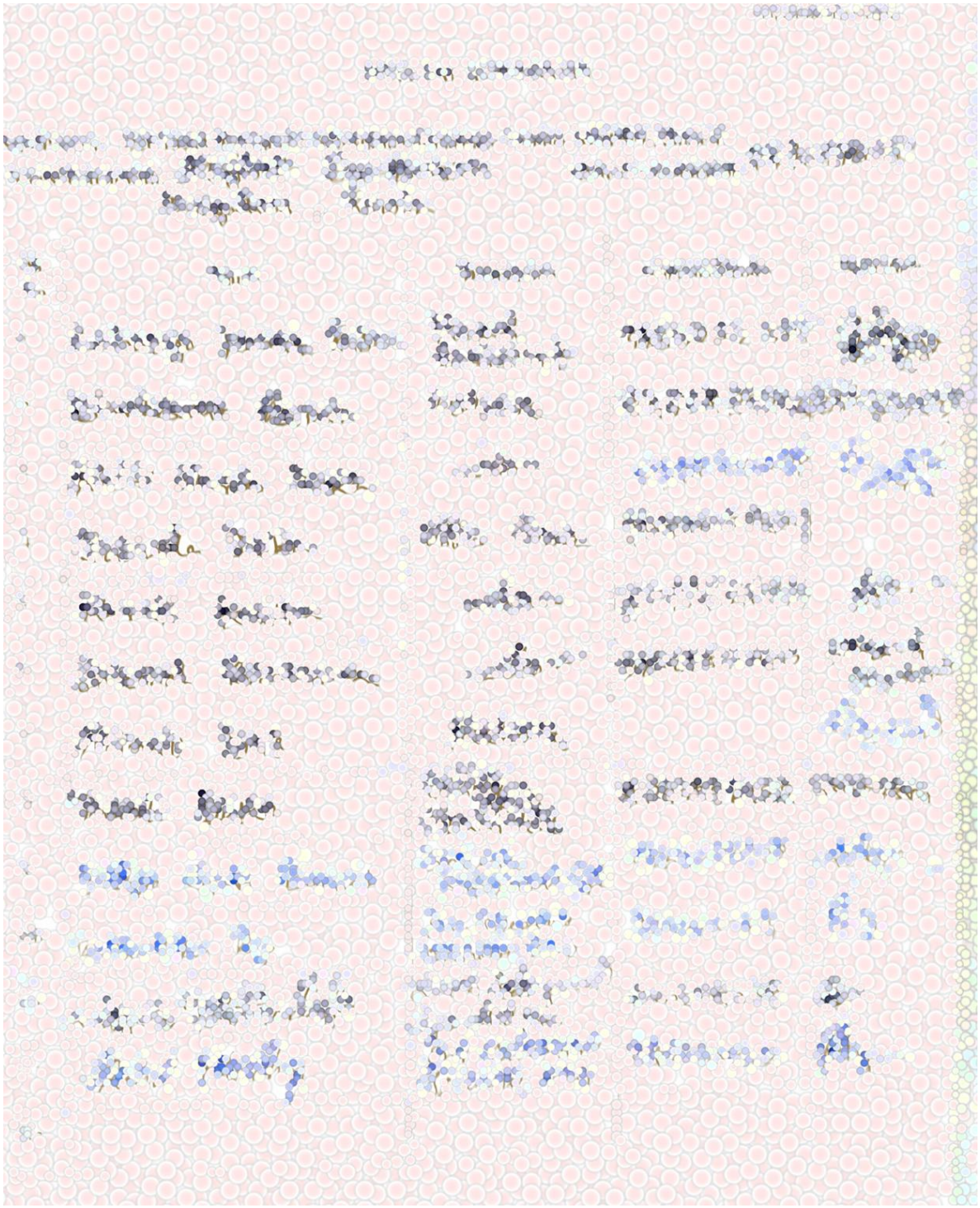


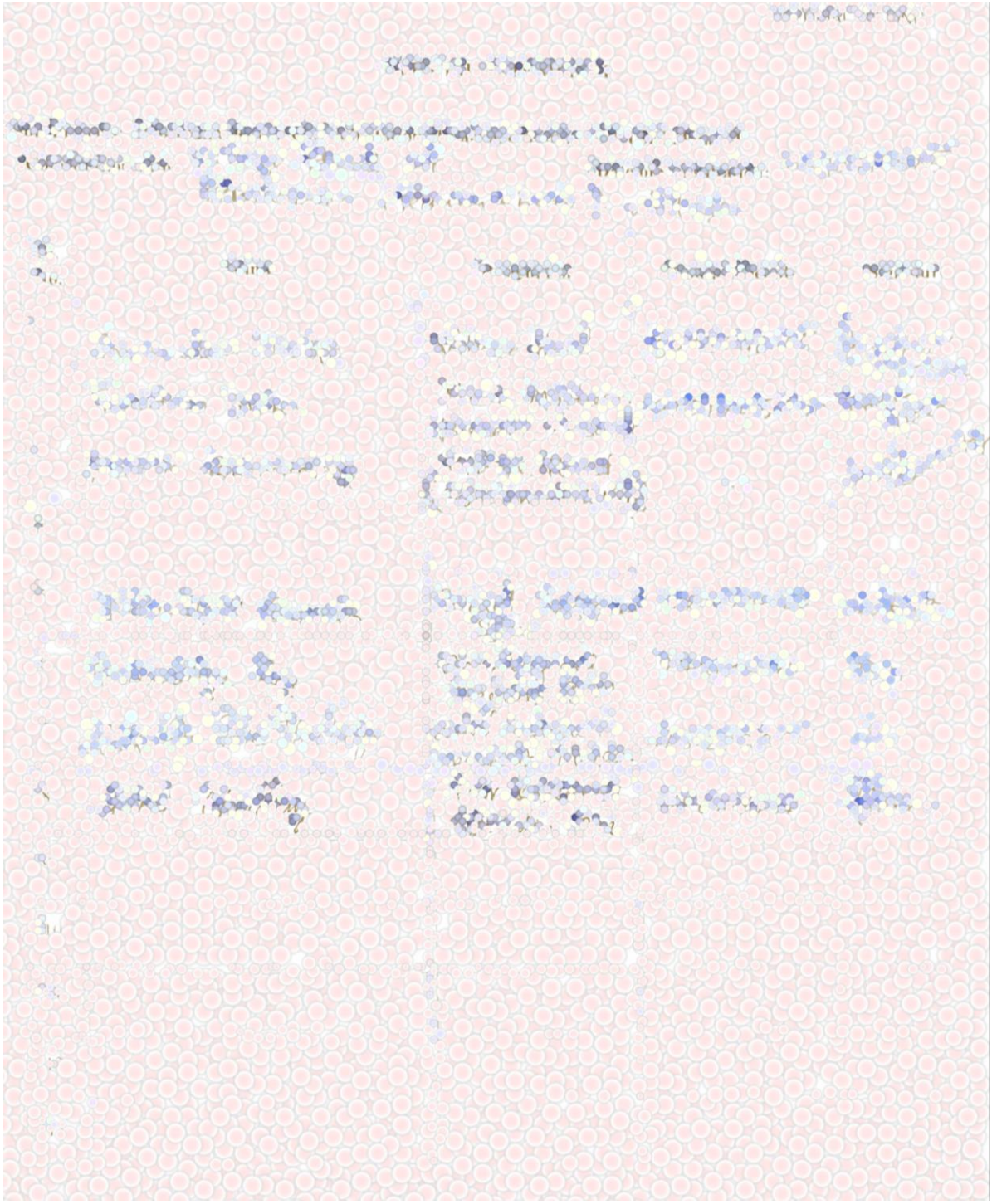


Photographs of Public Consultation at 220/132 kV Rowta Site

Appendix 13 : Photographs of Consultation with Staff residing in existing quarters of Rowta Substation

Appendix 14 : Attendance Sheet and Photographs of Consultation with Local Institution, Rowta

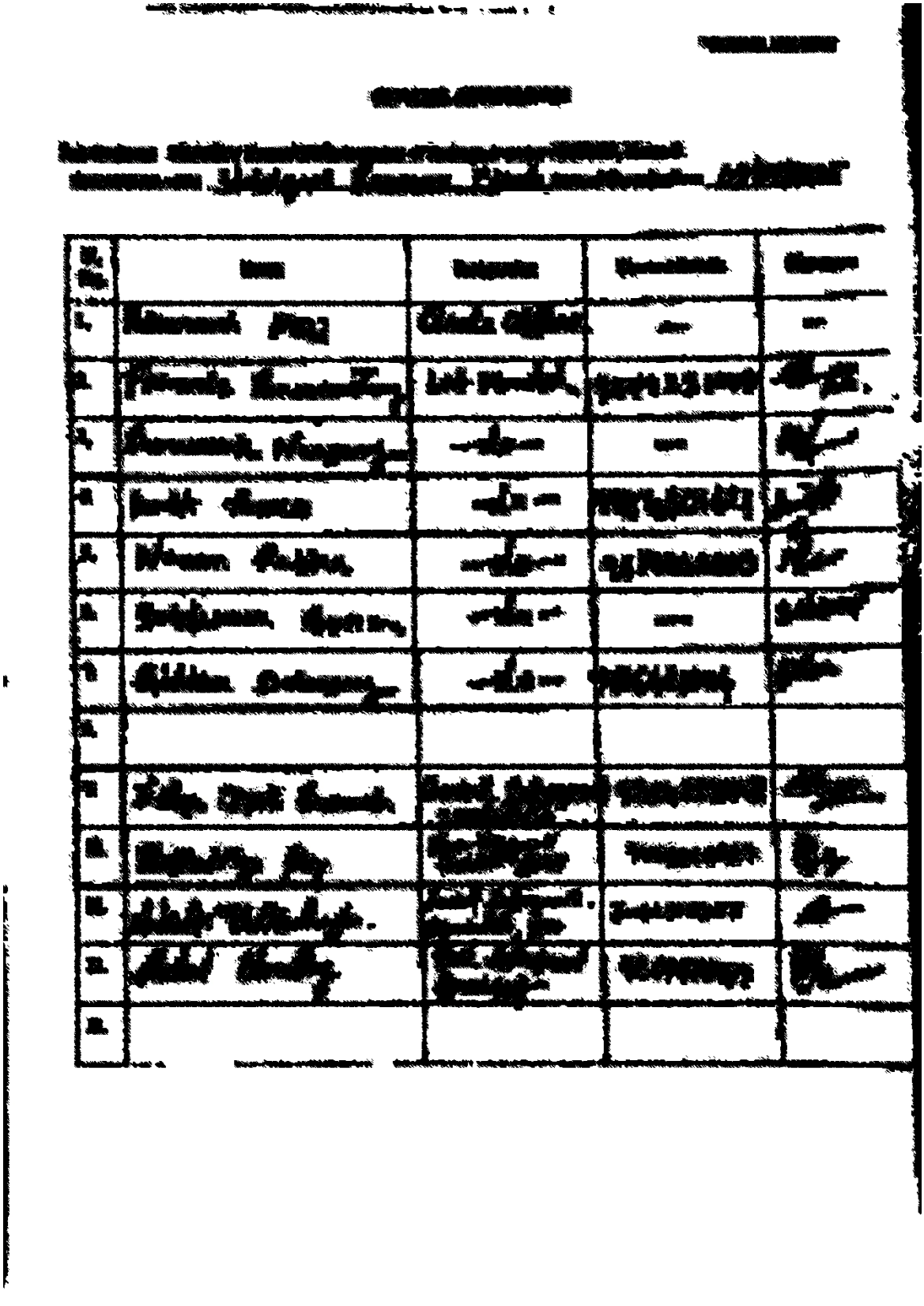




Consultation with Irrigation Dept. Official

Consultation with Village Head

Appendix 15 : Attendance Sheet and Photographs of Consultation with Revenue Circle, Udalguri



Consultation with Revenue Dept. Official

Appendix 16 : Communication with Divisional Forest Office for 220/132 kV GIS at Rowta

Assam Electricity Grid Corporation Limited
Head Office: 1st Floor, Bijulee Bhawan, Paltan Bazar, Guwahati – 781001
CIN:-U40101AS2003SG007238
Phone: 0361-2739520 / Fax: 0361-2739513 Web:www.aegcl.co.in

OFFICE OF THE D.F.O. B.T.R. Regd. 532 Date 21/5/25 UDALGURI

No. AEGCL/RE/RGSS/T-12/2025-26/33 Dtd. 20/05/2025

To,
The Divisional Forest Officer,
Dhansiri Forest Division.

D/A Communicate R.O. Rowta 21/05/25

Sub: Regarding tree felling for site clearance at AEGCL's Rowta GSS site to facilitate the construction of 220/132kV, 2x160 MVA GIS at Rowta under AIIB PKG:P-II-A.

Ref: NoA No. AEGCL/MD/Tech-1119/AIIB-Phase-II/PACKAGE-A/2023/Part-I/02, dtd: 11/03/2025.

Sir,

With reference to the subject mentioned above, I would like to inform you that the construction of 220/132 kV, 2x160MVA GIS at Rowta GSS under AIIB Phase-II is expected to begin very soon. The proposed GIS substation is a critical infrastructure project that will significantly strengthen the power transmission network in the region. It is expected to improve power reliability, reduce transmission losses, and support future load growth in Udalguri and adjoining districts. However, the designated project site is currently covered with various trees and vegetation, which need to be cleared during the initial phase of construction to ensure smooth and timely execution of the work.

Therefore, I request your good office to kindly conduct an assessment of the Rowta GSS land, and guide us through the necessary procedures to obtain clearance for tree felling at the site. Prompt action in this regard will greatly assist in the timely initiation of this important infrastructure project.

This is for favour of your kind information and necessary action.

Yours sincerely,

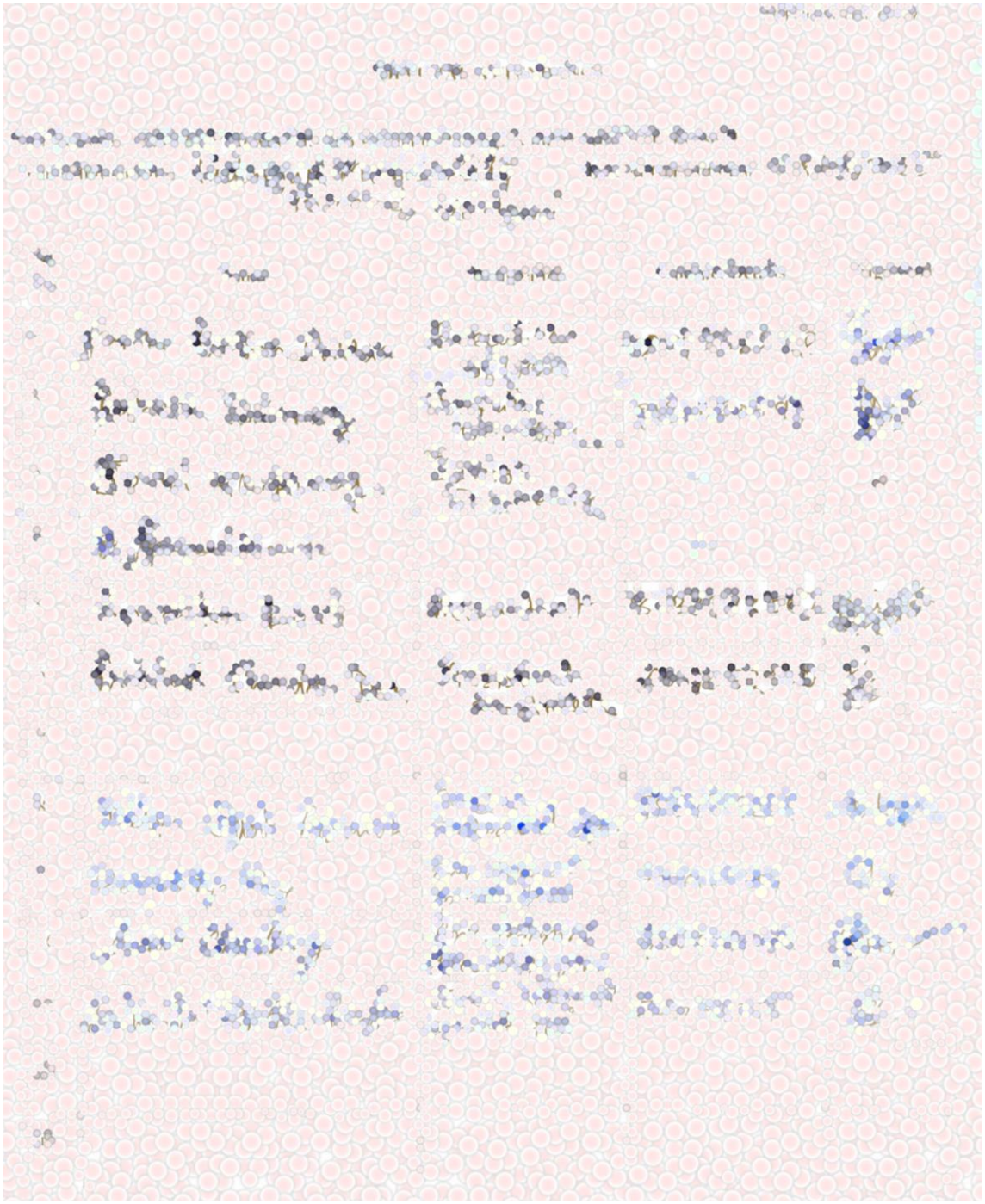
Resident Engineer,
132 kV Grid Sub-Station,
AEGCL, Rowta

Memo no. AEGCL/RE/RGSS/T-12/2025-26/ Dtd.
Copy to:-
(a) The Deputy General Manager, Tezpur T&T Circle, AEGCL, Tezpur, for information.
(b) The Assistant General Manager, Depota Division, AEGCL, Depota, for information.
(c) The Project Manager, Jakson Infra, Udalguri, for information.

Resident Engineer,
132 kV Grid Sub-Station,
AEGCL, Rowta

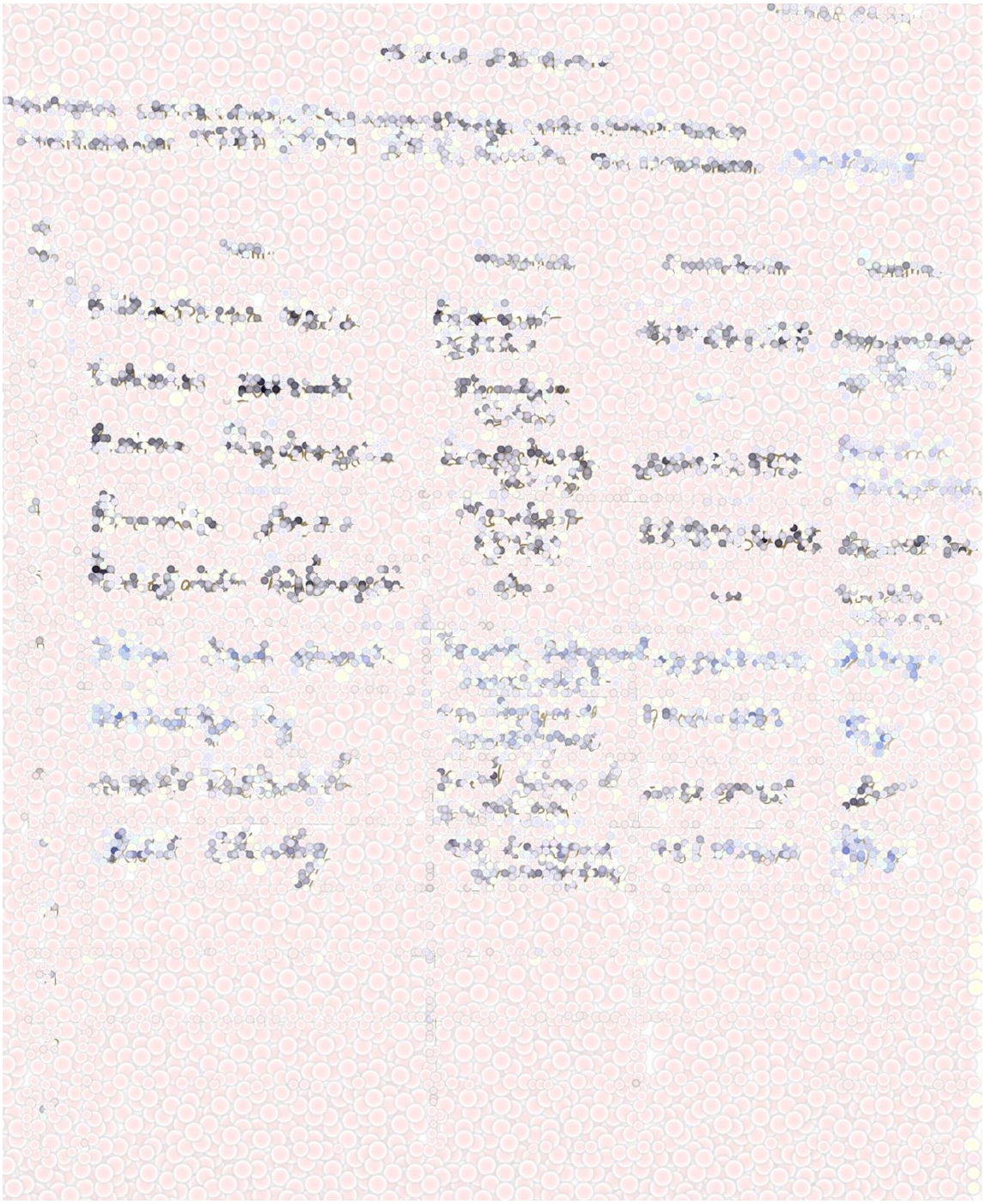
O/o the Resident Engineer, 132KV Rowta Grid Sub-Station, Rowta

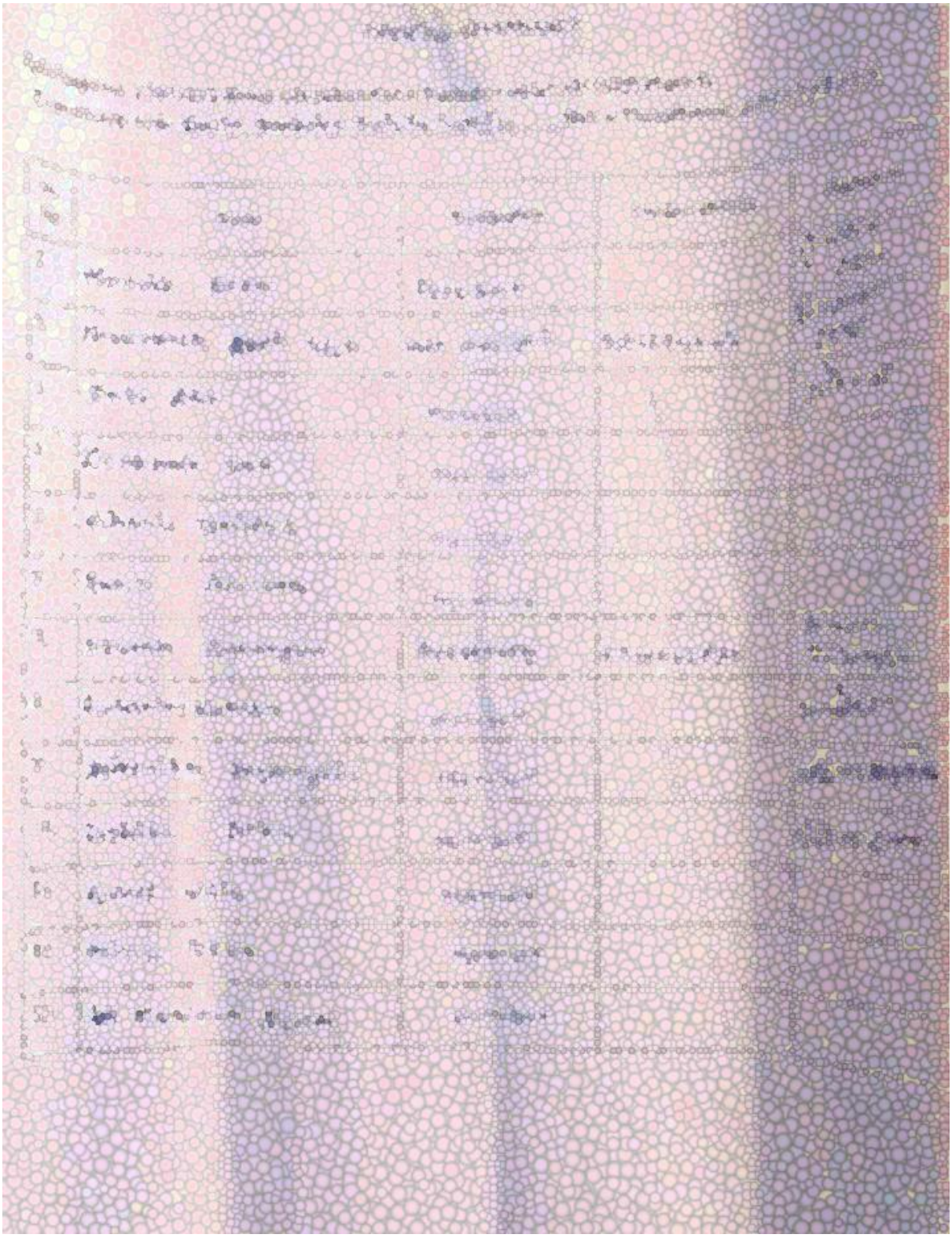
Appendix 17 : Attendance Sheet and Photographs of Consultation with Urban Local Body (Udalguri Municipality Board), Udalguri

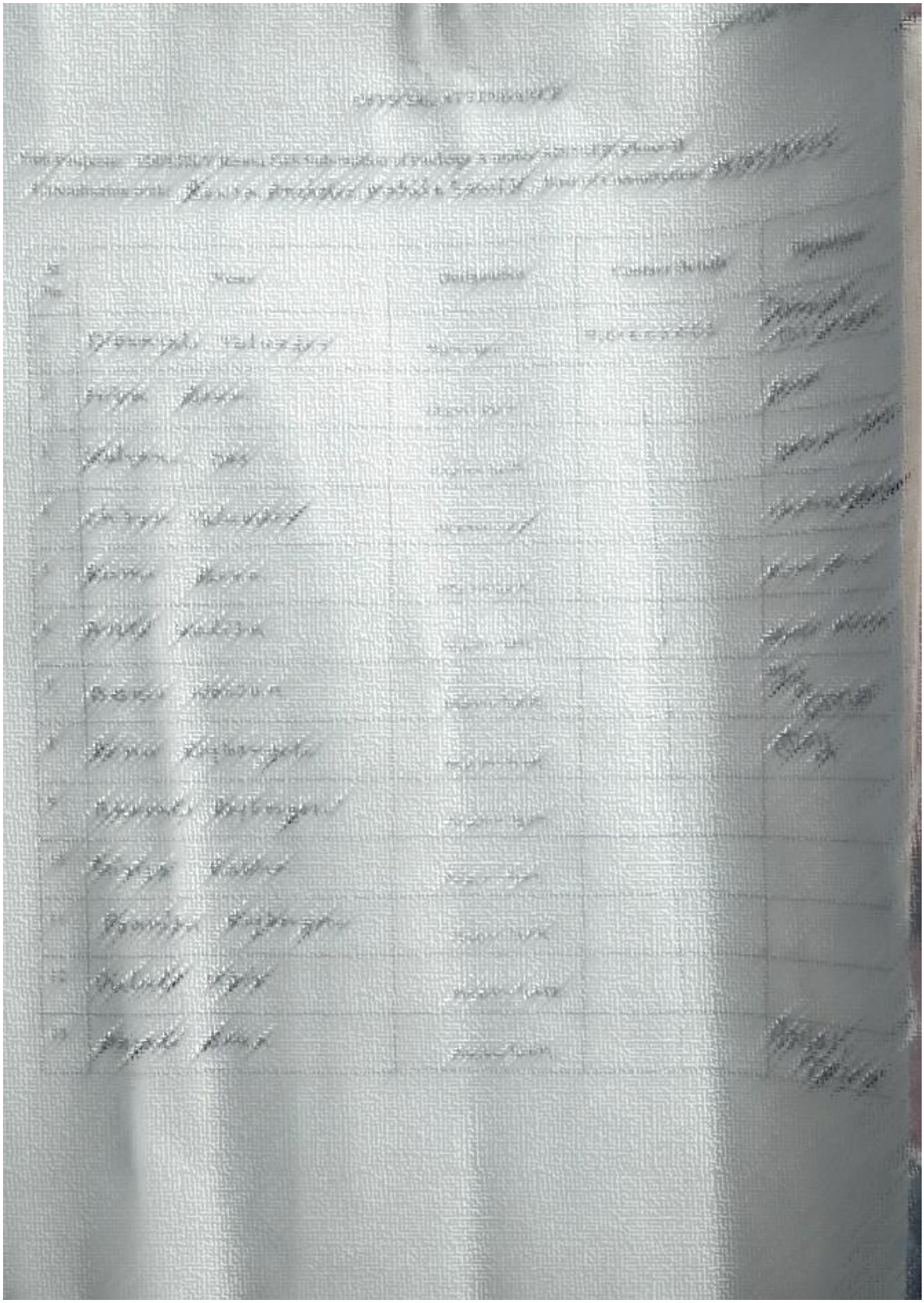


Consultation with Udalguri Municipal Board Official

Appendix 18 : Attendance Sheet and Photographs of Consultation with Self Help Group (SHG) and Rowta Ancholik Mohila Samiti







Consultation with Nabajyoti SHG Members

Consultation with Rowta Ancholik Mohila Samiti

Appendix 19 : Public Consultation Questionary Format

*OFFICIAL USE ONLY

Public Consultation Format

Site/Location_____

Village_____

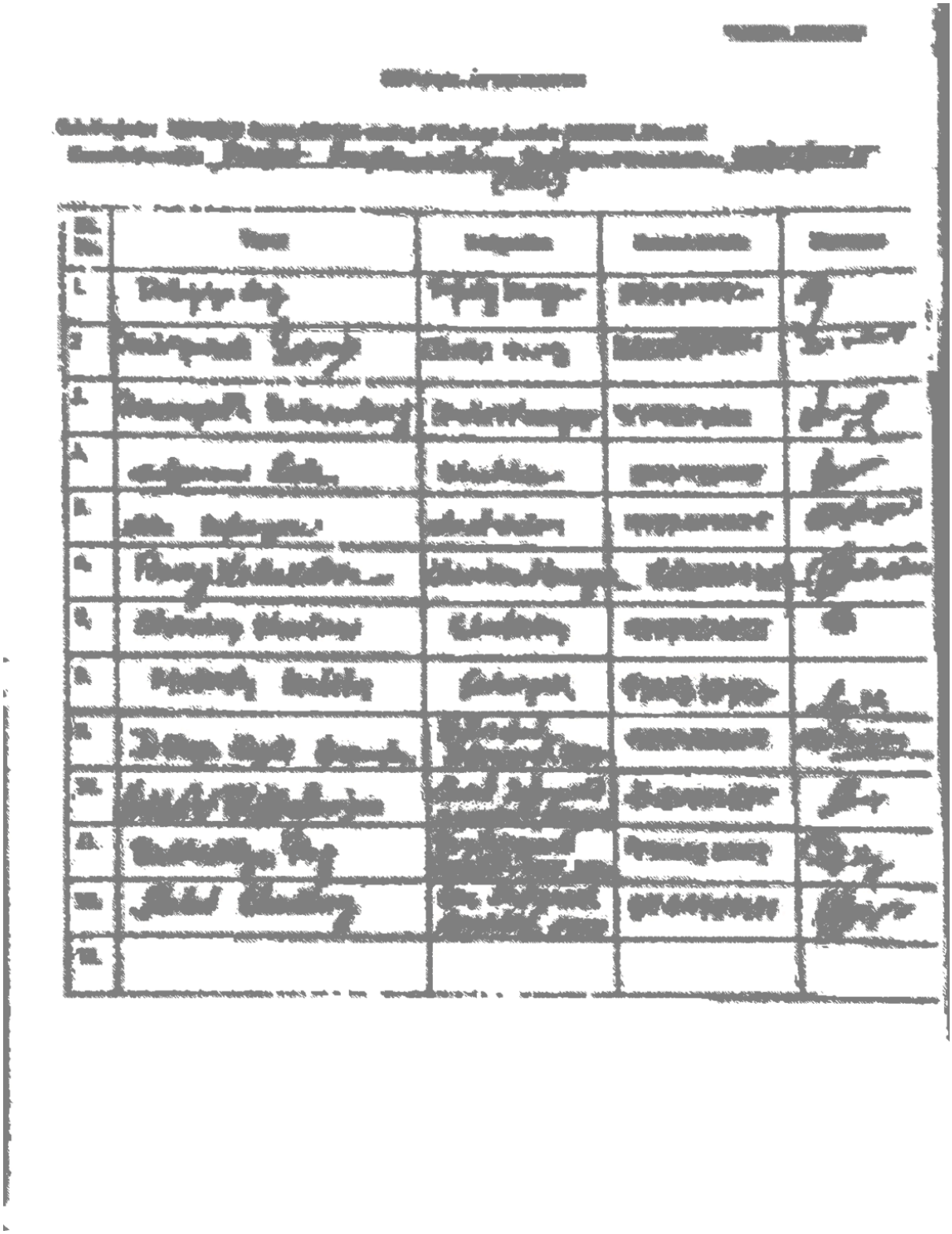
District_____

Date of Consultation_____

Consultation conducted by_____

Sl. No.	Consultation Questions	Participants' Opinion, Comments and Suggestions
1	Have you heard about the proposed 220/132 kV GIS Substation project?	
2	Do you support the construction of the substation and related infrastructure in your area?	
3	Do you have any concerns regarding the construction or operation of the substation?	
4	Do you think the selected site for the substation is appropriate and safe?	
5	Would you or someone in your family be interested in job opportunities (skilled/unskilled) during construction?	
6	Do you think local laborers and vendors should be prioritized for employment and business opportunities?	
7	What are the main sources of livelihood in this area? Will the project affect your agricultural or commercial activities?	
8	What is your primary source of drinking water? Do you face any seasonal shortages or water quality issues?	
9	Do you expect any loss of farmland or crops due to this project?	
10	Are you aware that trees will be cut within the substation boundary for construction? Any concerns regarding this?	
11	Do you foresee any potential health or safety risks due to the construction activities?	
12	Are there any protected areas, forests, or ecologically sensitive zones near the proposed project site?	
13	Are there any migratory animals or birds in this area that may be affected by the project?	
14	Do people from this community migrate to other regions for employment? If yes, where and for what jobs?	
15	What benefits do you expect from the project for your household and community?	
16	Do you expect any kind of loss (land, crops, trees, or other) due to this project?	
17	Do you have any suggestions to improve the implementation of the project in your area?	

Appendix 20 : Attendance Sheet and Photographs of Consultation with PIU Officials, AEGCL Rowta



Consultation with PIU Officials, AEGCL

Appendix 21 : Grievance Register Format

Grievance Register	
Date of Grievance Recorded	
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	