Site Specific Environmental Management Plan (SSEMP)

Of

Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP)

CLIENT: **POWER GRID BANGLADESH PLC**

HANBAEK COMPANY LIMITED

PROJECT: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)

Contract No.: POWER GRID/ADB/3853- BAN/DWZTGEP/400kV&230kV LILO/P1

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Power Grid Bangladesh PLC

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Abbreviations

ADB	Asian Development Bank
AAQ	Ambient Air Quality
APCR	Air Pollution Control Rules, 2022
BEQM	Baseline Environmental Quality Monitoring
DoE	Department of Environment
EHS	Environment, Health and Safety
EMO	Environmental Management Officer
EMP	Environmental Management Plan
ES	Environmental Specialist
GRM	Grievance Redress Mechanism
GW	Groundwater
HCLK	Hanbaek Company Limited, Korea
HSMP	Health and Safety Management Plan
HSEM	Health, Safety and Environment Manager
IEE	Initial Environmental Examination
IES	International Environmental Specialist
LHS	Left Hand Side
MoEFCC	Ministry of Environment, Forests and Climate Change
NL	Noise Level
NGO	Non-Government Organization
PIU	Project Implementation Unit
PIC	Project Implementation Consultant
PPE	Personal Protective Equipment
POWER GRID	Power Grid Bangladesh PLC.
RBS	Riverbed Sediment
RHS	Roads and Highways Department
RoW	Right of Way
SPCR	Sound Pollution Control Rules
SSEMP	Site Specific Environmental Management Plan
SQ	Soil Quality
SW	Surface Water
WQ	Water Quality

Executive Summary

- **Project Overview**

1. This Executive Summary provides an overview of the Site-Specific Environmental and Social Management Plan (SSEMP) developed for the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP), particularly focusing on the 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1). The SSEMP integrates ADB's Safeguard Policy Statement (2009), national environmental regulations (ECA 1995 and ECR 2023), and good international industry practices (GIIP). It is designed to identify, mitigate, and monitor environmental and social impacts throughout the pre-construction and construction phases of the project.

- **Environmental Baseline**

2. Baseline assessments were conducted across the transmission route covering:

- **Air Quality:** PM2.5, PM10, SO_2, NOx levels – all within permissible limits.
- **Noise Levels:** Measured day/night noise for 5 tower sites.
- **Water Quality:** Groundwater and surface water tested for DO, pH, TDS, COD, etc.
- **Soil & Sediment Quality:** Benchmarked against Danish EPA standards (HH ANNEX).

Baseline data is compiled in FF ANNEX with raw monitoring data in GG ANNEX.

- **Management & Mitigation Plans**

3. Detailed thematic management plans were developed and aligned with project risks:

Area	Annex	Key Focus
Camp, Worker Safety	H	Housing, sanitation, PPE, GRM, labor conditions
Waste Management	I, O	Construction waste, hazardous waste, e-waste, medical waste
Public & Occupational Safety	J	Electrical risks, traffic, noise, EMF, community safety
Transportation & Storage	K	Material logistics, traffic control, sensitive areas
Emergency & Disaster Risk	L, Z	Fire, flood, earthquake, accident SOPs
Biodiversity & Bird Safety	F	Migratory routes, buffer zones, invasive species
Tree Plantation & Restoration	M	3:1 compensatory planting, native species, fencing

- **Monitoring, Reporting & SOPs**

4. A full monitoring and reporting mechanism has been institutionalized:

- **Monthly Environmental Monitoring:** Covers air, noise, water, and waste (Annex T).
- **Training Logs and Attendance:** Maintained per topic and frequency (Annex JJ).
- **Raw Data and Test Results:** Available for third-party verification (Annex FF, EE).
- **Documentation Requirements:** Detailed list of contractual and regulatory deliverables (V ANNEX).

- **Training & Awareness**

5. A field-ready Training Implementation Plan (Annex Y) is in place targeting:

- EHS induction & toolbox talks
- Emergency response drills
- PPE use & fire training
- Cultural sensitivity near mosques
- Ecological protection (migratory birds, invasive species)

Trainings are reviewed bi-annually by POWER GRID, contractors, and consultants.

- **Emergency & Risk Response**

6. The SEP (Annex KK) outlines:

- 10 types of emergencies including fire, flood, electrocution
- First responder teams trained in fire safety, spill response, and evacuation
- Coordination with hospitals, fire services, and local authorities

- **Community Engagement & Grievance Mechanism**

7. Community liaison roles are defined across 12 impact areas (Annex S):

- Engagement schedules, reporting templates, and responsibilities
- GRM access via trained community liaison officers
- Transparent disclosure of project updates and mitigation

- **Implementation Schedule**

8. The project's SSEMP implementation is phased (Annex T), including:

- Environmental testing schedule (air, noise, soil, water)
- Mitigation timelines for dust suppression, camp sanitation, solid waste
- Monthly training and continuous monitoring activities

- **Conclusion**

9. This SSEMP integrates comprehensive environmental safeguards, proactive risk management, and participatory stakeholder engagement to ensure that the project meets all environmental and social obligations while upholding community health, ecological balance, and sustainable construction practices.

1 Introduction

1.1 Background

10. The Power Division, under the Ministry of Power, Energy and Mineral Resources (MPEMR) leads the power sector while the Bangladesh Energy Regulatory Commission (BERC) is the regulatory agency which regulates electricity, gas, and petroleum sectors. The electricity sector is unbundled into generation, transmission, and distribution segments. Backbone transmission lines and substation network in the country are operated by the Power Grid Bangladesh PLC. shortly known as the Power Grid. As of December 2018, Power Grid network comprised, transmission lines operated at 400 kV, 230 kV and 132 kV voltage levels with a total length of 11,396 circuit km and 132/33 kV substations with a cumulative capacity of 20,211 MVA. Development of transmission and distribution network in line with generation has been identified as a key element of the power sector strategy in the 'Bangladesh Seventh Five Year Plan FY2016 – FY2020'. Development of an inter-region transmission network is required due to the unbalance in concertation of generation and demand, while local network expansions are required to cater the increasing demand at new load centers. Due to the growing electricity demand, a considerable number of grid substations and transmission lines have already been overloaded. Therefore, urgent upgrades and expansions are required by POWER GRID to supply power to the key economic corridors in the southern and western regions including greater Dhaka area.

11. The **Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP)** focuses on expanding the local transmission network to deliver electricity to new and expanding load centers while meeting the network operating criteria. The People's Republic of Bangladesh applied for financing for transaction technical assistance (TRTA) from the Asian Development Bank (ADB) to conduct assessments to prepare the investment project. The concept paper for the project was approved by ADB on 6th March 2019, comprising three main investment components namely;

- **Component 1:** Transmission system in Greater Dhaka expanded. The project will construct and commission substations with a total capacity of 4,450 MVA and 40 km of transmission lines in Greater Dhaka.
- **Component 2:** Transmission system in Western Zone expanded. The project will construct and commission substations with a total capacity of 3,070 MVA and 368 km of transmission lines in western zone.
- **Component 3:** Institutional Capacity of POWER GRID strengthened. The project will enhance capacity by (a) supporting installation and operation of an enterprise resource planning (ERP) system to assist POWER GRID in optimally managing its capital-intensive assets; (b) establishing a Drone Inspection Center within the operation and maintenance department of POWER GRID with some gender equality element.

12. On behalf of the government, overall coordination of the project will be managed by MPEMR. POWER GRID will be the Executing Agency (EA) for Component 1, 2 and 3. The project preparation, implementation, monitoring, and reporting to ADB and the government will be handled by the Project Management Unit (PMU) established by POWER GRID. EPC Contractors with separate environmental officer and Health & Safety Officer for each

package will implement Environment Management Plan (EMP). Designated PMU engineers will be trained and supervised by the POWER GRID safeguards unit to work together with contractors for EMP implementation.

13. The scope of the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGE) has been revised to reflect changes in the transmission line construction. Initially, the project included the construction of the Kaliganj-Purbachal 400 kV transmission line (18 km). However, due to Right of Way (RoW) issues related to another project of Power Grid Bangladesh PLC , it has been decided that the Kaliganj-Purbachal line will be built as part of the Ghorashal-Kaliganj-Purbachal-Bashundhara line under that project. As a result, the scope of the DWZTGE project has been reduced, and only the connection from this line to Kaliganj and Purbachal substations will be included in the current project. Consequently, there will be no additional social impact due to this scope reduction. Additionally, the LILO (Loop-in Loop-out) of the Kaliakoir-Bhulta 400 kV line to Kaliganj has been excluded, as this line has not been constructed yet. The revised project scope now includes the LILO of the Tongi–Ghorasal 230kV double circuit line at Kaliganj, covering a distance of 3.39 route-km (Four Circuit).[1]

14. The Contractor shall (a) establish an Environmental management system to reduce or mitigate Environmental impacts during operational phase (b) comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor the implementation of the project EMP through the SSEMP, (c) allocate the budget required to ensure that such measures requirement and actions are carried out, (d) submit quarterly reports on the compliance of such measures to the employer.

15. Where unanticipated environmental risks or impacts become apparent during the Contract, the Contractor is required to update the SSEMP to outline the potential impacts to site works and associated mitigation measures for the Technical Approval.

16. The IEE stipulated the need for Site Specific Environmental Management Plan (SSEMP) and specified the preparation of the SSEMP to cover particular aspects of Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1).

17. The SSEMP is based on the Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMP) as formulated in the project Initial Environmental Examination (IEE), wherein the environmental impacts associated with the construction work and the corresponding mitigating measures are identified, and described.

1.2 Objectives of SSEMP

18. The objective of the plan is to provide an examination and management and monitoring of the principal environmental impacts of the proposed project. The outline of a Site-Specific Environmental Management Plan is also suggested with an indication of the extent of work

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to be done to keep the development and environment compatible. The specific objectives of this SSEMP are to:

- ❖ Identify and describe elements of community and environment which are likely to be affected by the proposed project, including natural and socio-economic environment;
- ❖ Identify the aspects of the project likely to result in significant impacts on the resources/receptors;
- ❖ Identify and provide risk management actions in compliance to the identified risks;
- ❖ Develop plans for management and monitor the impacts during the construction of the project;
- ❖ Predict and evaluate the significance of the impacts of the project;
- ❖ Identify the (environment, social, and health) aspects of the project that need to be managed and recommend appropriate and justified mitigation and enhancement measures;
- ❖ Identify and suggest remedial actions against the anticipated impacts;
- ❖ Conservation of natural resources and biodiversity through proper implementation of mitigation measures;
- ❖ Establish an Environmental management system to reduce or mitigate Environmental impacts during operational phase for managing environmental impacts;
- ❖ Comply with the approved SSEMP and any corrective or preventative actions set out in safeguards monitoring reports to monitor the implementation of the project EMP through the SSEMP;
- ❖ Where unanticipated environmental risks or impacts become apparent during the Contract, the Contractor is required to update the SSEMP to outline the potential impacts to site works and associated mitigation measures for the technical approval.

19. The purpose of the SSEMP is to identify potential environmental risks and impacts, and to develop a plan to minimize or eliminate these impacts. The plan suggested specified remedial actions against all possible environmental issues and components. Sixteen (16) Sub plans have been prepared in corresponding to mitigate all the issues.[2] They are

    a) Air Quality Management Plan

    b) Noise Level Management Plan

    c) Land Use and Soil Management Plan

    d) Water Resources Management Plan

    e) Ecological Resources (Flora and Fauna) Management Plan

[2] Among 16 management plans most of them are developed following the IEE and EMP report and later based on the recommendations from Power Grid other management plans have been incorporated.

f) Migratory Bird Management Plan

g) Socio Cultural Environmental Issues

h) Camp, Work Site Safety, And Immigrant Workers Management Plan

i) Waste Management Plan

j) Occupational and Public Health and Safety Management Plan

k) Transportation and Storage Material Management Plan

l) Disaster and Emergency Risk Response Plan

m) Tree Plantation Plan

n) Site Specific Traffic Management Plan

o) Site-specific management plans for safety, waste, and hazardous materials

p) Effluent Management Plans

20. All the remedial action plans mentioned above have been suggested based on general requirements for a SSEMP will be made sure and furthermore mitigation measures will be applied.

21. A monitoring plan in section **7.2:Environmental Monitoring Work Schedule** has been attached to mitigate and monitoring of ambient air quality, ambient noise level, vibration level, water (surface and ground) quality, soil and sediment quality and other various measures that have been mentioned in the EMP.

1.2.1 Scope of SSEMP

22. The scope of the Site-Specific Environmental Management Plan (SSEMP) for the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP) focuses on managing the potential environmental impacts arising from construction activities within the designated project area, which encompasses the proposed 400kV and 230kV transmission lines, towers, substations, and associated base camps. The study area is defined as a 2 km radius from the proposed transmission lines and infrastructure.

23. The 2 km radius for the study area surrounding the proposed transmission lines and infrastructure has been chosen based on established practices for assessing environmental and social impacts. This radius is commonly used in similar infrastructure projects to account for both direct and indirect effects, such as air and noise pollution, soil erosion, and impacts on local communities and wildlife. In Bangladesh, this approach has been adopted in several projects, such as the Environmental and Social Impact Assessment (ESIA) for the Meghnaghat 600 MW Combined Cycle Power Plant and the 220kV Transmission Line projects by the POWER GRID BANGLADESH PLC, which utilized a 2 km study area to assess potential impacts on nearby environments and communities. This radius ensures a comprehensive analysis of the environmental footprint of the project, considering both the immediate and extended impact zones. The **2 km radius** is consistent with national standards and aligns with best practices for such infrastructure projects. The revised project scope now includes the LILO of the Tongi–

Ghorasal 230kV double circuit line at Kaliganj, covering a distance of 3.39 route-km (Four Circuit).[3]

24. The primary objectives of the SSEMP are to identify, assess, and mitigate the environmental impacts of the construction phase while ensuring the protection of human, biological, and physical environments surrounding the project area. The responsibilities under this plan extend beyond the project boundaries to include:

    - All logistics activities, including transportation routes and vehicle movement in and out of the project site, must adhere to environmental protection standards to minimize the risk of soil erosion, air pollution, and traffic congestion in surrounding communities.
    - Any construction activity that may result in significant environmental impacts, such as soil disturbance, air and water pollution, noise, or disruption to local wildlife, will be included within the scope of this plan. These activities must comply with both national and international environmental standards.
    - All activities during construction will be aligned with the Initial Environmental Examination (IEE) and Environmental Management Plan (EMP) findings, and will follow the mitigation measures outlined therein, ensuring full compliance with the approval conditions from the Department of Environment (DoE), Bangladesh.
    - Continuous monitoring and periodic reporting will be conducted throughout the construction phase to ensure compliance with environmental regulations, as well as the effective implementation of mitigation measures. The reports will be submitted to the Project Management Unit (PMU) and relevant stakeholders, including the Asian Development Bank (ADB), as per the contractual obligations.

25. This SSEMP defines the approach to environmental management implementation of the project. Compliance with the SSEMP, the procedures, work practices and controls will be mandatory and must be adhered to by all personnel and contractors employed on the construction phase of the transmission line project. This SSEMP seeks to promote best environmental practices on-site for the duration of the construction phase.

1.3 Methodology

26. This report is based on data gathered from both primary and secondary sources throughout the study period, including baseline surveys and field observations conducted at the proposed project site and construction area. Data collection methods involved secondary data from various references, along with insights gained from field visits and information provided by the project proponent. Reconnaissance visits and detailed baseline survey means detailed baseline assessment like assessment of ambient air and noise, and collection of GW, SW and Soil samples. Survey includes bird management, OHS plan, ecological resources, transportation ways, etc. of the surrounding areas were carried out, followed by an assessment of the gathered information to identify key

[3] Social Monitoring Report Project No: 51137-003
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environmental concerns associated with the project. Sample questionnaires for the survey have been attached to II ANNEX:

27. The following steps were followed throughout this process:

- Screening of the project and scoping of anticipated impacts through analyzing project components, and activities at the beginning of the study;
- Undertaking field surveys toward the collection of primary baseline environmental and social information about the project area;
- Collection of secondary information from different government and non-government portals;
- Compilation of survey/monitoring data. Field survey using a prepared questionnaire conversing a wide cross-section of people in the study area to acquire field-level data on the existing environment and socio economics and apprehended impacts due to the project;
- Identification of potential impacts/risks and evaluation of their consequences;
- Formulation of mitigation and avoidance measures was done for identified risks.

1.4 Key Environmental Management and Other Documents

28. The list of key environmental management documents/references used for carrying out the SSEMP study and preparation of the report is given below.

- Bangladesh: Dhaka and Western Zone Transmission Grid Expansion Project – Initial Environmental Examination (IEE) Report ***(October 2019)***
- Bangladesh: Dhaka and Western Zone Transmission Grid Expansion Project – Environmental Monitoring Report ***(August 2024)***
- Bangladesh: Dhaka and Western Zone Transmission Grid Expansion Project-Social Monitoring Report ***(September 2024)***

1.5 What is SSEMP

29. A **Site-Specific Environmental Management Plan (SSEMP)** is a comprehensive document that outlines environmental management measures for a specific project site where construction or industrial activities will occur. It serves to identify potential environmental risks, assess their impacts, and establish a framework for implementing mitigation measures to ensure sustainable and compliant project execution. The SSEMP typically includes a site description, an assessment of environmental risks, and detailed management strategies covering aspects such as air and water quality, waste management, biodiversity conservation, and occupational health and safety. Developed in collaboration with regulatory agencies, stakeholders, and local communities, it helps ensure that the project aligns with environmental regulations, industry best practices, and social considerations. The SSEMP acts as a guiding document for project teams, ensuring proactive environmental responsibility and compliance throughout the project lifecycle.

2 Laws and Legislations

31. The project is subject to the environmental requirements of both Department of Environment (DoE) and Asian Development Bank (ADB). These requirements are defined in the following sections.

2.1 Applicability of National and International Law and Legislations

32. The national environmental standard set by DoE and international regulations like Asian Development Bank (ADB) have implemented a well- defined legal framework for protection, conservation and management of the biophysical and social environment.

33. Those most relevant in project context are summarized in the following table. Laws/rules/acts ordinances pertaining to forests and other environmental domains having no interaction/effect directly or indirectly with the project activities have not been discussed.

Table 1: National Policies and Acts Relevant to the Project

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Environmental Conservation Rules, 2023	Ministry of Environment Forests and Climate Change	❖ Declaration of Ecologically critical areas ❖ Requirement of environmental clearance certificate for various categories of projects ❖ Requirement of IEE/EMP as per category ❖ Renewal of the environmental clearance certificate within 30 days after the expiry Provides standards for quality of air, water and sound and acceptable limits for emissions/discharges from vehicles and other sources	Applicable as the project falls under the "Red" Category
Air Pollution Control Rules-2022	Ministry of Environment, Forests and Climate Change	❖ Prevention of Air Pollution ❖ Standards for Ambient Air Quality	Applicable since several air pollution sources like construction activities and other project activities.
Environment Conservation Act, 2010 (Amendment)	Ministry of Environment, Forest and Climate Change	This Act aims to provide for further amendments to the Bangladesh Environment Conservation Act No. 1 of 1995. Amendments regulate and give new definition to several aspect of the original Act, such as: wetland; hazardous waste; ecologically critical area; restriction on cutting hill; restriction on production, import, storage, loading, transportation etc. of hazardous waste to protect the environment; restriction on pollution; environmental clearance certificate; penalties; claim for compensation; confiscation of materials and equipment involved; etc.	Applicable as the project will need to protect the environment during its construction and operation phase
Noise Pollution (Control) Rules, **2006**	Ministry of Environment, Forest and Climate Change	❖ Prevention of Noise pollution ❖ Standards for noise levels	Applicable since several noise generating sources like motorized vehicles and heavy machineries

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Environment Conservation Act, 1995 (amendments in 2000 & 2002)	Ministry of Environment, Forest and Climate Change	❖ Define Applicability of environmental clearance ❖ Regulation of development activities from environmental perspective ❖ Framing applicable limits for emissions and effluents ❖ Framing of standards for air, water and noise quality ❖ Formulation of guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment ❖ Declaration of Ecologically critical areas	Applicable as according to this act (Section 12), no industrial unit or project shall be established or undertaken without obtaining, an Environmental Clearance Certificate (ECC) from the Director General of DoE.
Bangladesh Labor Law, 2006; **Bangladesh Labor Rules 2015**	Ministry of Labor	This Act pertains to the occupational rights and safety of workers and the provision of a comfortable work environment and reasonable working conditions	Applicable. POWER GRID to include all relevant clauses of this act in contract document to ensure that labor's right is protected.
Solid Waste Management Rules 2021	Ministry of Environment, Forest and Climate Change	❖ When recovering resources from waste, the principles of management that consider the waste hierarchy, such as the 3Rs, segregation, and reduction, must be followed at all stages from waste generation to final disposal. ❖ Responsibilities of waste generators, consumers, and users Dispose of waste in accordance with the regulations of authorities including local government. Dispose of waste separately. Do not dump, store, or burn waste outdoors. ❖ Raise public awareness of proper waste management. ❖ Dispose of all waste generated at one's place of work or residence in the manner prescribed by the local government authority and other authorities or institutions; ❖ Separate the biodegradable, indigestible and hazardous solid waste as described in Schedule 1 in 3 (three) containers with different lids in their installations. And	Applicable as the project site will generate various solid wastes during construction purposes

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		put in the designated dustbin for the specified class of waste designated by local government authority or other authorities; ❖ Not to expose any part of the waste, from which (a) Animal may spread waste; (b) May be spread foul odor; (c) May be mixed with air; (d) May fall; or (e) Waste may leak liquids; ❖ Waste generated from construction and demolition of infrastructure should be kept separately before handing over to local government authorities so that dust does not spread in the air or fall through the rainwater; ❖ Not to dispose individually or collectively generated waste outside its yard/premise in open space, drains or water and not to burn it in open space; and ❖ Not to dump solid waste in parks, stations, terminals or public places accept certain dustbins.	
The Bangladesh National Building Code (BNBC) 2020	Building Construction Committee, GoB	Sets out the constructional responsibilities of relevant authority to adopt precautionary measures to ensure the safety of the workmen. According to Section 1.2.1 of Chapter 1 of Part 7, "In a construction or demolition work, the terms of contract between the owner (**Power Grid**) and the Hanbaek Company Limited, Korea and the owner (**Power Grid**) shall be clearly defined.	Applicable since the project involves construction activities
Electricity (Amended) Act 2018	Ministry of Power, Energy and Mineral Resources	❖ Licensing of transmission operators. ❖ Safety standards for transmission lines. ❖ Rights and responsibilities of transmission line licensees and consumers. Rules for constructing, maintaining, and operating transmission infrastructure.	Applicable as the project consists of constructing transmission lines

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Electricity Act, 2018	Ministry of Power, Energy and Mineral Resources	If a land acquisition is required for the establishment of a power generation plant/park or sub-station, it shall be deemed to have been necessary for public interest and the existing laws and regulations on an acquisition of land shall have to be followed. ❖ If any private company holding license requires any land for constructing any connection line with the power station. Sub-station or grid substation the licensee may purchase or acquire such land from the concerned landowner in accordance with the existing laws and regulations regarding land acquisition. ❖ No licensee shall harm or obstruct or interfere with railways, highways, airports, waterways, canals, docks, wharves and jetties and pipes, during power generation, transmission, supply, or distribution. ❖ The licensee shall take all logical precautions during construction of power supply lines and doing civil works so as not to have any harmful effect on the communication system of telegraph, or electromagnetic signal emitting lines by way of induction or any other means.	Applicable as the project will subject to the act of transmitting electricity through a transmission line to the national grid.
Electricity Rules 2020 and amendments in 2022	Ministry of Power, Energy and Mineral Resources	❖ Electricity Rules have been published by ministry on November 2020 based on Clause 59 of Electricity Act 2018 (SRO 297 of Act/2020). The main observation is to provide compensation for the installation of transmission line towers to the landowners as per the applicable laws and policy. ❖ The Electricity Rules 2020 provides guidelines for RoW selection, impact identification and compensation for the affected assets including the land required for construction of towers. ❖ Replacement cost for the land affected for construction of towers under electricity rules 2020.	Applicable as the project will be subject to the act of transmitting electricity through a transmission line to the national grid. **Power Grid** shall ensure to provide compensation to project affected persons (PAPs) according to the rules.

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		One-time Cash compensation to the legal landowners at current market price and for damaged crops and any other affected assets according to Electricity Rules 2020.	
Bangladesh Water Act 2013	Ministry of Water Resources	1. Right to water 2. Adoption of National Water Policy and National Water Resources Plan 3. Clearance Certificates 4. Water Stressed Areas and Safe Yield 5. Restricting abstraction, Protection Orders and Compliance Order 6. Right to information and false information 7. Water resource protection / pollution control and water quality standard	Applicable as the project will consist of constructing transmission lines beside various water bodies
Bangladesh Water Rules 2018	Ministry of Water Resources	❖ It was enacted after the Bangladesh Water Act 2013 ❖ Right to water and clean drinking water ❖ Impose of national water policy ❖ Compliance order, removal order by national committee	Applicable as the project has the use of water during its construction period
The Acquisition and Requisition of Immovable Property Act 2017	Ministry of Land	❖ Current GoB Act and Guidelines, relating to acquisition and requisition of land ❖ It has been replaced with the 1982 ordinance in order to overcome its shortcomings ❖ "Acquisition means acquiring the ownership and possession of any immovable property for any requiring person or organization in exchange for compensation or rehabilitation or both."	Applicable
Fire Prevention & Extinction Act- 2003 & Fire Prevention & Extinction Rule-2014	Bangladesh Fire Service & Civil Defense	❖ Legislation to form rules and regulations for Fire Prevention and Extinction and Rescue Work from the Fire Combustion	Applicable since the project involve activities demanding fire-fighting arrangement
Hazardous Waste Management Rules, 2011	Ministry of Environment, Forest and Climate Change	❖ Restriction of storage of hazardous waste more than 90 days ❖ Enforcement to dispose only through the licensed collector	Applicable

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
National 3R Strategy for Waste Management, 2010	Ministry of Environment, Forest and Climate Change	❖ Provide guideline to develop waste management strategy according to 3R ❖ Sector specific promotion strategy for 3R	Applicable as the project site will generate waste during its construction period
The Climate Change Trust Act, 2010	Climate Change Trust, GoB	An Act to establish a trust to be called the Climate Change Trust to redress the adverse impact of climate change on Bangladesh and to take measures on other matters relating there.	Applicable as the project potentially may have an adverse impact on climate change due to GHG emission
Quick Enhancement of Electricity and Energy Supply (Special Provisions) Act, 2010.	Ministry of Power, Energy and Mineral Resources	❖ Strengthens the legal framework for the development, maintenance, and expansion of power infrastructure. ❖ Focus on the expansion of transmission infrastructure to meet increasing electricity demands. Guidelines for private sector participation in transmission.	Applicable as the project consists of constructing transmission lines
National Biodiversity Strategy and Action Plan (2004)	Ministry of Environment, Forest and Climate Change	❖ Conserve, and restore the biodiversity of the country for wellbeing of the present and future generations; ❖ Maintain and to improve environmental stability for ecosystems; ❖ Ensure preservation of the unique biological heritage of the nation for the benefit of the present and future generations; ❖ Guarantee the safe passage and conservation of globally endangered migratory species, especially birds and mammals in the country; and ❖ Stop introduction of invasive alien species, genetically modified organisms and living modified organisms.	Applicable as the project corridor consists of variable biodiversity
The Energy Policy (1996; updated 2004)	Ministry of Power, Energy and Mineral Resources	❖ The first National Energy Policy of Bangladesh was formulated in 1996 by the Ministry of Power, Energy and Mineral Resources to ensure proper exploration, production, distribution, and the rational use of energy resources to meet growing energy demand sustainably. The policy was updated in 2004 in response to rapid	Applicable as the project consists of constructing transmission lines

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		global and domestic change. The updated policy includes additional objectives, namely to ensure environmentally sustainable energy development programs, to encourage public and private sector participation in the development and management of the energy sector, and to electrify the entire country. The policy highlights the importance of protecting the environment by requiring an EIA for any new energy development project, or by introducing an economically viable and environment friendly technology	
Bangladesh Energy Regulatory Commission Act, 2003	Ministry of Power, Energy and Mineral Resources	❖ Establishes the Bangladesh Energy Regulatory Commission (BERC), which regulates energy (including electricity) generation, transmission, and distribution. ❖ Licensing of transmission operators. ❖ Tariff regulations for electricity transmission. ❖ Regulations concerning disputes related to electricity transmission.	Applicable as the project consists of constructing transmission lines
Environment Court Act, 2000 (subsequent amendments in 2002)	Ministry of Environment, Forest and Climate Change and Judiciary	GoB has given highest priority to environment pollution Passed 'Environment Court Act, 2000 completing environment related legal proceedings effectively	Applicable for completing environmental legal requirements effectively
The Forest Act, 1927 (subsequent amendments in 1982,1989 and 2000)	Ministry of Environment, Forests and Climate Change	❖ Categorization of forests as reserve, protected and village forests ❖ Permission is required for use of forest land for any non-forest purposes	Applicable as the project may involve transmission line construction near or through forest areas, requiring compliance with forest land use regulations and obtaining necessary permissions.
The Industrial Policy (1999)	Ministry of Power, Energy and Mineral Resources	The National Industrial Policy (1999) aims to ensure a high rate of investment by the public and private sectors, a strong productive sector, direct foreign investment, development of labor-intensive industries, introduction of new appropriate	Applicable as the project consists of constructing transmission lines

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		technology, women's participation, development of small and cottage industries, entrepreneurship development, high growth of exports, infrastructure development, and environmentally sound industrial development. The World Trade Organization guidelines have been proposed to be followed in the Industrial Policy.	
Water Supply and Sanitation Act, 1996	Ministry of Local Government, Rural Development and Cooperatives	Management and Control of Water Supply and Sanitation in Urban areas	Applicable as the project involves activities of water supply and sanitation during its construction period
The Power Policy (1996)	Ministry of Power, Energy and Mineral Resources	As with the Petroleum Policy, this is presently an integral part of the National Energy Policy (1996). It has different policy statements on a whole range of issues including demand forecasts, long-term planning and project implementation, investment and lending terms, fuel and technology, power supply to the different zones, isolated and remote load centers, tariffs, captive and standby generation, system loss reduction, load management and conservation, reliability of supply, system stability, load dispatching, institutional issues, private sector participation, human resource development, regional/international cooperation, technology transfer and research program, and environment policy and legal issues	Applicable as the project consists of constructing transmission lines
The Ground Water Management Ordinance, 1985	Upazila Parishad	❖ Management of ground water resources ❖ Installation of tube-wells at any place after license from Upazila Parishad only	Applicable in case any groundwater is used for construction or domestic purpose for the project.
Bangladesh Wild Life (Preservation) Act, 1974	Ministry of Environment and Forest;	Preservation of Wildlife Sanctuaries, Parks, and Reserves	Applicable since the project area is habitat of many important aquatic fauna. An endangered species.

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
	Bangladesh Wild Life Advisory Board		
The Protection and Conservation of Fish Act 1950 (subsequent amendments in 1982)	Ministry of Fisheries and Livestock	Protection and conservation of fish in Government owned water bodies	Applicable since project area consists of few major and minor waterbodies
Antiquities Act 1968	Ministry of Cultural Affairs	This legislation governs preservation of the national cultural heritage, protects and controls ancient monuments, regulates antiquities as well as the maintenance, conservation and restoration of protected sites and monuments, controls planning, exploration and excavation of archaeological sites.	Applicable
The Building Construction Act, 1952 and subsequent amendments	Ministry of Works	This act provides for prevention of hazardous construction of building and excavation of tanks which are likely to interfere with the planning of certain areas in Bangladesh	Applicable since the project involves construction activities
The Vehicle Act, 1927 **The Motor Vehicles Ordinance, 1983** **The Bengal Motor Vehicle Rules, 1940**	Bangladesh Road Transport Authority (BRTA)	Exhaust emission; Vehicular air and noise pollution; Road/traffic safety; Vehicle Licensing and Registration; Fitness of Motor Vehicles; Parking bylaws	Applicable since the project involves use of significant vehicles in construction and operation.
Workmen's Compensation Act 1923 amendment 1983	Ministry of Labor	This act focuses on the workmen's wages and compensation, The amount of compensation and how the wages will be calculated.	Applicable as the project will appoint a majority of workforce and immigrant workers as well
Telegraph Act, 1885	Ministry of Power, Energy and Mineral Resources	Under the law sections 10-19, specifies parameters and obligations for government-built transmission lines throughout the country	Applicable as the project consists of constructing and applicability of transmission lines

Table 2: International Policies and Guidelines Relevant to the Project

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
Safeguard Policy Statement (SPS), 2009	Asian Development Bank	❖ Project risks and respective mitigation measures and project assurances; ❖ Project level grievance redress mechanism including documentation in the EMP; ❖ Definition of the project area of influence; ❖ Physical cultural resources damage prevention analysis; ❖ Climate change mitigation and adaptation; ❖ Occupational and community health and safety requirements (including emergency preparedness and response); ❖ Economic displacement that is not part of land acquisition; ❖ Biodiversity conservation and natural resources management requirements; ❖ Provision of extensive sufficient justification if local standards are used; ❖ Ensuring adequate consultation and participation; and ensuring that EMP includes implementation schedule and page 23 (measurable) performance indicators	Applicable as the project is funded by ADB and The Project will fall under **Category C** according to ADB's SPS 2009. as it is expected to have minimal or no adverse environmental impacts. The project primarily involves integrating transmission lines into existing substations, with no significant land use changes, biodiversity disruption, or large-scale environmental risks. As a result, it does not require an environmental assessment, only basic due diligence to confirm compliance with environmental standards.
IFC EHS General Guidelines	International Finance Corporation	❖ The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP), as defined in IFC's Performance Standard 3: Resource Efficiency and Pollution Prevention. IFC uses the EHS Guidelines as a technical source of information during project appraisal activities, as described in IFC's Environmental and Social Review Procedures Manual. ❖ These General EHS Guidelines are designed to be used together with the relevant Industry Sector EHS Guidelines, which provide	Applicable as the project will appoint various work force and labors for the construction

Name of the Act/Rule	Enforcement Agency/Authority	Key Features	Applicability to the Project
		guidance to users on EHS issues in specific industry sectors. For complex projects, use of multiple industry-sector guidelines may be necessary.	

2.2 National Environment Quality Standards

34. The Bangladesh standards intend to impose restrictions on the volume and concentration of wastewater/solid waste/gaseous emission etc. discharged into the environment. The standards, which are commonly known as Environmental Quality Standards (EQS), have legal bindings. There is a separate schedule for industry-specific standards, other than the general industrial emission and effluent standards. This schedule covers a wide range of industries fertilizer, tannery, integrated textile, food, cement, etc.

Table 3: Ambient Air Quality Standards

Parameter	**T**SP	**$PM_{2.5}$**	**PM_{10}**	**NO_2**	**SO_2**	**CO**	**O_3**
Air Pollution Control Rules 2022[4]	-	65 ($\mu g/m^3$)	150 ($\mu g/m^3$)	80$\mu g/m^3$ (0.043 ppm)	80 $\mu g/m^3$ (0.031 ppm)	5mg/m^3 (4.36 ppm)	100 $\mu g/m^3$ (0.051) ppm
Time period	24hours	24hours	24hours	24hours	24hours	8hours	8hours

Source: Air Pollution Control Rules-2022, Schedule-01, DoE

Table 4: Bangladesh Standards for Noise

Sl. No.	**Area Class**[5]	**Day (dBA)**	**Night (dBA)**
a.	Silent area	50	40
b.	Residential area	55	45
c.	Mix area	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Source: Sound Pollution Control Rules 2006 Schedule 05, Department of Environment.

Note:

a) Daytime start from 6.00 am morning and end at 9.00 pm night.

b) From night 9.00 pm to 6.00 am morning; identify as nighttime.

[4] Air Pollution Control Rules'2022 Schedule-01, Department of Environment, Govt. of Bangladesh
[5] Sound Pollution Control Rules 2006 Schedule 05, Department of Environment, Govt. of Bangladesh

Table 5: Standard for Inland Surface Water

SL. No.	Way of Usage	Parameter											
		pH	**DO mg/L**	**BOD mg/L**	**NO_3-N mg/L**	**NH_4-N mg/L**	**PO_4-P mg/L**	**Total Cr. mg/L**	**Pb mg/L**	**Hg mg/L**	**Total Coliform CFU/100ml**	**TDS mg/L**	**COD mg/L**
1.	Source of Drinking water for supply only after disinfecting	6.5-8.5	≥6	≤ 2	7.0	0.1	0.1	0.02	0.03	0.001	≤100	1000	10
2.	Water usable for recreational activity	6.5-8.5	≥ 5	≤ 3	7.0	0.3	0.5	0.2	0.05	0.001	≤ 50	1000	10
3.	Source of drinking water for supply after conventional treatment	6-9	≥ 5	≤ 3	7.0	0.3	0.5	0.02	0.03	0.001	≤5000	1000	25
4.	Water usable by fisheries:	6-9	≥ 5	≤ 6	7.0	0.3	0.5	0.05	0.1	0.004	≤ 5000	1000	50
5.	Water usable by various process and cooling industries	6.5-8.5	≥ 1	12	-	2.7	-	0.1	0.1	0.05	-	1000	100
6.	Water usable for irrigation	6.5-8.5	-	≤ 12	5.0	1.5	2.0	0.1	0.1	0.002	≤ 50,000	1000	100

Source: Environmental Conservation Rule-2023, Schedule-31, Standards for inland surface water.

Note: Electrical Conductivity for Irrigation water -2250 µS/cm (at a temperature of 25º C: Sodium less than 26%: boron less than 0.2%).

Table 6: Standard for Project Water (Inland Surface Water)

Sl. No.	Water Quality Parameters	Unit	Standards
1	pH	-	6-9
2	Turbidity	mg/L	-
3	BOD_5	mg/L	≤ 6
4	COD	mg/L	50
5	TDS	mg/L	1000
6	TSS	mg/L	-
7	DO	mg/L	≥ 5
8	Total Coliform	CFU/100ml	≤ 5000

Source: Environmental Conservation Rule-2023, Schedule-31, Standards for inland surface water.

Table 7: Bangladesh Standards for Drinking Water

Sl. No.	Water Quality Parameters	Unit	Standards
1	pH	-	6.5-8.5
2	Turbidity	mg/L	-
3	Manganese (Mn)	mg/L	0.4
4	Iron (Fe)	mg/L	0.3-1.0
5	Arsenic (As)	mg/L	0.05
6	Electric Conductivity (EC)	µS/cm	-
7	Chloride	mg/L	250*
8	Coliform (Faecal)	NFU/100ml	0
9	Ammonia (NH_3)	mg/L	1.5

Source: Schedule 02, Rule 31, ECR 2023
*Note: * sea costal area 1000 mg/L*

2.3 International Standards

35. The General EHS Guidelines of International Finance Corporation (IFC) contain information on cross-cutting environmental, health, and safety issues potentially applicable to the transmission line.

36. Tower Wise Mouza Maps have been attached to **LL ANNEX:**

37. The standards and limits are required set according to the requirements of various industries and projects. This guideline provides an approach to the management of significant sources of emissions, including specific guidance for assessment and monitoring of impacts.

Table 8: WHO Ambient Air Quality Guidelines

WHO Ambient Air Quality Guidelines6						
Parameters	**Averaging Period**	**Interim Target**				**Guideline Value in mg/m^3**
		1	**2**	**3**	**4**	
Particulate Matter $PM_{2.5}$	Annual	35	25	15	10	5
	24- hour7	75	50	37.5	25	15
Particulate Matter PM_{10}	Annual	70	50	30	20	15
	24- hour	150	100	75	50	45
Ozone (O_3)	Peak Season8	100	70	-	-	60
	8- hour	160	120	-	-	100
Nitrogen Dioxide (NO_2)	Annual	40	30	20	-	10
	24- hour	120	50	-	-	25
Sulfur dioxide (SO_2)	Annual	125	50	-	-	40
Carbon Monoxide (CO)	24- hour	07	-	-	-	4

Table 9: WHO Noise Level Guidelines

Noise Level Guidelines[9]		
Receptor	**One Hour LA_{eq} (dBA)**	
	Daytime 07:00 - 22:00	**Nighttime 22:00 - 07:00**
Residential; institutional; educational[10]	55	45

Table 10: WHO Drinking Water Quality Standards

S/I	**Water Quality Parameters**	**Unit**	**WHO Guidelines for Drinking Water (2022)**
1	pH	-	-
2	Arsenic (As)	mg/L	0.01
3	Electric Conductivity (EC)	µS/cm	-
4	Iron (Fe)	mg/L	-
5	Coliform (Faecal)	CFU/100 ml	0
6	Turbidity	mg/L	-
7	Manganese (Mn)	mg/L	0.08
8	Chloride	mg/L	-
9	Ammonia (NH_3)	mg/L	-

6 WHO Global Air Quality Guidelines (Updated 2021)
7 99th percentile (i.e. 3-4 exceedance days per year).
8 Average of daily maximum 8-hour mean O3 concentration in the six consecutive months with the highest six month running-average O3 concentration.
9 Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999
10 For acceptable indoor noise levels for residential, institutional, and educational settings refer to WHO (1999)

2.4 Comparison of Environmental Safeguard Principles between ADB and Bangladesh

38. The following table presents a summary comparing the environmental safeguard principles of ADB and the government.

Table 11: Comparison of Environmental Safeguard Principles between ADB and Bangladesh

No.	SPS 2009 Principles	Delivery Process (SPS 2009)	Government System	Gaps (if any)
1	Use of screening process to determine the appropriate environmental assessment	Uses sector-specific rapid environmental assessment checklist for screening and assigns categories based on potential impacts: ❖ A - EIA required (irreversible, diverse or unprecedented adverse environmental impacts) ❖ B - IEE required ❖ C - no environmental assessment required but a review of environmental implications • FI - ESMS required	ECA 1995 and ECR 2023 (amended in 2017) set screening criteria to classify industries/projects based on potential environmental impacts as follows: Green (pollution-free), Orange-A, Orange-B and Red (causes significant environmental impacts). The screening criteria are based on project or industry type and do not consider the scale and location. The category determines the level of environmental assessment.	No major gaps
2	Conduct an environmental assessment	• EIA and IEE - Identify potential impacts on physical, biological, PCRs, and socioeconomic aspects in the context of project's area of influence (i.e., primary project site and facilities, and associated facilities) • ESMS for FIs	• Industry/project category • Green - no environmental assessment required • Orange-A - no IEE or EIA required but must provide process flow, lay-out showing effluent treatment plant, etc. • Orange-B - IEE required • Red - both IEE and EIA are required	No major gaps
3	Examine alternatives	• Analyze alternatives to the project's location, design, and technology • Document rationale for selecting the project location, design, and technology • Consider "no project" alternative	• Regulations (i.e., ECA 1995 and ECR 2023, amended in 2017) do not require specifically the identification and analysis of alternatives	Not required by law but the TOR for EIA to be approved by the DOE now includes a discussion on analysis of alternatives.
4	Prepare an EMP	• EMP to include monitoring, budget and implementation arrangements	• EMP and procedures for monitoring included in the IEE and EIA (i.e., Orange-A, Orange-B, and Red category projects)	No major gaps
5	Carry out meaningful consultation	• Starts early and continues during implementation • Undertaken in an atmosphere free of intimidation • Gender inclusive and responsive • Tailored to the needs of vulnerable groups • Allows for the incorporation of all relevant views of stakeholders • Establish a grievance redress mechanism	• Public consultation and participation are not mandatory based on ECA 1995 and ECR 2023(amended in 2017) • Grievance redress mechanism is not mentioned in ECA 1995 and ECR 2023 (amended in 2017) • EIA format required by DOE includes stakeholders' consultation	Approval of the TOR of EIA by DOE now includes consultation with stakeholders.
6	Timely disclosure of draft environmental	• Draft EIA report posted on ADB website at least 120 days prior to Board consideration (for	• No requirement for public disclosure of environmental reports but DOE posts the Minutes of	Still no requirement for public disclosure of

No.	SPS 2009 Principles	Delivery Process (SPS 2009)	Government System	Gaps (if any)
	assessment (including the EMP)	Category A) • Draft IEE/EARF prior to appraisal • Final or updated EIA/IEE upon receipt • Environmental monitoring report submitted by borrowers upon receipt	the Meeting on the application for environmental clearance certificate to its website, http://www.doe-bd.org/minutes.php	environmental assessment, but the project will be posted to the DoE website and will be available in summary form at the project site.
7	Implement EMP and monitor effectiveness	• Prepare monitoring reports on the progress of EMP • Retain qualified and experienced external experts or NGOs to verify monitoring information for Category A projects • Prepare and implement corrective action plan if non-compliance is identified • Requires submission of quarterly, semi-annual, and annual reports to ADB for review	• Environmental clearance is subject to annual renewal based on compliance of the conditions set by DOE	No major gaps
8	Avoid areas of critical habitats (use of precautionary approach to the use, development and management of renewable natural resources)	• Provides guidance on critical habitats	• ECA 1995 and ECR 2023 (amended in 2017) identifies ecologically critical areas and the rules to protect them	No major gaps
9	Use pollution prevention and control technologies and practices consistent with international good practices	• Refers to World Bank's Environmental Health and Safety (EHS) General Guidelines 2007 (or any update) • If national regulations differ, more stringent will be followed • If less stringent levels are appropriate in view of specific project circumstances, provide full and detailed justification	• Effluent standards, ambient and emission standards included in ECA 1995 and ECR 2023 (amended in 2017) • Ambient noise levels included in Noise Pollution Control Rules 2006	No major gaps
10	Provide workers with safe and healthy working conditions and avoid risks to community health and safety	• Refers to WB EHS General Guidelines 2007 (or any update)	• Occupational health and safety standards included in the Factories Act 1965, the Bangladesh Labor Law 2006, and the Bangladesh Labor Act 2013.	No major gaps; WB/IFC EHS guidelines will still apply, as per the ADB SPS, and enforcement requirements will be noted.
11	Conserve physical cultural resources (PCRs) and avoid destroying or damaging them	• Use of field-based surveys and experts in the assessment • Consult affected communities on PCRs findings • Use chance find procedures for guidance	• Preservation and protection of cultural resources are within the Antiquities Act 1968.	No major gaps
12	Grievance Redress Mechanism	• Establish a grievance redress mechanism	• Grievance redress mechanism is not mentioned in ECA 1995 and ECR 2023 (amended in 2017)	Not required by regulation in Bangladesh

3 Description of the Project

3.1 Project Summary

39. The location of the Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1) is shown in Figure 1.

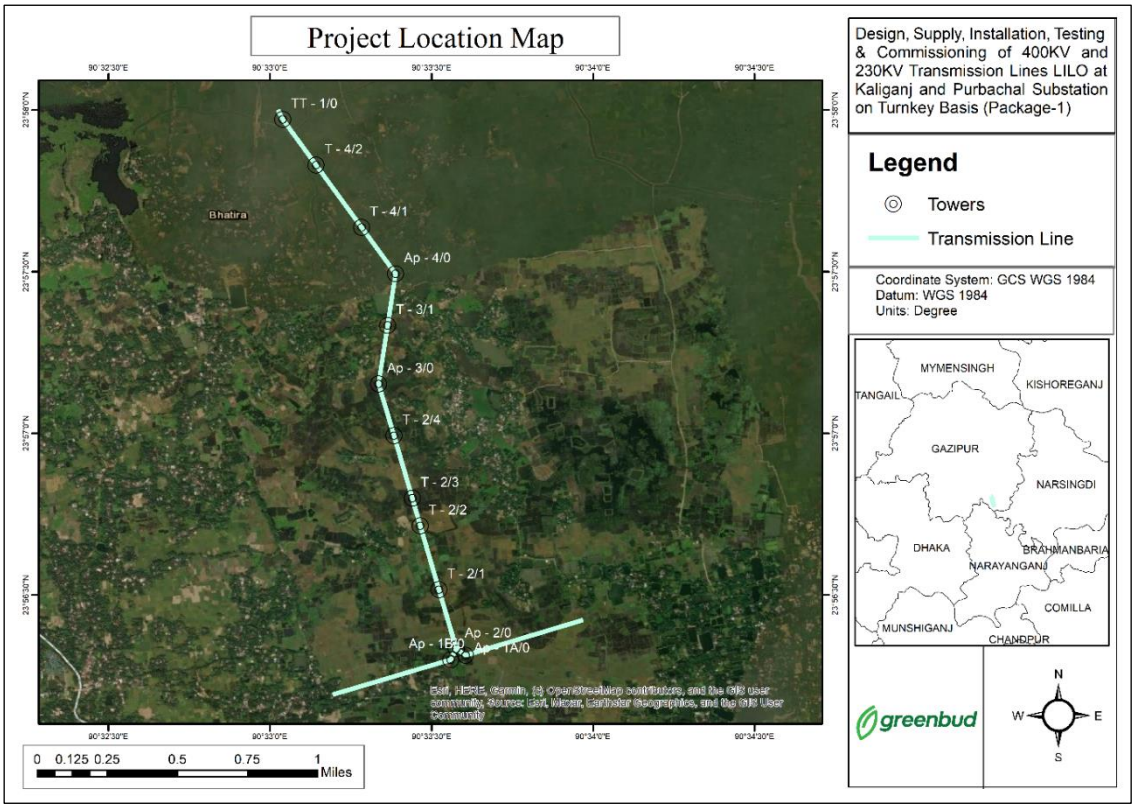


Figure 1: Location Map of the project

40. The contract for Package-1, which involves the construction of 400 kV and 230 kV LILO (Line in Line Out) at Kaliganj and Purbachal, was signed with Hanbaek Co. Ltd. on September 25, 2023. However, as of the latest project update, construction activities have not yet commenced.

41. The project is scheduled for completion by May 11, 2025, and the current phase is focused on pre-construction planning and mobilization. Given the early stage of the package, there are no remarks on performance at this time. Continued monitoring of progress will be essential as the construction phase begins to ensure that all milestones are met according to the project timeline.

42. Environmental monitoring activities for Package-1, which focuses on the 400 kV and 230 kV LILO at Kaliganj and Purbachal, have been systematically carried out in compliance with the project's environmental management requirements.

43. The baseline environmental quality monitoring was completed across various parameters, including air quality, noise levels, surface water quality, groundwater quality, and soil quality. This data serves as a reference point to evaluate future changes and potential

environmental impacts resulting from the construction activities. The sampling locations of various parameters for the baseline environmental quality monitoring are given below:

44. The timeline and locations for the baseline environmental quality monitoring reports are given below

Table 12: Sampling locations and timeline for the Baseline Environmental Monitoring

Tower	Date	Co-ordinates				
		AAQ	ANL	GW	SW	Soil
T-1/0	08.02.25	23°58'0.906"N	23°58'1.116"N	23°58'6.29"N	23°57'59.0162"N	23°55'52.432"N
		90°33'3.408"E	90°33'1.59"E	90°32'55.859"E	90°32'58.406"E	90°34'1.233"E
T-4/0	09.02.25	23°57'28.528"N	23°57'30.075"N	23°57'28.667"N	23°57'27.384"N	23°57'30.432"N
		90°33'23.954"E	90°33'23.303"E	90°33'24.84"E	90°33'22.473"E	90°34'1.233"E
T-3/0	10.02.25	23°57'10.977"N	23°57'9.805"N	23°57'22.085"N	23°57'23.334"N	23°57'10.719"N
		90°33'18.231"E	90°33'19.510"E	90°33'17.38"E	90°33'16.017"E	90°33'18.541"E
T-2/3	11.02.25	23°56'50.084"N	23°56'49.083"N	23°57'22.755"N	23°57'24.26"N	23°56'49.0829"N
		90°33'25.961"E	90°33'25.387"E	90°32'58.451"E	90°32'59.558"E	90°33'26.216"E
T-2/1	12.02.25	23°56'20.567"N	23°56'18.556"N	23°56'12.589"N	23°56'15.322"N	23°56'20.645"N
		90°33'34.481"E	90°33'33.555"E	90°33'32.488"E	90°33'38.667"E	90°33'34.799"E

45. Although the reporting for this stage is not yet applicable (N/A), these baseline assessments provide critical insights for ensuring that the project remains compliant with environmental standards throughout its lifecycle. Continuous monitoring will be conducted as construction progresses to mitigate any adverse environmental impacts.

3.2 Project Equipment and Vehicle Inventory

46. In order to ensure smooth and efficient execution of the Dhaka and Western Zone Transmission Grid Expansion Project, a range of specialized equipment and vehicles are required to support the construction and operational phases. The following tables outline the key equipment and vehicle inventory, detailing the type, quantity, and their intended use on-site. This inventory will ensure the project has the necessary resources to address the physical demands of the project while complying with safety, environmental, and operational standards.

Table 13:List of Equipment's

Sl. No.	Equipment Name	Unit	Quantity
1	Tower Crane for Erection	Sets	2
2	Truck Crane	Sets	2
3	Crane (8 Tone)	Nos.	1
4	Crane (5 Tone)	Nos.	1
5	Crane (3 Tone)	Nos.	1
6	Excavator	Nos.	3
7	Tensioner for Stringing	Nos.	5
8	Puller for Stringing	Nos.	5
9	Generator	Nos.	6
10	Manual Tensioner for Stringing	Nos.	10
11	Winch Machine	Nos.	9

Sl. No.	Equipment Name	Unit	Quantity
12	Conductor Traveler	Nos.	900
13	Pilot Wire	kms.	35
14	Conductor Grip	Nos.	50
15	Rig Machine for Piling	Sets	14
16	Shuttering Set for Civil Works	Sets	12
17	Gin Pole for Erection	Sets	11
18	Motorized Compressor	Nos.	15
19	Rope	kms.	17
20	Vernier Scale for Measurement	Nos.	3
21	Elco meter for Galvanizing Test	Nos.	4
22	GTI-FPS-375 for Air Monitoring	Nos.	1
23	SLM-25 for Noise Monitoring	Nos.	1

Table 14:List of Vehicles

Sl. No.	Name	Unit	Quantity
1	Truck	Nos.	3
2	Mini Truck	Nos.	5
3	Pickup	Nos.	3
4	Tractor Trolley	Nos.	6
5	Motorcycle	Nos.	21
6	Mini Tractor Trolley	Nos.	5
7	Private Car	Nos.	4

3.3 Project Category

47. The project involves the construction of transmission lines at Kaliganj and Purbachal in Bangladesh. According to the ADB's REA checklist, the project is categorized as Environment Category C as the project is considered to have minimal or no significant adverse environmental or social impacts.

48. However, according to the classification of the Bangladesh Environmental Conservation Rules 2023, the transmission line project is categorized as '**Orange**' category.

49. All industries and projects in the orange category are required to carry out the IEEs and would be useful in determining the severity of impact in terms of the level of change of the environment.

50. The IEE process helps in determining ways to mitigate negative impacts by considering available information, past experiences, and standard operating practices. The steps for conducting IEEs are as follows:

- Collection of baseline information with respect to a project and the environmental setting of the project and its site;
- Setting of boundaries of an IEE by identifying the significant issues;
- Impact assessment suggesting mitigation measures, development of an EMP, and discussion of alternative sites for the project or other project modifications; and

- In the event the IEE of the project or industry reveals that further investigation is required to be carried out, the sponsors will have to conduct a detailed EIA.

4 Salient Information of the Project

4.1 General

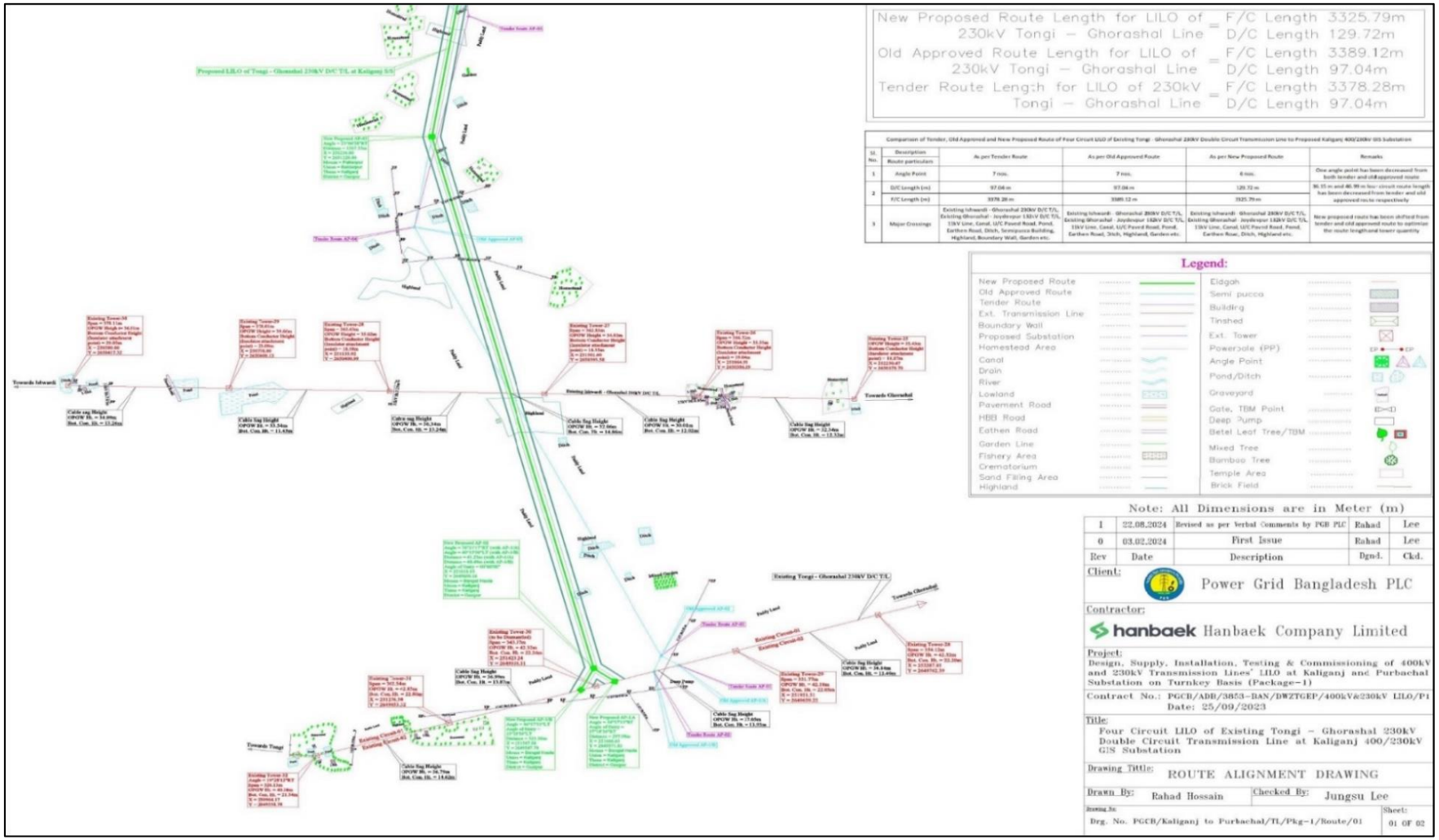
51. The salient information of the project is as follows:

Table 15: Description of the Project

Project Title	Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Funding Sources	Asian Development Bank, Government of Bangladesh
Executing Agency	Power Grid Bangladesh PLC
Project Implementation Consultant	N/A
Contractor	**Hanbaek Company Limited, Korea**
Project Location	Kaliganj, Gazipur
Total Length of the Subproject Package-01	Double Circuit Length = 129.72 m and Four Circuit Length = 3325.79 m
Paving	Reinforced concrete
Construction Duration	25.09.2023 to 11.05.2025

4.2 Project Layouts & Technical Descriptions

52. The key plan and project layout of the project has been given as follows:


New Proposed Route Length for LILO of 230kV Tongi – Ghorashal Line _ F/C Length 3325.79m D/C Length 129.72m
Old Approved Route Length for LILO of 230kV Tongi – Ghorashal Line _ F/C Length 3389.12m D/C Length 97.04m
Tender Route Leng;h for LILO of 230kV Tongi – Ghorashal Line _ F/C Length 3378.28m D/C Length 97.04m
Legend:
New Proposed Route
Old Approved Route
Tender Route
Ext. Transmission Line
Boundary Wall
Proposed Substation
Homestead Area
Canal
Drain
River
Lowland
Pavement Road
HBB Road
Eathen Road
Garden Line
Fishery Area
Crematorium
Sand Filling Area
Highland
Eidgah
Semi pucca
Building
Tinshed
Ext. Tower
Powerpole (PP)
Angle Point
Pond/Ditch
Graveyard
Gate, TBM Point
Deep Pump
Betel Leaf Tree/TBM
Mixed Tree
Bamboo Tree
Temple Area
Brick Field
Note: All Dimensions are in Meter (m)
1 22.08.2024 Revised as per Verbal Comments by PGB PLC Rahad Lee
0 03.02.2024 First Issue Rahad Lee
Rev Date Description Dgn'd. Ckd.
Client: Power Grid Bangladesh PLC
Contractor: hanbaek Hanbaek Company Limited
Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Contract No.: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1
Date: 25/09/2023
Title: Four Circuit LILO of Existing Tongi – Ghorashal 230kV Double Circuit Transmission Line at Kaliganj 400/230kV GIS Substation
Drawing Tittle: ROUTE ALIGNMENT DRAWING
Drawn By: Rahad Hossain
Checked By: Jungsu Lee
Drg. No. PGCB/Kaliganj to Purbachal/TL/Pkg-1/Route/01
Sheet: 01 OF 02

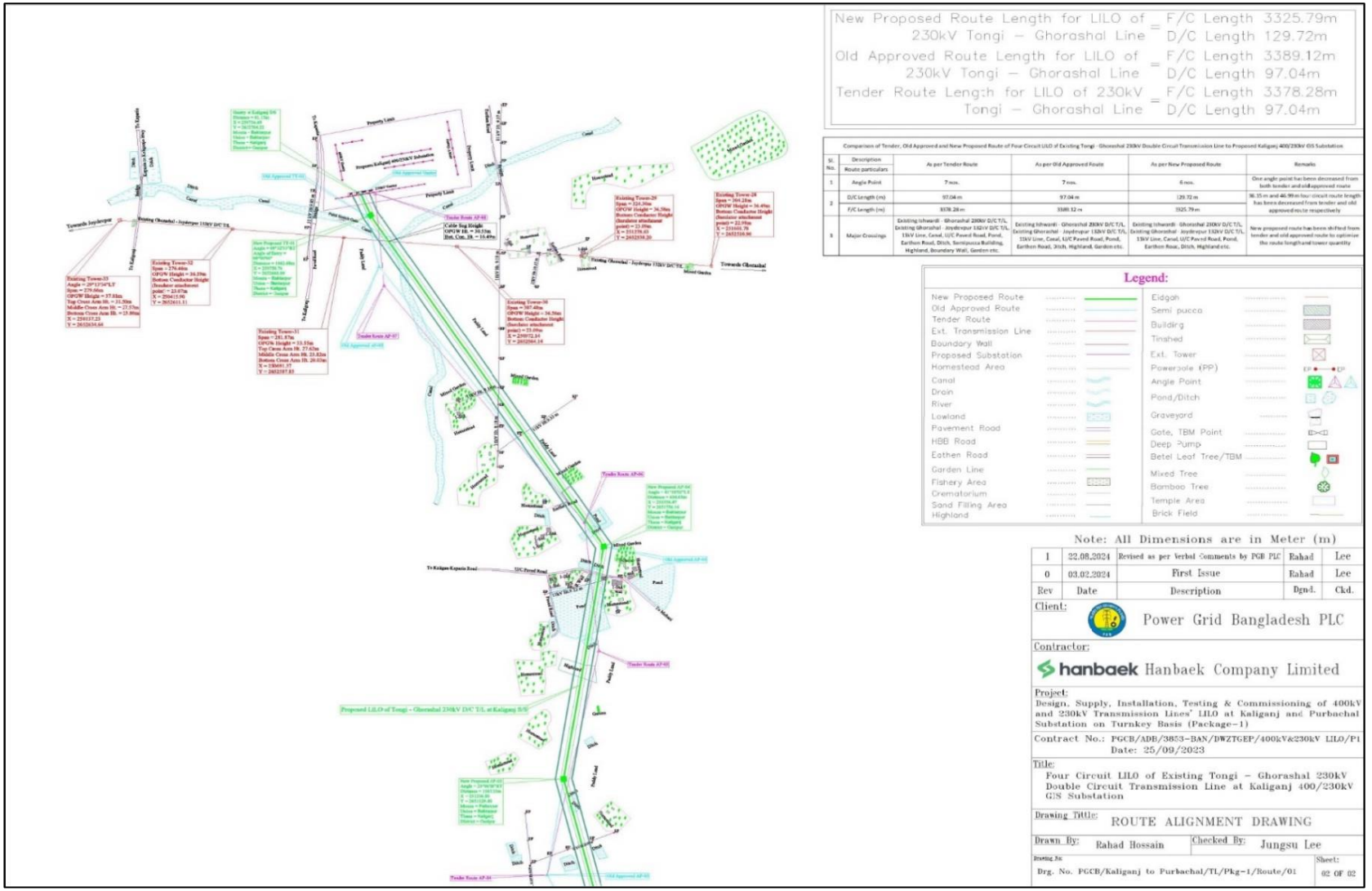


Figure 2: Route Alignment Drawing of the Project

4.3 Key Project Activities

53. The project, “Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines” LILO at Kaliganj and Purbachal Substation on a Turnkey Basis (Package-1)," is a key initiative aimed at strengthening the transmission network in Gazipur district, Bangladesh. Jointly funded by the Asian Development Bank (**ADB**) and the Government of Bangladesh, this project reflects a strong commitment to improving the region's power infrastructure, ensuring a more reliable and efficient electricity supply.

54. The Power Grid Bangladesh PLC. serves as the executing agency responsible for overseeing the implementation of this project. The construction activities will be carried out by Hanbaek Company Limited, a reputable contractor from Korea known for its expertise in large-scale infrastructure projects.

55. Located in Kaliganj, Gazipur, the project encompasses the construction of transmission lines that will enhance connectivity to the Kaliganj and Purbachal substations. The total length of this subproject, Package-1, includes a double circuit length of 129.72 meters and a four-circuit length of 3,325.79 meters. This extensive network will significantly improve the capacity and reliability of electricity distribution in the area.

56. The key activities involved in this project include the design of the transmission lines, procurement of necessary materials and equipment, installation of the double and four circuit lines, and rigorous testing to ensure compliance with safety and performance standards. Additionally, the project will encompass commissioning activities to bring the transmission lines into operational status. To ensure durability and stability, the paving for this project will be constructed using reinforced concrete. This choice of material is crucial for withstanding the operational demands of high-voltage transmission lines, thereby contributing to the long-term sustainability of the infrastructure.

57. The construction duration for this project is scheduled from September 25, 2023, to May 11, 2025, allowing adequate time for meticulous execution and quality assurance at every phase. This timeline reflects a strategic approach to ensure the timely completion of all construction and commissioning activities.

58. In summary, this project represents a vital investment in Bangladesh's energy infrastructure, aimed at improving the reliability and efficiency of electricity supply in the Gazipur region. Through the collaboration of the Asian Development Bank, the Government of Bangladesh, and experienced contractors, this initiative is set to make a significant impact on the region's energy landscape.

4.4 Primary Construction Requirement:

4.4.1 Components of Construction Works

59. The phasing of construction works for the transmission lines and the grid substations is indicated in the following table below. The construction methods are discussed for overhead transmission lines.

Table 16: The phasing of construction works

Sl. No.	Name of Task	Duration	Start	Finish
1	Survey Works	31 Days	01.08.2024	31.08.2024
2	Technical Documents Approval	61 Days	01.09.2024	31.10.2024
3	Soil Test	21 Days	01.11.2024	21.11.2024
4	Piling Works	160 Days	22.11.2024	30.04.2025
5	PIT and Load Test of Pile	31 Days	01.05.2025	31.05.2025
6	Pile Cap Works	122 Days	01.06.2025	30.09.2025
7	Erection Works	61 Days	01.10.2025	30.11.2025
8	Stringing Works	30 Days	01.12.2025	30.12.2025
9	Line Commissioning	1 Day	31.12.2025	31.12.2025

4.5 Construction of overhead transmission lines (OHLs)

60. Construction of OHLs involves the following activities, site preparation; foundation construction; structure construction and wire-stringing operations.

61. **Site Preparation**: Tower locations are cleared of vegetation prior to construction of the towers. Access roads may need to be upgraded or new roads constructed to accommodate construction vehicles and equipment access to each tower site.

62. **Foundation Construction**: Most structures have a concrete foundation. The size of the foundation depends on the type of structure and the terrain. Foundation construction begins with the auguring of holes for footings (four for lattice steel towers [LSTs]). For LSTs, each hole is usually 3 to 4 feet wide and 15 to 30 feet deep. Regardless of the structure type, foundations typically have a slight projection above the ground. After the footing holes are excavated, they are reinforced with steel and then concrete is poured into the holes. Once the concrete has cured, crews can begin the construction of the structure itself.

63. **Structure Construction:** Generally, structures are built from the ground up. Structures are assembled in sections near the new tower location and a crane is used to lift the sections into place. Crews then bolt the sections together. The method used is determined by terrain and available space next to the structure site. Tower erection is usually performed by crane, but helicopters are used in areas that are inaccessible to large ground-based construction equipment.

64. **Wire-Stringing Operations:** Wire stringing includes all activities associated with the installation of the primary conductors onto the transmission line structures. These activities include the installation of conductor, ground wire, insulators, stringing sheaves (rollers or travelers), vibration dampeners, weights, suspension and dead-end hardware assemblies for the entire length of the route.

65. To string the wire involves the following five steps:

❖ **Stringing the pilot line to install the conductor**

A light-weight sock line (pilot line) is flown from tower to tower, threading the sock line through wire rollers attached to the insulators on each structure. A clam lock device secures the sock line in the rollers.

❖ **Pulling**

The sock line is attached to a conductor pulling rope/cable, which is connected to a tensioning machine on a truck. The conductors are then pulled through by a puller machine. The puller and tensioner work together during the pulling operation to ensure that the conductor maintains the proper ground clearance at all times. Wire set-up sites or pulling stations, where the associated pulling machinery and equipment are staged, are located at intervals along the span.

❖ **Sagging and dead ending**

Once the conductor is pulled through the length of the line, the tensioner is then used to sag the conductors to the proper tension. Conductors expand with changes in temperature (they are longer at higher temperatures), so they need to be installed at the proper tension such that they do not sag too low when temperatures increase. All phases (or bundled phases) between two towers must be sagged to the same tension.

❖ **Splicing**

Once the conductor is pulled in and the proper tension of the conductor is reached, mid-span splicing is performed at dead-end tower locations to connect or splice segments together. Any temporary pulling splices are removed and replaced with permanent splices. Implosive sleeves may be used for splicing, which involves placing a layer of explosives around an aluminum sleeve. The layer of explosive is designed to create the required compression of the sleeve around the conductor. After splicing and sagging, conductors are affixed to dead-end towers.

❖ **Clipping-in, spacers**

After the conductors are spliced and affixed to dead-end towers, they are “clipped in”, or attached to tangent towers. This process involves removing the rollers and replacing them with clamps and other final insulator hardware to secure the conductors to the insulators. Vibration dampeners, weights, and spacers between the conductors of a bundled phase are then installed.

66. Guard poles or guard structures may be installed at transportation, flood control, utility crossings, parks, and other sensitive locations to protect these underlying areas during wire stringing operations. The guard structures intercept wire should it drop below a conventional stringing height, preventing damage to underlying structures. These guard structures are temporary and are removed after conductor installation is complete.

4.6 Electrical Works and Towers

67. For GSSs, installation of equipment will include transformers, circuit breakers, isolators, lightning arresters, panel boards, batteries, and battery chargers, etc. All equipment will be installed at the GSSs (outdoors and indoors) as per design specifications and standards. For this project, all material will be procured from foreign countries. Domestic materials like bricks, sand, cement, and reinforcing rods, will be sourced locally from existing licensed sources for the installation works.

5 Baseline Environmental Values and Sensitive Receptors

5.1 General

68. For the impact assessment process, information of the original state of the environment within the project area is necessary not only for determining and evaluating the possible impacts of the project measures. From the overall environmental scenario these potential impacts related to subprojects were then identified, and based on these an environmental management plan has been developed. The environmental characteristics that will be set will assist in checking and comparing the adverse and beneficial effects expected from the project before construction, at construction phase and during construction. Impact assessment of the project concentrated on the extent of the direct injurious changes that could be triggered by the project activities such as quality impairment of habitats, flora, fauna and humans, socio-economic status, established usage of the land and resources, climate change risk factors, physical and cultural properties and biophysical environment. The parameters have been determined following IEE but those are included in ECR 2023 also.

5.2 Baseline Environmental Values

5.2.1 Air Quality Monitoring

69. This section identifies the status of the ambient air quality of the Package 1. In these area, ambient air quality is dependent on many factors like air movement, traffic volume, congestion, emissions from motor vehicles, and suspended dust particles. A continuous monitoring scheme is essential to evaluate air quality and for the development of any plan for mitigation of health risks caused by polluted air. The "criteria pollutants," particulate matter (PM_{10}, $PM_{2.5}$), CO, SO_2 and NO_x must be monitored. Hence, to establish the baseline air quality, as per the monitoring plan, a primary analysis of air quality is proposed, before commencing the construction activities of subprojects.

70. Initially, one location was selected for air quality monitoring, but following guidance from **Power Grid**, five locations were chosen. This decision allows for a more comprehensive assessment of air quality across the project site, considering varying conditions such as construction activities and proximity to sensitive areas. Monitoring multiple locations provides a more accurate and representative dataset, helping to identify localized impacts and ensuring effective mitigation measures.

Table 17: Location of Air Quality Monitoring Station

Tower	Date	Co-ordinates
T-1/0	**08.02.25**	23°58'0.906"N 90°33'3.408"E
T-4/0	**09.02.25**	23°57'28.528"N 90°33'23.954"E
T-3/0	**10.02.25**	23°57'10.977"N 90°33'18.231"E
T-2/3	**11.02.25**	23°56'50.084"N 90°33'25.961"E

T-2/1	**12.02.25**	23°56'20.567"N 90°33'34.481"E

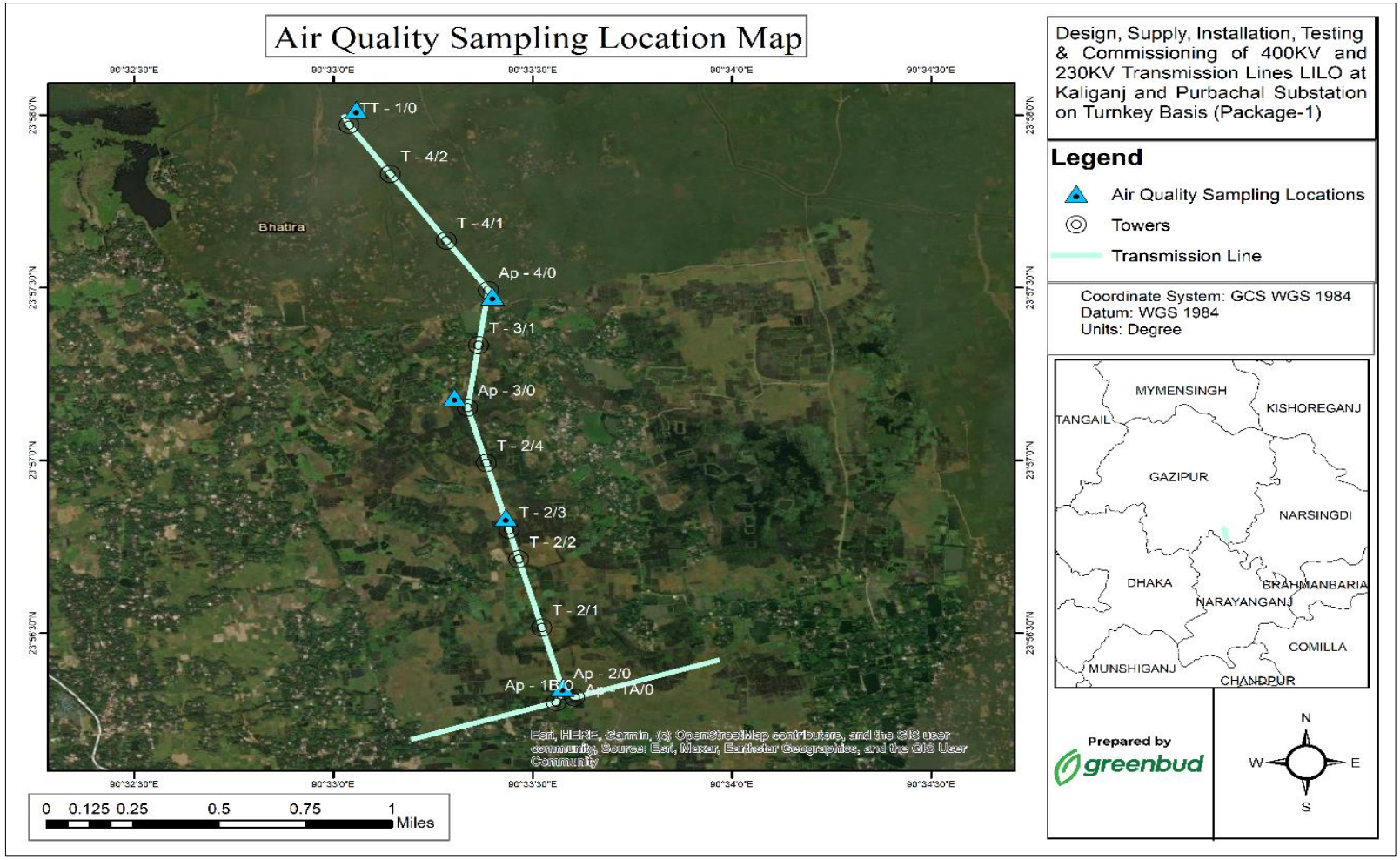


Figure 3: Monitoring Location Map of Air Quality

71. **Methodology of Sampling and Testing**: The air sample has been collected by using High Volume Sampler Greintech (GTI-FPS-375) with impinger attached for 8-hours of sampling period. Then, the 8-hour sampling data are converted to the 24hour data using conversion factor equation. The specification and method of analysis for the ambient air quality monitoring is enumerated in the following tables as per Ambient Quality Standard by Air Pollution Control Rules-2022, Schedule-01.

Table 18: Method of Analysis of Ambient Air Quality

No.	Parameter	Methodology	Device/Equipment	Sampling Period
1	SPM	Gravimetric	GTI-FPS-375	8hours
2	PM_{10}	Gravimetric	GTI-FPS-375	8hours
3	$PM_{2.5}$	Gravimetric	GTI-FPS-375	8hours
4	NOx	Modified West and Ga\eke Method	GTI-FPS-375 with Impinger attachment	8hours
5	Sox	Modified Jacob & Hochhseiser Method	GTI-FPS-375 with Impinger attachment	8hours
6	CO	Iodine Pentoxide Method	GTI-FPS-375 with Impinger attachment	8hours
7	O_3	KI Chemical Method	GTI-FPS-375 with Impinger attachment	8hours

Table 19: Description of the methodology of Ambient Air Quality

SL/No	Name of the parameters	Methodology
1	SPM, PM_{10}, $PM_{2.5}$	**Gravimetric method**; Air sampler is the simplest of the direct weight methods and has been adopted by the USEPA and British Standard Intuition (1969). Typically, EPA's validated reference test methods for PM (EPA Methods 5 and 17) measure only material that is collected on and ahead of the filter media of a sampling device.
2	SOx	**Modified West & Gaeke Method (IS 5182 Part 2 Method of Measurement of Air Pollution: Sulphur dioxide)**. Sulphur dioxide from air is absorbed in a solution of potassium tetrachloromercurate (TCM). A dichlorosulphitomercurate complex, which resists oxidation by the oxygen in the air, is formed. Once formed, this complex is stable to strong oxidants such as ozone and oxides of nitrogen and therefore, the absorber solution may be stored for some time prior to analysis. The complex is made to react with pararosaniline and formaldehyde to form the intensely colored pararosaniline methyl sulphonic acid. The absorbance of the solution is measured by means of a suitable spectrophotometer at 560 nm.
3	NOx	**Modified Jacob & Hochheiser Method (IS 5182 Part 6 Methods for Measurement of Air Pollution: Oxides of nitrogen).** Ambient nitrogen dioxide (NO_2) is collected by bubbling air through a solution of sodium hydroxide and sodium arsenite. The concentration

SL/No	Name of the parameters	Methodology
		of nitrite ion (NO_2) produced during sampling is determined colorimetrically by reacting the nitrite ion with phosphoric acid, sulfanilamide, and N-(1-naphthyl)-ethylenediamine dihydrochloride (NEDA) and measuring the absorbance of the highly colored azodye at 540 nm.
4	O_3	**Method 411, Air Sampling and Analysis, 3 Edition (Determination of oxidizing substances in the atmosphere, Chemical Method)** Micro-amounts of ozone and the oxidants liberate iodine when absorbed in a 1% solution of potassium iodine buffered at pH 6.8 + 0.2. The iodine is determined spectrophotometrically by measuring the absorption of tri-iodide ion at 352 nm. The stoichiometry is approximated by the following reaction: $O_3 + 3\ KI + H_2O \dashrightarrow KI_3 + 2\ KOH + O_2$
5	CO	**Iodine Penta-Oxide Method** Iodine pentoxide easily oxidizes carbon monoxide to carbon dioxide at room temperature: $5CO + I_2O_5 \rightarrow I_2 + 5CO_2$ This reaction can be used to analyze the concentration of CO in a gaseous sample. the liberate iodine finally titrated with sodium thiosulfate by starch indicator.

72. As per the national standard (Air Pollution Control Rules-2022), O_3 and CO need to be monitored for 8 hours to compare with the national standard whereas standard for PM10, PM2.5, NOx and SO2, is 24-hour. So, standard duration is varying from parameter to parameter. Considering all these issues, conversion factors have been used for the calculation of the parameters in the standard timelines from 8-hour monitoring period. Many agencies (e.g., New York State Dept. of Environmental Conservation, California Office of Environmental Health Hazards Assessment, USEPA, Ontario Ministry of Environment) face the same problems and have had to adapt by applying a conversion process using Pasqual's (1961) air mass dispersion tables defining six air mass stability classes (Table 20) and a set of meteorological conditions (Table 21). Using the simple power law principle, Schroeder and Jugloff (2012) described the steps for converting eight-hour readings to 24- hour/annual values. (Schroeder & Jugloff, 2012). The stability classes (Table 20) are related to average wind speed, daytime solar radiation and night-time cloud cover (Table 21), refining these relationships, was also developed by Pasquill.

Table 20: Pasquill-Gifford Air Dispersion Stability
(Classes & Associated Dispersion Exponents)

Stability Class	p	Definition
A	0.5	Very unstable
B	0.5	unstable
C	0.333	Slightly unstable
D	0.2	Neutral
E	0.167	Slightly stable
F	0.167	Stable

Table 21: Meteorological Conditions Used to Define the Stability Classes[11]

Surface wind speed	**Daytime incoming solar radiation**			**Night time cloud cover**	
m/s	Strong	moderate	slight	>50%	<50%
< 2	A	A – B	B	E	F
2 – 3	A – B	B	C	E	F
3 – 5	B	B – C	C	D	E
5 – 6	C	C – D	D	D	D
> 6	C	D	D	D	D

Note: Grey highlight indicates condition selected for Bangladesh

73. Weather data was not recorded during the monitoring period. So, from Bangladesh context, the annual average wind speed in project area is about <2 m/s. So, considering the wind speed, from Table 21 (1st row as the average wind speed in all the area is <2 m/s), the Project stability class was calculated as 0.39 (see below):

P =	0.5+0.5+0.167
	3
	= 0.389≈0.39

74. The value of exponential factor is calculated based on the stability class of study area (Table 20). According to wind speed, the stability class of the study area is A, B, E, and F. Hence, the value of P will be average of the respected P values of these stability classes. This suggests a somewhat unstable air mass, resulting in considerable dilution of an eight-hour sample when spread out over a 24-hour period. In order to provide 24-hour averages for the five parameters, the following power-law equation as defined in Schroeder and Jugloff 2012 was applied:

$C_{long} = C_{short} (t_{short}/t_{long})^{p}$

Where,

C_{long} = Expected output in specific time period

C_{short} = Outcome during Monitoring Period

t_{short} = Specific time period during monitoring (in minutes)

t_{long} = Expected time period (in minutes)

p = Exponential factor where the value is 0.39

75. This generalized approach was applied to all data, and the 24-hour/annual averages generated in order to be able to compare Project results to GoB standards.

[11] J. Schroeder and D. Jugloff, 2012. Interpretation of 24-hour sampling data: Development of 24- hour ambient air quality criteria and their use in Ontario, Toronto, ON: Standards Development Branch, Ontario Ministry of the Environment

5.2.1.1 Monitoring Instrument



GTI-FPS-375



Attached Impinger



5.2.1.2 Calibration Certificate of the Instruments



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CERTIFICATE of CALIBRATION

Certificate No. 02411064318
Issue Date 13/07/2024

Customer Details:

Name	**Greenbud**
Address	Level:14, Building No:02, Confidence Center, Kha-09, Shahjadpur, Gulshan, Dhaka-1212, Bangladesh.

Details of Unit Under Verification (UUV):

Description	Respirable Dust Sampler
Manufacturer	Greintech Instruments
Model/Type	GTT-FPS-375
Serial Number	20011908005788
ID No.	**GB-150-070-003**
Range/working Range	Ref. On Obs.
Least Count	Ref. On Obs.
Accuracy	As Per Instrument
Location of Verification	Laboratory
Visual Inspection	OK
Date of Calibration	10/07/2024
Suggested Due Date	09/07/2025
Procedure	The calibration had been performed in accordance with the procedure COP/SCS/186
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (˚C)	25±3
Relative Humidity (%RH)	35 to 65

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Thermal Anemometer	testo	SCS/TAM/01	EMC/243651M	01/02/2025	EMC-CHINA
02	Thermo Hygrometer (Data Logger)	CEM	SCS/DL/05	QSI/1982/23/10	08/10/2024	QSI-INDIA

OBSERVATION:

Air Flow : (verified against calibrated anemometer)

Sl. No.	Meter Flow (m^3)	Actual Flow (m^3)	Error (m^3)	Tolerance (m^3)	Status	Uncertainty (m^3)
01	0.0	0.000	0.000	N/S	D	±0.05% of rdg
02	0.5	0.503	-0.003	N/S	D	
03	1.0	1.005	-0.005	N/S	D	
04	2.0	2.008	-0.008	N/S	D	
05	5.0	5.013	-0.013	N/S	D	

Air Flow : (verified against calibrated anemometer)

Sl. No.	Meter Flow (L/min)	Actual Flow (L/min)	Error (L/min)	Tolerance	Status	Uncertainty (L/min)
01	2.5	2.502	-0.002	N/S	D	±0.05% of rdg
02	5.0	5.005	-0.005	N/S	D	
03	10.0	10.012	-0.012	N/S	D	
04	15.0	15.020	-0.020	N/S	D	
05	20.0	20.028	-0.028	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:

Md. Mobinul Islam
(Sr. Calibration Engineer)

Issued By:
Standard Calibration Service Private Limited Dhaka

Md. Arman Ahmed Rozu
(Technical Manager)

End of Calibration Certificate

02411064318

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CERTIFICATE of CALIBRATION

Certificate No. 02411064310
Issue Date 25/07/2024

Customer Details:

Name	**Greenbud**
Address	Level:14, Building No:02, Confidence Center, Kha-09, Shahjadpur, Gulshan, Dhaka-1212, Bangladesh.

Details of Unit Under Calibration (UUC):

Description	Air Quality Tester
Manufacturer	ROHS
Model/Type	JD-3002
Serial Number	N/P
ID No.	**GB-110-014-004**
Range/working Range	Ref on Obs
Least Count	Ref on Obs
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	23/07/2024
Suggested Due Date	22/07/2025
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/115 (Procedure based on Comparision Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2 & 3.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Carbon Dioxide Meter	EXTECH	SCS/COM/01	QSI/1090/23/06	16/06/2024	QSI-INDIA
02	Portable Gas Analyzer	LOOBO	SCS/PFGA/01	QSI/2481/24/02	15/02/2025	QSI-INDIA
03	RTD with Indicator	Eurotherm/ Tempsens	SCS/RTD/01	QSI/1241/23/12	19/12/2024	QSI-INDIA
04	Multi-function Process Calibrator	FLUKE	SCS/MPC/03	QSI /0591/23/12	20/12/2024	QSI-INDIA
05	Thermo Hygrometer(Data Logger)	CEM	SCS/DL/05	QSI/1982/23/10	08/10/2024	QSI-INDIA

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.
Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.
Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.
Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Temperature: (verified against calibrated instruments)

Sl. No.	Standard Value (°C)	U.U.C. Value (°C)	Error (°C)	Tolerance	Status	Uncertainty (°C)
01	-10.09	-10.0	0.09	N/S	D	±0.20
02	0.00	0.0	0.00	N/S	D	±0.20
03	9.90	10.0	0.10	N/S	D	±0.30
04	19.82	20.0	0.18	N/S	D	±0.30
05	29.75	30.0	0.25	N/S	D	±0.30
06	49.68	50.0	0.32	N/S	D	±0.30

Humidity: (verified against calibrated instruments)

Sl. No.	Standard Value (%)	U.U.C. Value (%)	Error (%)	Tolerance	Status	Uncertainty (%)
01	20.0	20.0	0.0	N/S	D	±0.5
02	29.9	30.0	0.1	N/S	D	±0.5
03	39.8	40.0	0.2	N/S	D	±0.5
04	49.5	50.0	0.5	N/S	D	±0.5
05	69.3	70.0	0.7	N/S	D	±0.5
06	84.1	85.0	0.9	N/S	D	±0.5

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HCHO (0 to 1)mg/m³ : (Verified Against Traceable Sample)

Sl. No.	Standard Value (mg/m³)	U.U.C Value (mg/m³)	Error (mg/m³)	Tolerance (mg/m³)	Status	Uncertainty
01	0.100	0.100	0.000	N/S	D	±0.4% of rdg.
02	0.200	0.202	0.002	N/S	D	±0.4% of rdg.
03	0.400	0.402	0.002	N/S	D	±0.4% of rdg.
04	0.600	0.603	0.003	N/S	D	±0.4% of rdg.
05	0.800	0.805	0.005	N/S	D	±0.4% of rdg.

TVOC (0 to 2)mg/m³ : (Verified Against Traceable Sample)

Sl. No.	Standard Value (mg/m³)	U.U.C Value (mg/m³)	Error (mg/m³)	Tolerance (mg/m³)	Status	Uncertainty
01	0.100	0.101	0.001	N/S	D	±0.4% of rdg.
02	0.500	0.503	0.003	N/S	D	±0.4% of rdg.
03	1.000	1.004	0.004	N/S	D	±0.4% of rdg.
04	1.500	1.506	0.006	N/S	D	±0.4% of rdg.
05	1.800	1.808	0.008	N/S	D	±0.4% of rdg.

Carbon Dioxide CO_2 :(0 to 2000 ppm)

Sl. No.	Target Value (ppm)	Actual Value (ppm)	Error	Tolerance	Status	Uncertainty
01	100	100.6	-0.6	N/S	D	±0.05 % of rdg.
02	200	201.1	-1.1	N/S	D	±0.05 % of rdg.
03	500	501.8	-1.8	N/S	D	±0.05 % of rdg.
04	1000	1002.3	-2.3	N/S	D	±0.05 % of rdg.
05	1500	1502.7	-2.7	N/S	D	±0.05 % of rdg.

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:
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(Sr. Calibration Engineer)

Issued By:
Md. Arman Ahmed Razu
(Technical Manager)

End of Calibration Certificate

02411064291

Page 3 of 3

76. **Testing Results**: Based on various sources, 05 locations were considered for Baseline Ambient Air Quality Monitoring. The obtained result of the baseline monitoring is given below.

Table 22: Ambient Air Quality Monitoring Result

Sl. No.	Date	Coordinates	Period	Parameters (µg/m^3)						
				$PM_{2.5}$	PM_{10}	SOx	NOx	CO	O_3	SPM
AAQ-01	08.02.25	23°58'0.906"N 90°33'3.408"E	8-hour	55	67	62	72	372	30	87
			As per Standard	36	44	40.4	46.9			
AAQ-02	09.02.25	23°57'28.528"N 90°33'23.954"E	8-hour	59	71	66	73	380	33	77
			As per Standard	38	46	43.0	47.6			
AAQ-03	10.02.25	23°57'10.977"N 90°33'18.231"E	8-hour	57	81	70	68	376	37	82
			As per Standard	37	53	45.6	44.3			
AAQ-04	11.02.25	23°56'50.084"N 90°33'25.961"E	8-hour	62	70	71	70	367	30	74
			As per Standard	36	44	46.3	45.6			
AAQ-05	12.02.25	23°56'20.567"N 90°33'34.481"E	8-hour	59	69	63	69	362	32	75
			As per Standard	38	45	41.0	45.0			
Air Pollution Control Rules-2022				**65**	**150**	**80**	**80**	**5000**	**100**	**NYS**
Standard Time Period as per APCR-2022				**24hr.**	**24hr.**	**24hr.**	**24hr.**	**8hr.**	**8hr.**	**NYS**

77. According to the air quality test result, it can be summarized that all the parameters of the air quality has been found within the standard limit according to the APCR-2022. One of the reasons behind this can be the rain as the baseline survey was conducted during the wet season. Another reason can be the nature of the locations of baseline survey as most of the locations were located at rural area.

5.2.2 Noise Level Monitoring

78. This section identifies the status of the ambient noise level in Package 1 alignment location. The ambient noise level has been measured within the project area for 24 hours. One Noise data logger sound level meter (Model: SLM25) has been used to collect the ambient noise levels. After getting all the noise data it has been downloaded to a computer. The noise meter has been settled in a tripod and kept 2-3 m away from the sources. Five sensitive locations have been covered. The noise level has been analyzed according to the methodology and compared with the Sound Pollution (Control) Rules, 2006- Schedule 1. The SLM (sound level meter) has been oriented towards the facility of interest for each measurement taken. The SLM was calibrated before the noise monitoring survey was carried out. The sound level has been recorded in form of A-weighted equivalent continuous sound pressure level (LA_{eq}) values with the use of A-weighting filters in the noise measuring instrument.

79. Initially, only one location was chosen for noise level monitoring along the **Dhaka and Western Zone Transmission Grid Expansion Project** route. However, after consultation with **Power Grid**, it was decided to expand the monitoring to five specific locations. These additional locations, listed with their respective coordinates and dates, were selected to better capture the variations in noise levels across different segments of the project area.

80. The decision to monitor five locations ensures a more comprehensive assessment, as the project spans areas with varying levels of construction activities and proximity to sensitive receptors, such as residential zones, schools, and religious sites. By monitoring multiple sites, the project team can identify localized noise disturbances more accurately, ensuring that mitigation measures are tailored to the specific needs of each area. This approach will help in minimizing noise pollution and ensuring that the project remains compliant with both national and international noise standards.

Table 23: Location of Noise Level monitoring station

Tower	Date	Co-ordinates
T-1/0	**08.02.25**	23°58'1.116"N 90°33'1.59"E
T-4/0	**09.02.25**	23°57'30.075"N 90°33'23.303"E
T-3/0	**10.02.25**	23°57'9.805"N 90°33'19.510"E
T-2/3	**11.02.25**	23°56'49.083"N 90°33'25.387"E
T-2/1	**12.02.25**	23°56'18.556"N 90°33'33.555"E

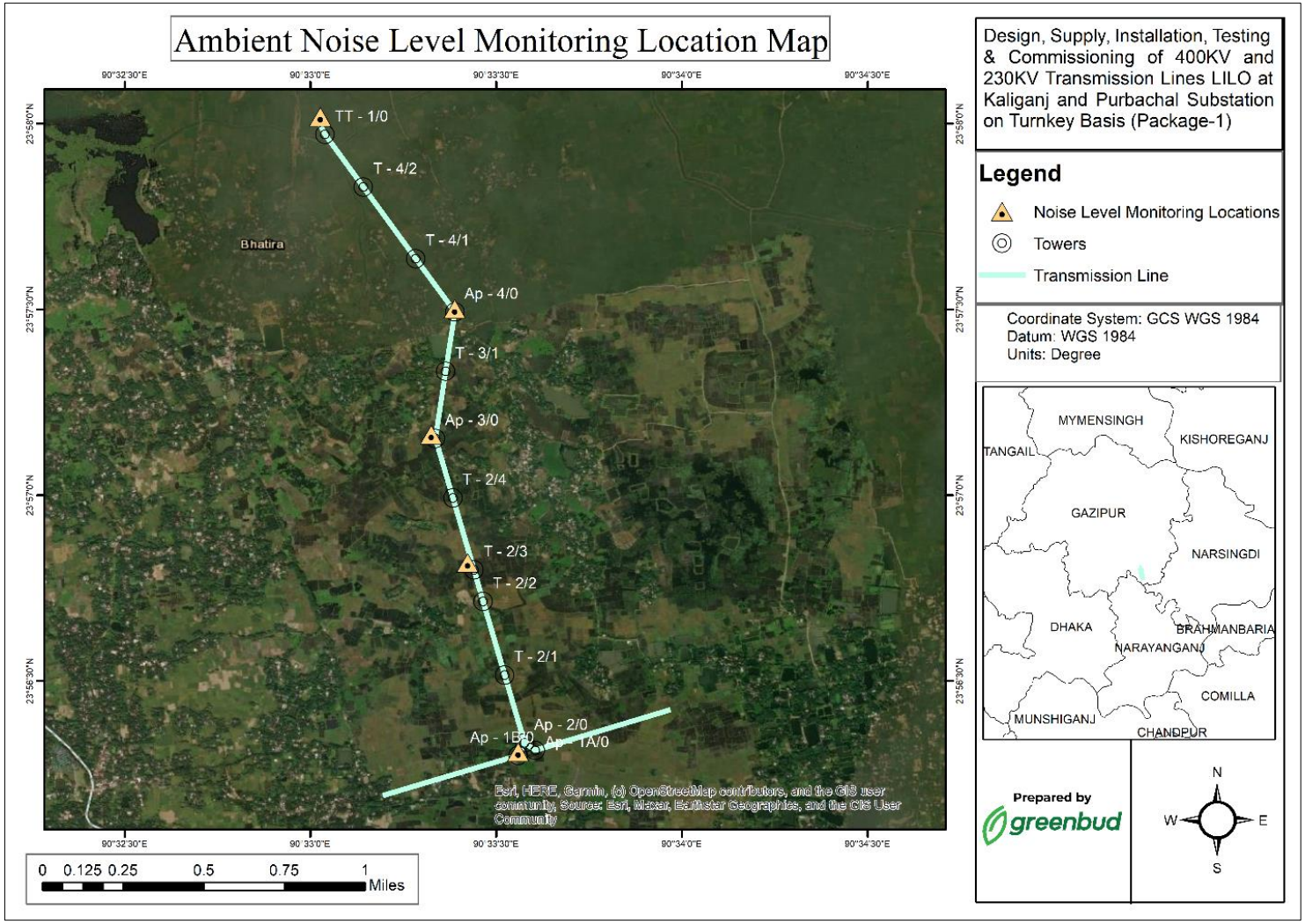


Figure 4: Monitoring Location Map of Noise Level

81. **Methodology of Sampling and Testing**: A calibrated noise meter (Model SLM-25) has been used for noise level monitoring with a data record system. Noise level monitoring was carried out for 24 hours (once) during monitoring period with 1-min equivalent sound pressure levels. At the location, measurement was taken at 1-min intervals over a 24-hour period. Finally, the measurements were done by dividing the 24 hours into two parts, i.e., daytime, which is considered from 0600 to 2100 hours and night from 2100 to 0600 hours. At each location, day time Leq has been computed from the hourly sound level values measured between 0600 to 2100 hours and night time Leq has been computed from the hourly sound pressure level values measured between 2100 to 0600 hours. The sound level is recorded in form of A-weighted equivalent continuous sound pressure level (Leq) values with the use of A-weighting filters in the noise measuring instrument. The time schedule of noise monitoring is considered as per EMoP and Sound Pollution Control Rules-2006. The details of noise methods are shown in below table:

Table 24: Method of Analysis for Noise and Vibration Measurement

Sl./No.	Parameter	Methodology	Device/Equipment	Duration
1.	L_{eq}	Portable Noise Meter with Data Recording System	SLM-25	24hours

82. The specification for the Noise level monitoring is enumerated in the following table as per Ambient Noise Standard by SPCR'2006.

Table 25: Ambient Noise standard by SPCR'2006

No.	Area Class	Day (dBA)	Night (dBA)
a.	Silent area	50	40
b.	Residential area	55	45
c.	Mix area	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

83. **Testing Results**: Based on various sources and field investigation's five locations were considered for Baseline Ambient Noise Level. The obtained result of the baseline monitoring is given below.

Table 26: Ambient Noise Level Monitoring Result

S/N	Tower	Category	Monitoring result		Standard Limit	
			L_{eq} (Day)	L_{eq} (Night)	Day	Night
ANL-01	T-1/0	Silent Zone	**48.59**	**37.80**	50	40
ANL-02	T-4/0	Silent Zone	**46.30**	**37.84**	50	40
ANL-03	T-3/0	Silent Zone	**45.71**	**36.23**	50	40
ANL-04	T-2/3	Silent Zone	**41.86**	**37.77**	50	40
ANL-05	T-2/1	Silent Zone	**42.95**	**37.86**	50	40

84. The summary result shows that the value of Leq (day) is within the standard. On the other hand, the value of Leq (night) is also within the standard. From the analysis data it has

been found that the noise level of monitoring station is within the SPCR-2006 standard during the day and night time.

85. The noise level monitoring results from the transmission line project indicate that the noise levels recorded at all monitoring stations are within the acceptable limits defined by the SPCR-2006 standard. For the **Leq (Day)** parameter, all monitored values are below the threshold of **50 dB**, ranging from **41.86 dB to 48.59 dB**, ensuring that daytime noise levels are compliant with the standard for a **Silent Zone**.

86. Similarly, for the **Leq (Night)** parameter, all the monitored values are also within the standard, ranging from **36.23 dB to 37.86 dB**, which is below the nighttime limit of **40 dB**. This demonstrates that construction activities and site operations are not causing excessive noise disturbances during nighttime hours.

87. These results confirm that, despite ongoing construction activities for the transmission line towers, the noise levels remain well within the designated thresholds, minimizing potential adverse impacts on the surrounding community and the environment. The monitoring efforts and mitigations in place are effective in maintaining the project's compliance with noise standards.

5.2.3 Surface Water Quality

88. Samples were collected from the center of the water body approximately 0.5m below the water surface. Location of sample collection is presented in Table 27. The analyzed result for surface water was compared to Bangladesh Standard (ECR, 2023) Guidelines. Result of inland surface water analysis is presented in Table 28 and Table 29.

Table 27: Location of Surface water Quality Monitoring Station

S/N	Sampling Date	Co-ordinates
SW-01	**12.02.2025**	**23°57'59.0162"N**
		90°32'58.406"E
SW -02		**23°57'27.384"N**
		90°33'22.473"E
SW -03		**23°57'23.334"N**
		90°33'16.017"E
SW -04		**23°57'24.26"N**
		90°32'59.558"E
SW-05		**23°56'15.322"N**
		90°33'38.667"E

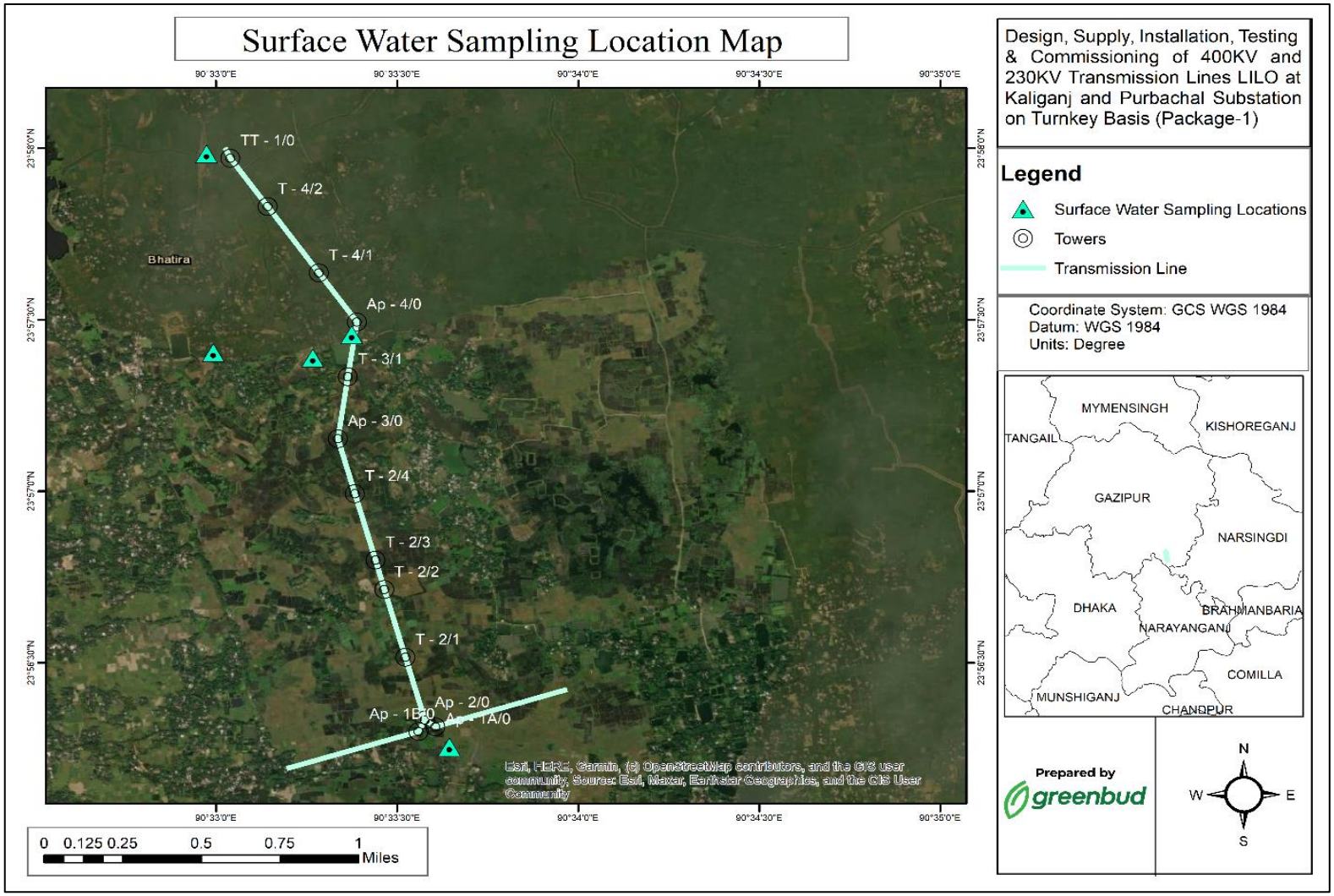


Figure 5: Monitoring Location Map of Surface Water

89. **Methodology of Sampling and Testing**: The surface water samples are collected from upstream-50m and downstream-50m of waterbody. The depth of the at which water samples are collected is 0.5 m. The samples have been collected by directly filling the container from the surface water body being sampled or by decanting the water from a collection device or pump in properly labeled sampling bottle and then the bottle is properly sealed. The sampling water bottles are properly cleaned by distilled water prior to the sample collection. After collecting the water samples, the samples were sent to the authorized laboratory within 24 hours period. The parameters which have been determined by following ECR'23 (pH and TC) and IEE and methods required for the surface water quality monitoring are enumerated in the following table:

Table 28: Surface Water Quality Baseline Monitoring Analytical Methods and Standards

S/I	Water Quality Parameters	Unit	Bangladesh Standard for Surface Water (ECR'2023)	Method of Analysis
1	Arsenic (As)	mg/L	-	AAS
2	Iron (Fe)	mg/L	-	AAS
3	Manganese (Mn)	mg/L	-	AAS
4	pH	-	6.5-8.5	pH Meter
5	Total Coliform (TC)	CFU/100mL	-	Membrane Filtration
6	Faecal Coliform (FC)	CFU/100mL	-	Membrane Filtration

90. **Testing Results:** Based on various sources and consultation with **Power Grid** five sampling locations were considered for Baseline Surface Water Quality Monitoring. The obtained result of the baseline monitoring is given below:

Table 29: Surface Water Quality Testing Results

Sample No.	Tower No.	pH	TC (N/100 ml)
SW-1	T-1/0	7.0	200
SW-2	T-4/0	6.9	308000
SW-3	T-3/0	6.7	5200
SW-4	T-2/3	6.7	1600
SW-5	T-2/1	7.0	500
ECR'2023 Standards		**6.5-8.5**	**-**

91. The pH levels of the surface water samples from the project site are within the acceptable range of 6.5 to 8.5 as per the ECR 2023 standards. However, the Total Coliform (TC) values exceed the acceptable limits in some locations, particularly at T-4/0, indicating potential contamination concerns.

92. The Arsenic levels in all samples are well below the 0.5 mg/L limit, indicating that the surface water at these locations is within acceptable safety levels for this contaminant. The Iron concentrations are also within the expected range for natural water bodies, with values ranging from 0.99 mg/L to 8.59 mg/L, which is typically found in groundwater and surface water in regions with natural iron presence. Manganese levels are consistently low across the samples, all under the 0.1 mg/L threshold, which is good for maintaining water quality. The Fecal Coliform (FC) values show significant variation, with SW-2 having the highest count of 232,000 N/100 ml, indicating a possible contamination source at this location. However, the other sites, such as SW-1, SW-3, SW-4, and SW-5, show more acceptable levels of fecal contamination, well within limits for potable water standards. These parameters have been determined following the Initial Environmental Examination (IEE), which was conducted before 2020. Since the IEE did not align with the updated ECR 2023 standards, the current testing results may not fully comply with the ECR 2023 water quality parameters. Moving forward, all future sampling will strictly follow the ECR 2023 guidelines to ensure compliance with the latest environmental regulations and improve the monitoring framework.[12]
93. Microbial presence (TC and FC) was detected in all samples, with higher counts in SW-2 and SW-3. However, these are likely influenced by external community activities or upstream sources, not directly linked to project operations.

[12] Surface Water Quality Reports have been attached to FF ANNEX

5.2.4 Ground Water Quality

94. To determine the quality of ground water, sample was collected from the deep tube well of the study area and analyzed in the lab for different parameters following the standard method. Change of any parameters of water due to construction can affect the crops, flora, and fauna.

95. Ground water samples have been collected from the Ground water supply point or deep tube well or shallow tube well set up in the construction area. Ground water samples have been collected in a standard sampling bottle and 250 ml sterilized clean PET bottle for complete physio-chemical and bacteriological tests respectively. The samples have been analysed as per standard procedure/method given in Standard Method for Examination of Water and Wastewater Edition 20, published by APHA as well as using a site field test kit. Ground-Water Sampling Locations

96. Ground water samples were collected for determining the quality of existing sources. Ground water in the project area was selected as the source of groundwater. Detail of the sampling location is provided in Table 30.

Table 30: Location of Ground Water Quality Monitoring

S/N	Sampling Date	Co-ordinates
GW-01	**12.02.2025**	**23°58'6.29"N**
		90°32'55.859"E
GW-02		**23°57'28.667"N**
		90°33'24.84"E
GW-03		**23°57'22.085"N**
		90°33'17.38"E
GW-04		**23°57'22.755"N**
		90°32'58.451"E
GW-05		**23°56'12.589"N**
		90°33'32.488"E

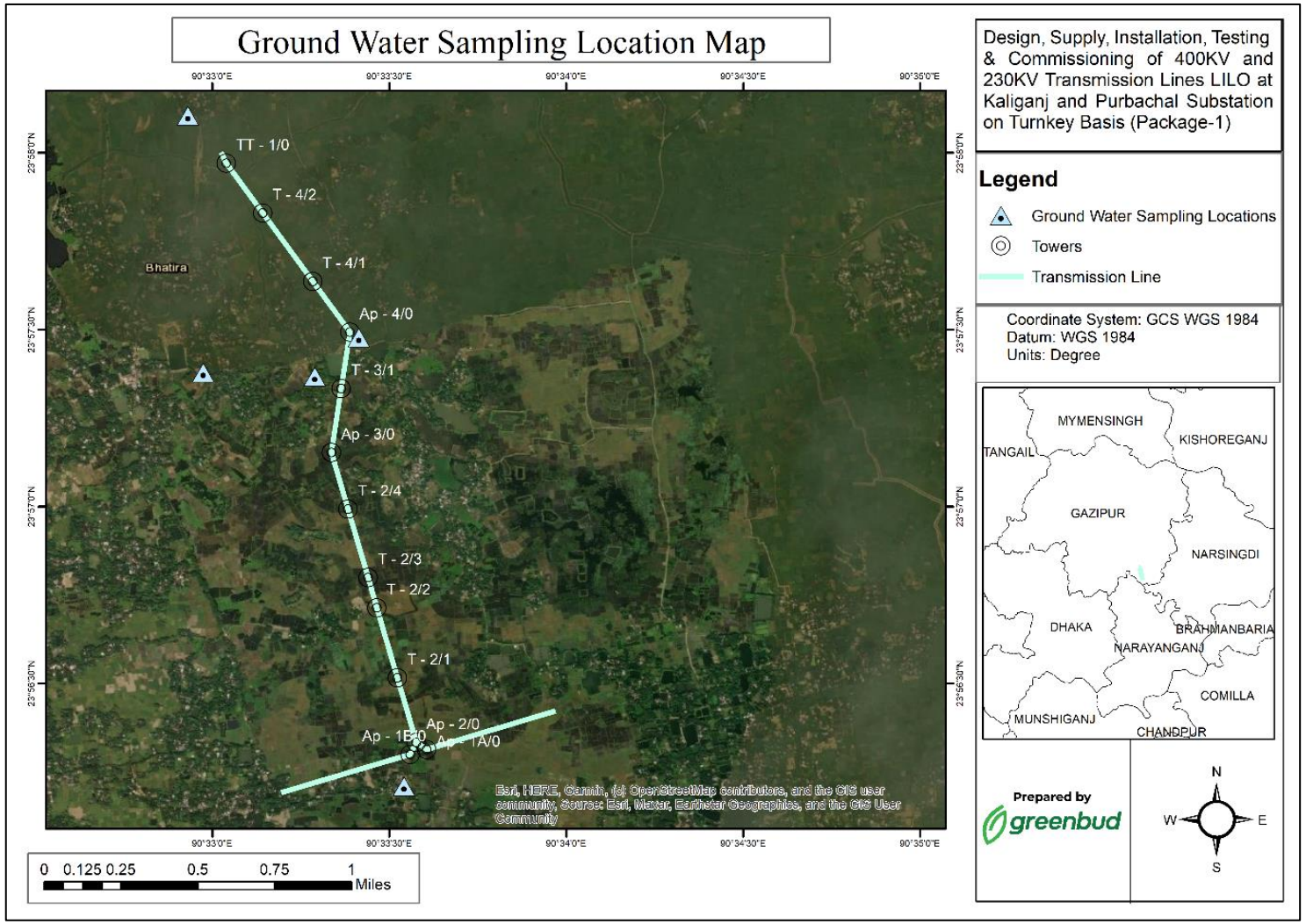


Figure 6: Monitoring Location Map of Ground Water Quality

97. **Methodology of Sampling and Testing:** The Groundwater samples were collected from tube well from the afore-mentioned location. The samples have been collected by directly filling the water sample bottle from the tube well in a properly labeled sampling bottle and then the bottle is properly sealed. The sampling water bottles have been properly cleaned by distilled water prior to the sample collection. After collecting the water samples, the samples were sent to the authorized laboratory within 24 hours period. The parameters which has been determined by following IEE and methods required for the Groundwater quality monitoring are enumerated in the following table:

Table 31: Ground Water Quality Baseline Monitoring Analytical Methods and Standards

S/l	Water Quality Parameters	Unit	Bangladesh Standard for Ground Water (ECR'2023)	Method of Analysis
1	Ammonia	mg/L	0.5	UVS
2	Chemical Oxygen Demand (COD)	mg/L	4	CRM
3	pH	-	6.5-8.5	pH Meter
4	Phosphate	mg/L	6.0	UVS
5	Total Coliform	CFU/100 ml	0	Membrane Filtration
6	Faecal Coliform	CFU/100 ml	0	Membrane Filtration
7	Biochemical Oxygen Demand (BOD)	mg/L	-	5-Day BOD Test

98. **Testing Results:** Based on various sources, five sampling locations were considered for Baseline Ground Water Quality Monitoring. The obtained result of the baseline monitoring is given below:

Table 32: Ground Water Test Results

Sample No.	Ammonia (mg/L)	COD (mg/L)	TC (CFU/100 ml)	FC (CFU/100 ml)	pH	Phosphate (mg/L)	BOD (mg/L)
GW-1	0.40	56	0	0	7.1	2.0	2.0
GW-2	0.32	312	0	0	6.7	1.0	2.0
GW-3	0.23	36	17	13	7.0	0.66	2.0
GW-4	0.30	48	0	0	6.4	0.70	2.0
GW-5	0.35	56	48	21	6.8	1.2	1410
ECR'2023 Standards	**0.5**	**4**	**0**	**0**	**6.5-8.5**	**6**	**-**

99. All the parameters are within the acceptable limits set for the Drinking Water in ECR 2023 except TC & FC in (GW-3 & GW-5) & COD in all water.

100. The selected surface water (SW) and groundwater (GW) quality parameters align with the project's obligations under the Environmental Impact Assessment (IEE), the Environmental Management Plan (EMP), and Bangladesh's Environmental Conservation Rules (ECR 2023). For surface water, parameters like ammonia, BOD, COD, DO, TSS, and oil and grease are critical for assessing water quality, and their inclusion ensures that organic pollutants and oxygen levels are monitored, in line with the EMP and ECR standards. Monitoring pH and turbidity ensures the preservation of aquatic ecosystems, while parameters like electrical conductivity (EC) ensure compliance with water quality standards necessary for public health.

101. The groundwater quality assessment conducted across five sampling locations (GW-1 to GW-5) provides valuable insights into the current condition of key water quality parameters. Overall, most samples show compliance with the ECR 2023 standards, particularly in terms of ammonia concentration, pH levels, and coliform absence, which indicates that the groundwater in the majority of locations remains suitable for general use.
102. Ammonia levels across all samples are well within the permissible limit of 0.5 mg/L, ranging from 0.23 to 0.40 mg/L. The pH values also fall within the acceptable range of 6.5 to 8.5, reflecting a balanced level of acidity and alkalinity. Additionally, total coliform (TC) and fecal coliform (FC) were absent in most samples, with only GW-3 and GW-5 showing minor microbial presence, suggesting localized issues that can be managed through targeted intervention.
103. While chemical oxygen demand (COD) exceeded the standard value (4 mg/L) in all locations, the results serve as a useful basis for identifying potential non-biological organic contamination, particularly in GW-2. Notably, GW-5 shows a higher biochemical oxygen demand (BOD) value, which may point to organic matter accumulation in that specific area.
104. Overall, the monitoring data demonstrates that the ongoing construction activities have not had a detrimental effect on groundwater quality, and all parameters remain compliant with the ECR 2023 standards.

5.2.5 Soil Quality

105. **Justification of Selecting Sampling Points:** Baseline Soil Sampling were conducted from 8th February to 12th February, 2025 upon prior site visit and as per the requirement of IEE. The Soil quality monitoring has been conducted in Five (05) stations. The stations are described in the following table:

Table 33: Location of the Soil Sampling

S/N	Sampling Date	Co-ordinates
Code-01	**08.02.2025**	**23°55'52.432"N**
		90°34'1.233"E
Code-02	**09.02.2025**	**23°57'30.432"N**
		90°34'1.233"E
Code-03	**10.02.2025**	**23°57'10.719"N**
		90°33'18.541"E
Code-04	**11.02.2025**	**23°56'49.0829"N**
		90°33'26.216"E
Code-05	**12.02.2025**	**23°56'20.645"N**
		90°33'34.799"E

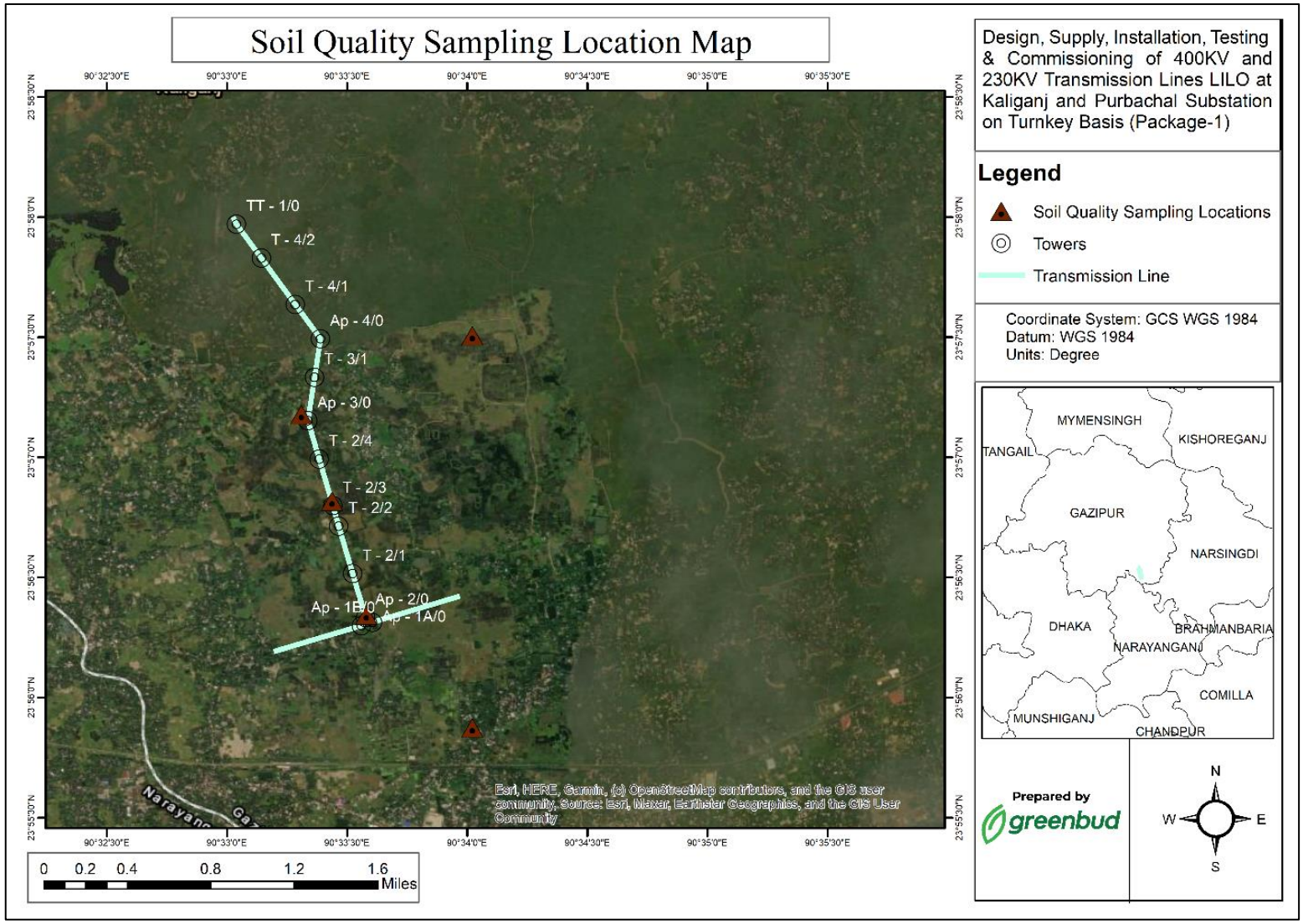


Figure 7: Monitoring Location Map of Soil Quality

106. **Methodology of Sampling and Testing:** The soil sample has been collected by a trowel after clearing the sample area. The sample of soil was collected at the specified depth, about 2.5 cm thick and 5 cm wide with the use of spade or trowel in a labelled plastic pouch bag after mixing the soil sample. After the collection of the soil, the soil sample has been sent to the laboratory. The parameters and methods required for the soil are enumerated in the following table:

Table 34: Soil Quality Baseline Analytical Methods

S/l	Soil Quality Parameters	Unit	Bangladesh Standard (ECR'23)	Method of Analysis
1	pH	-	-	1:2:5 Glass Electrode Method
2	Total Nitrogen (TN)	%	-	Micro-Kjeldahl Method
3	EC	ppm	-	FAO-UNESCO, 1973
4	Zinc (Zn)	ppm	-	DTPA Extraction Method
5	Phosphorus (P)	ppm	-	Olsen Method and Bray & Kurtz Method
6	Potassium (K)	ppm		NH_4OAc Extraction Method
7	Iron (Fe)	%	-	DTPA Extraction Method
8	Lead (Pb)	ppm	-	Nitric Acid Digestion Method
9	Copper (Cu)	ppm	-	DTPA Extraction Method
10	Calcium (Ca)	ppm	-	NH_4OAc Extraction Method

107. **Testing Results:** Based on various sources, five locations were considered for Baseline Soil Monitoring. The soil quality test is done on Soil Resource Development Institute (SRDI) central Laboratory. The obtained result of the baseline monitoring is given below.

Table 35: Soil Quality Test Results

Sample Code	pH	Total Nitrogen	EC	Zinc	Phosphorus	Potassium	Iron	Lead	Copper	Calcium
	-	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
Code:1	5.4	0.26	4.43	184.40	3.15	0.26	1.74	34.08	56.90	15.36
Code:2	4.8	0.28	2.55	90.82	2.10	0.31	1.57	35.65	45.11	14.24
Code:3	4.7	0.21	1.36	54.18	1.53	0.26	1.70	36.01	30.68	8.56
Code:4	7.8	0.09	10.69	36.01	2.53	0.68	1.57	0.05	22.17	18.75
Code:5	4.5	0.50	4.70	90.94	2.18	0.30	1.68	33.59	45.11	11.70

108. As there is no standard limit has been set by National Authority, so it can't be said if any parameter exceeds limit set for the Soil. However, to ensure comprehensive and consistent soil quality monitoring, the **Danish EPA Standard Soil Quality** guidelines have been included in the **HH ANNEX:** of this report.

109. The soil quality results indicate no significant impact from construction activities. **pH levels (4.5–7.8)** reflect slightly acidic to neutral conditions typical for the region. **Total Nitrogen (0.09–0.50%)** and **EC (1.36–10.69 ppm)** remain within normal ranges, indicating

no nutrient or salinity stress. Levels of **Zinc, Phosphorus, Potassium, Iron, Copper, Lead,** and **Calcium** are all within acceptable limits, with no signs of contamination.

110. Overall, the results confirm that the soil quality remains unaffected by the transmission line project activities, and all parameters are in line with typical soil standards. These monitoring efforts indicate that the project is not contributing to soil degradation or contamination.

5.3 Comparison of Parameters of the Environmental Monitoring

111. These plans include a range of parameters to monitor air quality, noise levels, surface water, groundwater, and soil quality, with a focus on construction-specific impacts. The EMP covers a broader scope of pollutants, while the SSEMP specifically targets construction-related environmental risks such as particulate matter, runoff contaminants, and hazardous waste. This tailored approach ensures that the project complies with national regulations, including the Environmental Conservation Rules (ECR 2023), and international best practices. The monitoring efforts are designed to minimize the environmental impact during both the construction and operational phases, ensuring sustainable practices throughout the lifecycle of the transmission grid expansion.

Table 36: Comparison of Environmental Monitoring Parameters between EMP and SSEMP

Environmental Parameter	EMP Parameters	SSEMP Parameters	Justification for Differences
Ambient Air Quality	SO_2, NO_2, CO, SPM, $PM_{2.5}$, PM_{10}, Pb, NOx, O_3	$PM_{2.5}$, PM_{10}, SOx, NOx, CO, O_3, SPM	SSEMP emphasizes dust and vehicle-related pollutants; EMP includes broader pollutants like Pb for long-term monitoring.
Noise Level Monitoring	L_{eq} (Day and Night)	L_{eq} (Day and Night)	Both use the same parameters; SSEMP targets construction-related noise near sensitive areas.
Surface Water Quality	NH_3, BOD, COD, TC, DO, pH, TDS, Turbidity, Oil & Grease, EC, PO4	As, Fe, Mn, pH, TC, FC	SSEMP focuses on metals and coliforms from construction runoff; EMP monitors overall surface water health.
Groundwater Monitoring	As, Cl, Fe, Mn, pH, Salinity, Turbidity, EC, TPH, Temp, Hardness	Ammonia, COD, BOD, TC, FC, pH, Phosphate, BOD	SSEMP targets construction-sensitive pollutants; EMP includes broader hydro chemical properties.
Soil Quality Monitoring	pH, N, EC, Zn, P, K, Fe, Pb, Cu, Ca	pH, N, EC, Zn, P, K, Fe, Pb, Cu, Ca	Parameters are the same; SSEMP prioritizes spill-related contamination, EMP focuses on long-term soil health.

5.3.1 Clarification on Environmental Values and Inclusion of Secondary Data

112. The environmental values presented in this chapter are primarily based on field measurements conducted at various locations along the project corridor in February 2025. These include air quality, noise levels, surface and groundwater quality, and soil parameters, collected and analyzed following national guidelines and project-specific environmental monitoring protocols. The field data reflect actual on-site environmental conditions and serve as the primary basis for impact assessment.

113. To supplement and validate these findings, relevant **secondary data sources** have also been reviewed. For air quality and noise levels, reference values were drawn from the *Department of Environment (DoE) Air and Noise Monitoring Report 2022* and the *Initial Environmental Examination (IEE) for Purbachal 132kV Substation Project (2021)*. For water quality, data from the *Bangladesh Water Development Board (BWDB)* and the *Department of Public Health Engineering (DPHE)* were consulted, along with the *UNICEF-DPHE National Drinking Water Quality Survey 2021*. Soil quality references were obtained

from *SRDI's Soil Resource Reports* and the *FAO-supported Soil Monitoring Program*, as well as benchmark thresholds noted in the *Danish EPA Soil Quality Guidelines*, included in the annex.

114. This integrated approach ensures that the baseline environmental profile is both location-specific and benchmarked against regional and national environmental norms.

Table 37: Comparative Analysis of Primary and Secondary Environmental Values

Parameter Scope	Primary (Field Data)	Secondary (Other Sources)	Remarks / Justification
Air Quality	During the field survey conducted in February 2025, the concentration of PM2.5 ranged between 55 and 62 µg/m³, while PM10 values were recorded between 78 and 85 µg/m³.	Based on the DOE Air Quality Monitoring Report 2022 and the IEE for the Purbachal 132kV Substation Project (2021), PM2.5 levels in similar areas typically range from 60 to 70 µg/m³, and PM10 from 80 to 95 µg/m³.	The observed primary air quality data is consistent with regional secondary data, suggesting that current construction activities have not significantly impacted local air pollution levels.
Noise Level	Measured noise levels during the monitoring period ranged from 41.86 to 48.59 dB(A) during the day, and from 36.23 to 37.86 dB(A) at night.	As per the DOE Noise Monitoring Report for rural environments, typical background noise levels are recorded between 45 and 52 dB(A) during the day and 38 to 44 dB(A) at night.	Field measurements show slightly lower noise levels compared to regional averages, which may be attributed to limited vehicular movement and the absence of heavy machinery during the monitoring.
Surface Water Quality	Surface water samples collected from project sites showed iron (Fe) concentrations ranging from 0.99 to 8.59 mg/L and pH values between 6.7 and 7.0.	According to BWDB's regional water quality studies and the ESIA conducted for the Purbachal Zone, Fe concentrations typically range from 1.5 to 6.0 mg/L, with pH values between 6.5 and 8.2.	Some field samples show elevated iron levels, exceeding secondary data ranges, possibly due to natural geological conditions or localized runoff rather than direct construction influence.
Groundwater Quality	Groundwater monitoring results indicated ammonia levels between 0.23 and 0.40 mg/L, chemical oxygen demand (COD) values from 36 to 312 mg/L, and pH levels between 6.4 and 7.1.	The DPHE Baseline Water Quality Survey 2021 reports ammonia values in the range of 0.3 to 0.45 mg/L and COD values between 30 and 90 mg/L for similar regions.	Ammonia and pH values align with national benchmarks, but elevated COD in some samples may suggest organic contamination or stagnant water conditions unrelated to project activities.
Soil Quality	The soil quality assessment revealed pH levels ranging from 4.5 to 7.8, and total nitrogen content between 0.09% and 0.50%.	SRDI and FAO soil monitoring records for comparable agroecological zones show pH values between 5.0 and 7.5, and nitrogen levels ranging from 0.1% to 0.45%.	Soil results are generally within acceptable limits, though slightly acidic conditions in some areas may reflect the natural characteristics of the region rather than project-induced changes.

5.4 Sensitive Receptors

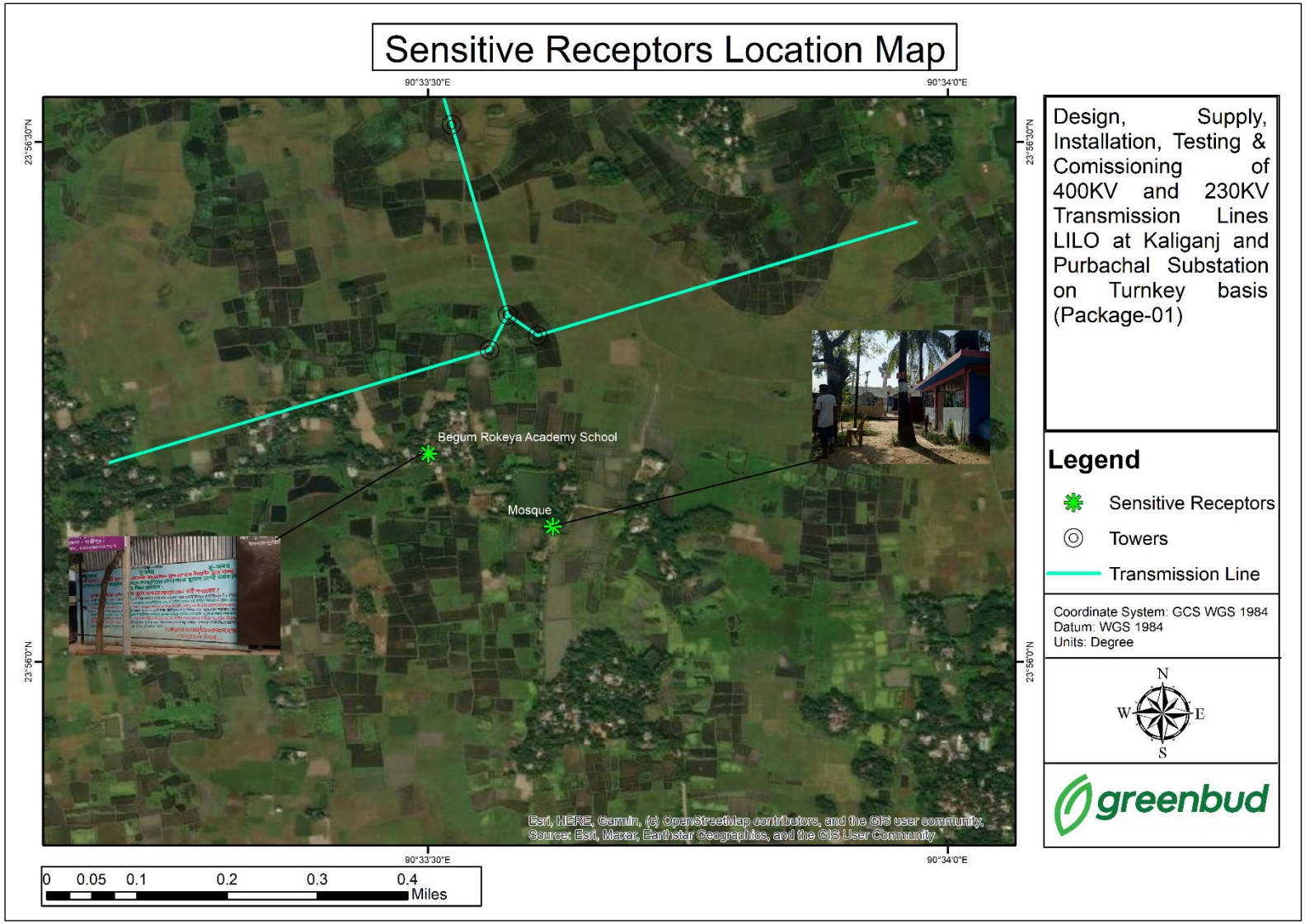
115. Sensitive receptors are people or other organisms that may have a significantly increased sensitivity or exposure to contaminants by virtue of their age and health (e.g., schools, day care centers, hospitals, nursing homes), status (e.g., sensitive or endangered species), proximity to the contamination, dwelling construction (e.g., basement), or the facilities they use (e.g., water supply well). The location of sensitive receptors must be identified in order to evaluate the potential impact of the contamination on public health and the environment.

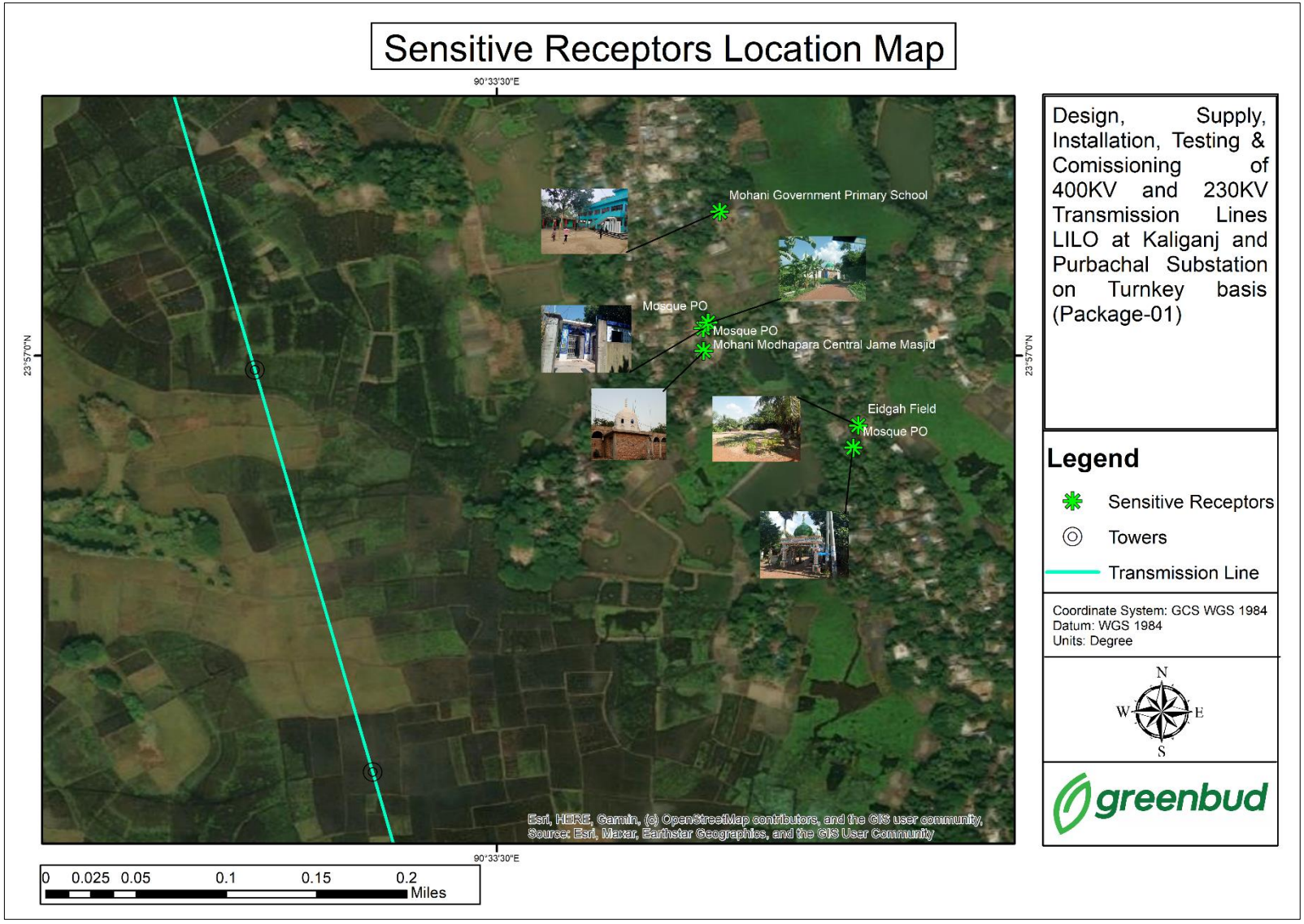
116. For the construction of the transmission line, the identification of sensitive receptors along the alignment has shown that their number is relatively low. Sensitive receptors, such as residential areas, schools, and hospitals, are generally located at a considerable distance from the transmission line alignment. These locations have been identified through site visits conducted by the Contractor, with input from the Consultants of **Power Grid**. A detailed description and location map of the sensitive receptors in proximity to the project corridor is provided below.

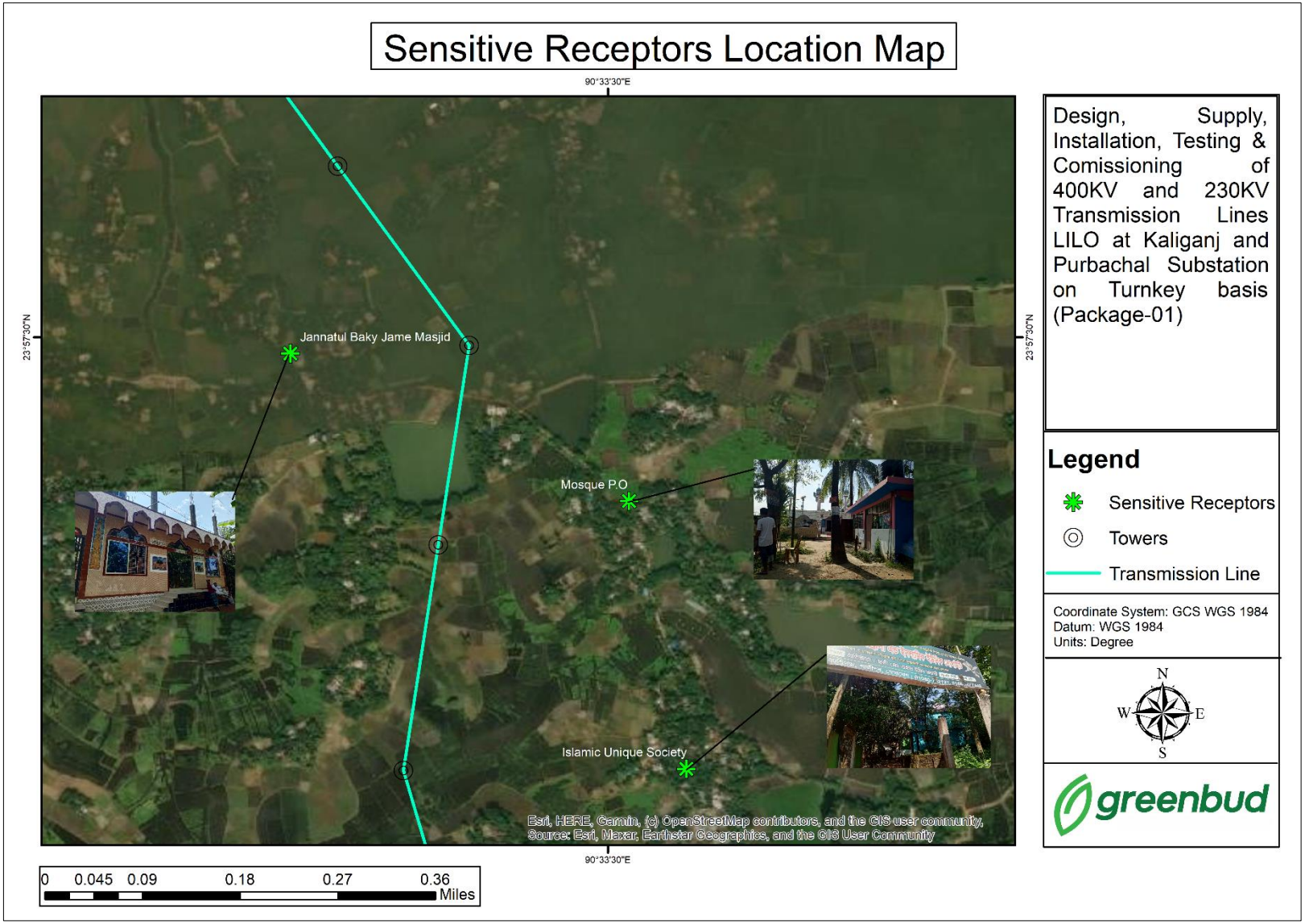
Table 38: Sensitive Receptors located alongside the Project Road

Sl. No.	Tower ID	Name of Receptor	Type of CPR	GPS Point	Distance of receptors from proposed/existing Tower (m)	Location towards Dhaka to Kaliganj
1	TT-1/0	Fuldi Bugpara Jame Mosque	Mosque	23°58'13.17"N 90°32'58.58"E	482.56	RHS
2		Mosque	Mosque	23°58'6.52"N 90°32'48.84"E	425.53	LHS
3	T-4/2	Emines College	Educational Institute	23°57'43.54"N 90°32'56.43"E	392.64	LHS
4	T-4/1	Jannatul Baky Jame Masjid	Mosque	23°57'29.23"N 90°33'14.75"E	280.64	LHS
5		Bangali Government Primary School	Educational Institute	23°57'49.71"N 90°33'28.91"E	496.76	RHS
6	T-3/1	Mosque	Mosque	23°57'22.14"N 90°33'31.01"E	268.27	RHS
7		Islamic Unique Society	Madrassa	23°57'9.28"N 90°33'33.77"E	384.05	RHS
8	T-2/4	Mohani Modhapara Central Jame Masjid	Mosque	23°57'0.14"N 90°33'35.97"E	376.53	RHS
9		Mohani Government Primary School	Educational Institute	23°57'4.16"N 90°33'36.43"E	412.36	RHS
10		Mosque	Mosque	23°57'0.79"N 90°33'35.96"E	370.86	RHS
11		Mosque PO	Mosque	23°57'0.96"N 90°33'36.10"E	375.86	RHS

Sl. No.	Tower ID	Name of Receptor	Type of CPR	GPS Point	Distance of receptors from proposed/existing Tower (m)	Location towards Dhaka to Kaliganj
12	T-2/3	Eidgah Field	Eidgah	23°56'57.99"N 90°33'40.43"E	493.13	RHS
13		Mosque	Mosque	23°56'57.34"N 90°33'40.29"E	477.78	RHS
14	T-2/0	Begum Rokeya Academy School	Educational Institute	23°56'12.02"N 90°33'30.02"E	271.13	LHS
15		Mosque	Mosque	23°56'7.81"N 90°33'37.22"E	375.18	LHS


Sensitive Receptors Location Map
90°33'30"E
90°34'0"E
23°56'30"N
23°56'0"N
Begum Rokeya Academy School
Mosque
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
0 0.05 0.1 0.2 0.3 0.4
Miles
Design, Supply, Installation, Testing & Comissioning of 400KV and 230KV Transmission Lines LILO at Kaliganj and Purbachal Substation on Turnkey basis (Package-01)
Legend
Sensitive Receptors
Towers
Transmission Line
Coordinate System: GCS WGS 1984
Datum: WGS 1984
Units: Degree
N
W
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S
greenbud


Sensitive Receptors Location Map
90°33'30"E
23°57'0"N
Mohani Government Primary School
Mosque PO
Mosque PO
Mohani Modhapara Central Jame Masjid
Eidgah Field
Mosque PO
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
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Sensitive Receptors Location Map
90°33'30"E
23°57'30"N
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Mosque P.O
Islamic Unique Society
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Design, Supply, Installation, Testing & Comissioning of 400KV and 230KV Transmission Lines LILO at Kaliganj and Purbachal Substation on Turnkey basis (Package-01)
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Sensitive Receptors
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Transmission Line
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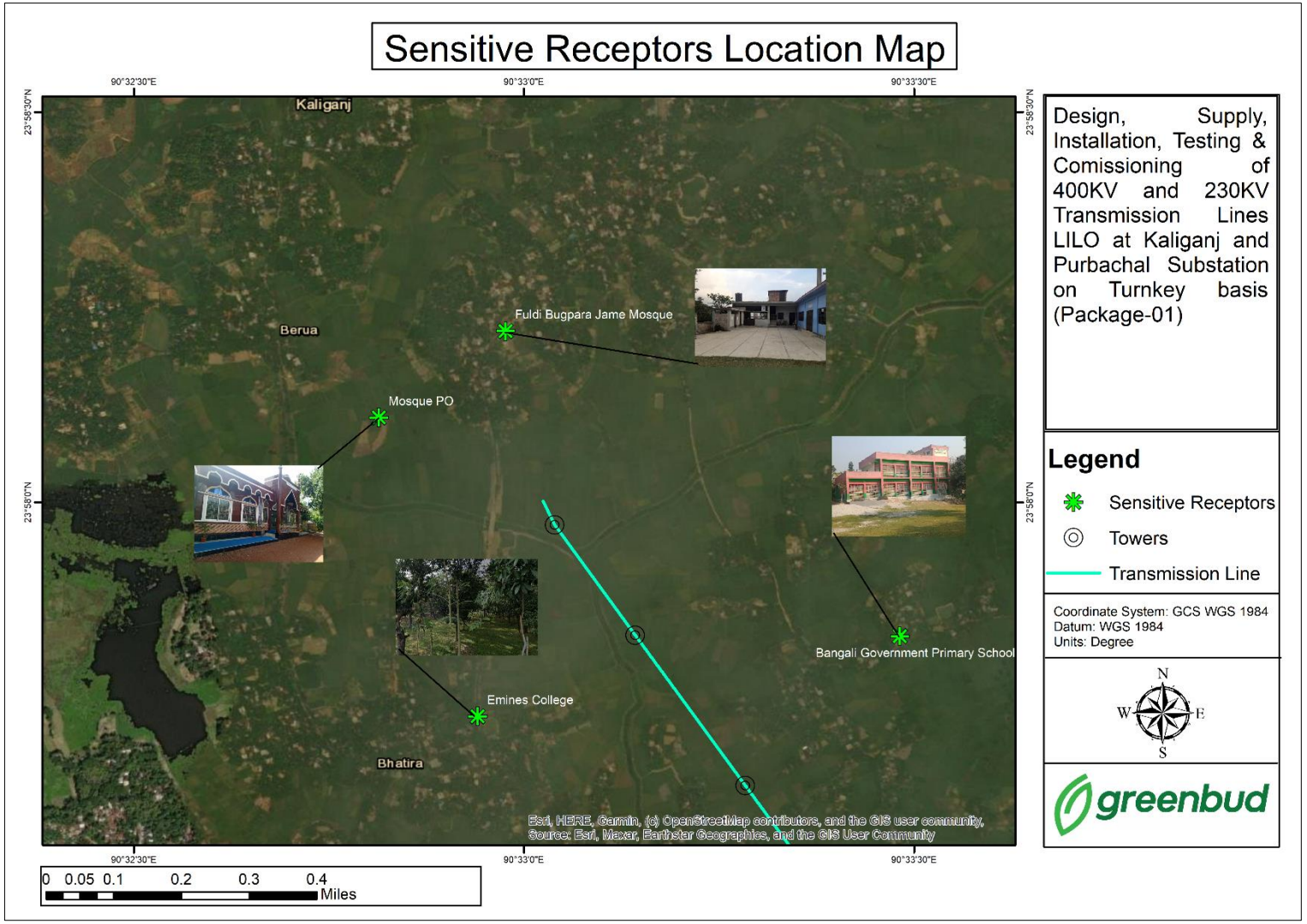


Figure 8: Location map of Sensitive receptors with pictorial visualization

6 Environmental Risk Assessment

6.1 General

117. Construction involves in the project area that are carried out within the environmental conditions that exist at the site. Environmental conditions will affect the construction activity while the activity will also affect the environment. Thus, there are risks in undertaking the work e.g., work which is carried out in the wet season will normally have larger risks attached to it than work undertaken during the dry season. The risk of undertaking any construction activity needs to be determined before the activity commences. Risk from pre-construction and construction activities of the project is assessed as the likelihood that the activity will have an effect on the environment as well as the consequence of the effect occurring. It is often described like this:

Risk = Likelihood × Consequence

6.2 Environmental Risk Assessment Matrix

118. The risk assessment process is undertaken with a risk assessment matrix. The level of risk was determined using the Risk Ranking Tool. Identified risks are ranked in priority according to the severity of the possible consequence and the likelihood of its occurrence, refer Tables 39 and 40. The Risk Matrix was used to evaluate and priorities the risk and refer Table 41.

Table 39: Likelihood Scale

Likelihood	Definition	Score
Certain	Will certainly occur during the activity at a frequency greater than every week if preventative measures are not applied	5
Likely	Will occur more than once or twice during the activity but less than weekly if preventative measures are not applied	3
Unlikely	May occur once or twice during the activity if preventative measures are not applied	2
Rare	Unlikely to occur during the project	1

Table 40: Consequences Scale

Consequence	Definition	Score
Catastrophic	The action will cause unprecedented damage or impacts on the environment or surrounding communities e.g. ➢ extreme loss of soil and water resources and quality from storm water runoff ➢ extreme pollution of soil and water resources including major contamination from hazardous materials ➢ widespread effects on ecosystems with deaths of fauna/flora	5

Consequence	Definition	Score
	➢ widespread community impacts resulting in illness, injury or inconvenience ➢ loss or destruction of archaeological or historical sites ➢ Occurrence will almost certainly result in the work being halted and a significant fine.	
Major	The action will cause major adverse damage on the environment or surrounding communities e.g., ➢ major loss of soil and water resources and quality from stormwater runoff ➢ major pollution of soil and water resources including contamination from hazardous materials ➢ significant effects on ecosystems with isolated deaths of non-vulnerable flora and fauna ➢ significant annoyance or nuisance to communities major damage to or movement required to archaeological or historical sites ➢ Occurrence may result in work being halted and a fine	3
Moderate	The action will cause limited adverse impacts on the environment or surrounding communities e.g., ➢ localized, short term noticeable changes in stormwater quality ➢ short term minor changes on ecosystems ➢ some annoyance or nuisance to communities ➢ isolated or partial damage to archaeological or historical sites work is unlikely to be halted, fines unlikely	2
Minor	No or minimal adverse environmental or social impacts e.g., ➢ no measurable or noticeable changes in stormwater quality. Water quality remains within tolerable limits ➢ little noticeable effect on ecosystems ➢ no or isolated community complaints ➢ no or unlikely damage to archaeological or historical sites ➢ no likelihood of being fined	1

Table 41: Risk Matrix

QUANTITATIVE RISK RANKING MATRIX					
Likelihood		**Consequences**			
		Catastrophic	**Major**	**Moderate**	**Minor**
		5	**3**	**2**	**1**
Certain	**5**	25	15	10	5
Likely	**3**	15	9	6	3
Possible	**2**	10	6	4	2
Rare	**1**	5	3	2	1
1 – 5 Low Risk			**6 – 10 Medium Risk**		**15 – 25 Significant Risk**

Table 42: Environmental Risk Assessment Scoring

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected?	Consequence of the site or sensitive receptors being Affected?	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
		Score	Score			
Pre-Construction/Construction Phase						
Route Survey and Alignment Finalization	Impact on natural habitats and biodiversity	2	2	4	Low Risk	• Select routes that avoid sensitive ecosystems and habitats
	Potential disturbance to sensitive ecosystems or cultural heritage sites	5	3	15	Significant Risk	• Incorporate buffer zones around cultural sites and wildlife areas
	Land Conflicts	5	3	15	Significant Risk	• Engage communities in route planning and compensate for land use properly
	Access to private or agricultural land	3	5	15	Significant Risk	• Provide fair and timely compensation to landowners
	Visual impact of the transmission line	5	3	15	Significant Risk	• Use visually appealing towers and route lines to minimize scenic disruption
Requisition Of Land	Loss of land permanently for 12 tower bases of the TL/LILO lines.	5	4	20	Significant Risk	• Prior to commencement of construction activities, the owners of the affected land must be notified and

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						provided proper compensation as per DoE and ADB guidelines. • As per DoE and ADB guidelines, RP should be prepared for land acquisition/requisition/compensation and follow it
Tree felling, Clearing of vegetation	Trees will be directly affected by cutting and trimming, as well as standing crops (if any) and bushes along the RoW will also be affected.	5	3	15	Significant Risk	• Prior to the start of clearing of vegetation, provide adequate compensation to the owners.
Fauna (Wildlife)	Disturbance of wildlife, especially birds, due to project activities such as moving of project equipment and transports (especially during night time).	5	4	20	Significant Risk	• Preparation of construction management plan (approved by **Power Grid** before access to site is permitted) by the contractor and follow it. • Follow DoE rules and regulations on noise.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						• Project workers should not disturb or kill birds or other animals.
Sitting of Construction Camps	Temporary loss of land for the construction camps for towers. Clearing of standing crops (if any), grass and bushes. Environmental pollution (such as air, noise, water, wastes and soil) affecting nearby the settlements.	5	3	15	Significant Risk	• Prior to commencement of construction activities, the owners of the affected land must be notified and provided proper compensation as per DoE and ADB guidelines. • As per DoE and ADB guidelines, RP should be prepared for land acquisition/ requisition /compensation. • Prior to the start of clearing of vegetation, provide adequate compensation to the owners in time. • Locate construction camps away from residential settlements, cultural sites, water bodies etc. (minimum 0.5 km). • Try to use fallow land and just after completion of construction, hand over

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						camp sites to the owners as in earlier condition.
Noise Level	Noise pollution due to construction activities, generators, and construction vehicle movement.	5	3	15	Significant Risk	• It is recommended that no construction should be allowed during night time (9 PM to 6 AM). • Avoid using of construction equipment producing excessive noise at any time. • Avoid prolonged exposure to noise (produced by equipment) by workers. • Regulate use of horns and avoid use of hydraulic horns in project vehicles. • Follow the government rules and regulations, EHS guidelines and WHO noise guidance whoever is more stringent on noise
Construction Wastes	Generation of construction wastes from the construction materials	3	3	9	Medium Risk	• Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						• Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements • Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste. • Use of construction materials containing recycled content when possible and in accordance with accepted standards.
Air Quality and Dust	Air pollution and dust generation due to construction activities, especially during	3	3	9	Medium Risk	• All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and not emit dark or smoky

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
	the running time of generators and construction vehicle movement.					emissions in excess of the limits described in the Environment Quality Standards (EQS). • Specific training will be focused on minimizing dust and exhaust gas emissions from heavy construction vehicles. • Drivers of vehicles used during construction will be under strict instructions to minimize unnecessary trips and minimize idling of engines. • Dust suppression facilities (back pack water sprayer) shall be available where earth and cement works are required. • Spray water on dry and loose surfaces of the construction sites regularly to minimize dust.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						• Maintain adequate moisture content of soil during transportation, compaction and handling. • Construction materials (sand, gravel, and rocks) and spoil materials will be transported in trucks covered with tarpaulins. • Sprinkle and cover stockpiles of loose construction materials (e.g., fine aggregates, sand). • Dust masks should be provided to all personnel in areas prone to dust emissions throughout the period of construction.
Soil Quality	Soil Pollution	3	3	9	Medium Risk	• Prevention of spillage and leakage of liquid at tower sites.
Traffic Congestion/Road Accident	Traffic congestion and road/railway accident due to movement of	5	3	15	Significant Risk	• Follow Bangladesh Road Transport Authority (BRTA) traffic rules and regulations to develop a traffic plan.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
	construction vehicles.					• Schedule deliveries of material/ equipment during off-peak hours. • Engage flagman where needed. • Engage experienced drivers to drive project vehicles. Arrange for signal lights at night, for proper traffic management. • Avoiding stockpiling of materials, especially at the roadsides, that could hamper traffic movement.
Pollution Due to Wastes	Pollution due to wastes (construction wastes from construction activities and general wastes from workers' camps).	3	3	9	Medium Risk	• Solid wastes collection system will be essential, which should include separation and collection of solid wastes in the dustbins/waste containers throughout the tower work sites. • Wastes, such as pieces of rods and wood, newspapers, containers etc.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						can be sold to vendors and the rest must be taken to the licensed, engineered sanitary landfill by the Contractors or licensed third party. • A log of the disposal of toxic and other waste materials is to be kept by the Contractors. • Contractor should prepare a waste management plan based on the EMP, for approval by **Power Grid** before access to site reflecting national and EHS guideline requirements.
Community Health and Safety (H&S)	Community H&S along the transmission line.	5	3	15	Significant Risk	• Safety barriers and warning signs surrounding the tower construction site. • Formulate and implement an emergency risk management plan, for approval by **Power Grid** before access to site reflecting national and EHS guideline requirements.
Occupational Health and Safety (H&S)	Health and safety risks of construction	5	3	15	Significant RIsk	• An experienced H&S Manager must be engaged on each work package with appropriate qualifications and

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
	workers.					experience and not doubling up on any other jobs by the contractor prior to the start of construction of the towers. • Only permitting trained and certified workers to work with any electrical equipment. • Before access to site granted, contractor to prepare H$S plan based on risk assessment for approval by **Power Grid** following national and EHS guideline requirements. • Safety instruction by the E&H Manager should be provided for the workers and visitors before they will be allowed to access the site. • First aid box and personal protective equipment, PPE (such as helmet, safety shoes, eye protection glass, ear plugs, waist belt, mask, hand gloves, body protective apron, ear muff and insulating boots, as needed) must be provided to the workers, and ensure their use by workers.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						• Safety signs as needed at the tower sites
Employment Generation/ Income	Employment opportunities for the local people, especially for PAPs.	2	1	2	Low Risk	• Employ local people, especially PAPs, for the tower construction activities as much as possible.
Foundation, excavation and tower erection	Soil erosion and loss of topsoil	3	3	9	Medium Risk	• Implement erosion control measures like silt fencing and re-vegetate disturbed areas.
	Disturbance to local vegetation and habitats	3	3	9	Medium Risk	
	Groundwater contamination from fuel/oil spills	5	3	15	Significant Risk	• Prevent spills, store fuel away from water sources, and use containment measures
	Noise and vibration impact on nearby communities	3	3	9	Medium Risk	• Limit construction activities to daylight hours and use noise barriers when necessary.
	Worker safety (risk of falling, heavy equipment)	5	3	15	Significant Risk	• Implement proper safety training, use personal protective equipment (PPE), and ensure regular maintenance of equipment and safety barriers.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
	Generation of construction waste	3	3	9	Medium Risk	• Prioritize waste minimization through material reuse, recycling, and adopting sustainable construction practices.
Stringing of Transmission Lines	Impact on avian species (bird collisions with lines)	5	3	15	Significant Risk	• Install bird diverters and use insulated cables in areas with significant bird activity.
	Disruption to natural landscapes and visual pollution	3	3	9	Medium Risk	• Use towers designed to blend with the landscape and minimize visual impact
	Electromagnetic radiation concerns for nearby communities	5	3	15	Significant Risk	• Maintain safe distance standards for transmission lines and conduct regular monitoring to ensure compliance with radiation safety limits.
	Noise pollution during the stringing process	3	3	9	Medium Risk	• Use noise-dampening equipment and schedule work during less disruptive hours to minimize community disturbance.
Stringing of Transmission Lines	Occupational health and safety risks (electrocution, falls)	5	3	15	Significant Risk	• Enforce strict safety protocols, provide PPE, and conduct regular training on electrical hazards and fall prevention techniques.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
Waste Management and Disposal	Inappropriate disposal of hazardous and non-hazardous waste	3	3	9	Medium Risk	• Implement a waste management plan for segregation, recycling, and proper disposal of hazardous materials
	Soil and water contamination from improper waste handling	5	3	15	Significant Risk	
	Generation of plastic and packaging waste	5	3	15	Significant Risk	
Concrete Mixing and Pouring for Foundations	Water pollution from cement runoff or improper disposal	5	3	15	Significant Risk	• Use contained mixing areas and treat wastewater before discharge
	Dust generation from concrete mixing	3	3	9	Medium Risk	• Use dust suppression methods (e.g., water sprays)
Concrete Mixing and Pouring for Foundations	Health risks for workers from exposure to dust and chemicals	3	3	9	Medium Risk	• Provide appropriate PPE (e.g., masks, gloves), ensure proper ventilation, and implement regular health monitoring and safety training

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
Installation of Electrical Components	Electrocution risks for workers and local communities	5	3	15	Significant Risk	• Provide proper PPE and training for workers on electrical safety protocols
Testing and Commissioning of Transmission Line	Noise during commissioning	3	2	6	Medium Risk	• Inform nearby communities about the commissioning schedule and limit the noise duration.
Operational Phase						
Operation and Maintenance of Transmission Lines	Risk of electrocution and public safety	5	3	15	Significant Risk	• Install warning signs and restrict public access near transmission towers.
Operation And Maintenance of Transmission Lines	Electromagnetic field (EMF) exposure concerns	5	3	15	Significant Risk	• Monitor EMF levels and ensure compliance with safety standards.
Tree Replantation	Indigenous tree species can be planted in home gardens and govt. lands	3	2	6	Medium Risk	• Planting of 368 saplings to replace felled trees, on the side slopes of the access roads, during the monsoon period. • The number of saplings which die within 3 years of planting should be replaced by new saplings.

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						• Nursing period of planted saplings should not less than 3 years.
Community Health and Safety	Community H&S along the transmission lines.	5	3	15	Significant Risk	• Safety barriers and warning signs at each tower with awareness raising programme. • Operational H&S risk assessment to be undertaken.
Safety and security of workers	Risk to continuous power supply	5	3	15	Significant Risk	• Ensure security of transmission towers in collaboration with law enforcing agencies. • Ensure availability of adequate safety gear for tower maintenance workers.
Power Supply	Due to adequate reliability of power supply, social life and economic condition of the people will be improved	2	1	2	Low Risk	• O&M of towers should be done in time to ensure their integrity.
EMF	Due to EMF, human health may be affected	5	3	15	Significant Risk	• For housing structures39, clearance between the transmission line and roof tops should be 6.5 m - 8 m and for

Construction Activity	Issues to Consider	Likelihood that the site or sensitive receptors will be affected? Score	Consequence of the site or sensitive receptors being Affected? Score	Risk score: (Consequence x likelihood)	Risk Status	Risk Management Actions
						river crossings it will 14.6 m -15.9 m, warning signs of TL will be needed on the river for navigations/fishing. Note that no • houses will be directly affected by the TL/LILO lines.
Line Monitoring and Surveillance	Disturbance to local communities	2	2	4	Low Risk	• Use less intrusive methods like drones and inform communities in advance of any surveillance activities.
Periodic Repair and Replacement of Components	Traffic disruptions and waste generation	3	2	6	Medium Risk	• Schedule repairs during off-peak hours and implement proper waste disposal for damaged components.
Emergency Response (e.g., line faults, accidents)	Electrocution and safety hazards	5	3	15	Significant Risk	• Train emergency response teams, install emergency shutdown systems, and inform the public of risks.
Avian Monitoring and Bird Diverters Installation	Bird collisions and wildlife impact	3	3	9	Medium Risk	• Install bird diverters and conduct regular monitoring to assess effectiveness.
Community and Stakeholder Engagement	Lack of communication and grievance management	5	3	15	Significant Risk	• Maintain a grievance redress mechanism and hold regular consultations with local stakeholders.

7 Implementation of the SSEMP

7.1 General

119. To maintain the effectiveness of environmental management, the SSEMP will be reviewed and amendments will be done during the construction stage should there be significant changes in activities, methods / processes, alignment, location, and management processes. The amendments that will be instituted shall be subject to approval by the **Power Grid**.

120. The review will cover the following:

- Assess the adequacy of this plan;
- Review monitoring results and identify areas of opportunity for improvement in SSEMP implementation;
- Determine the root cause or causes of non-conformances and deficiencies. Develop and implement a plan of corrective and preventative action to address non- compliance and deficiencies;
- Verify the effectiveness of the corrective and preventative actions.

The results of the reviews shall be documented and if necessary, SSEMP will be updated.

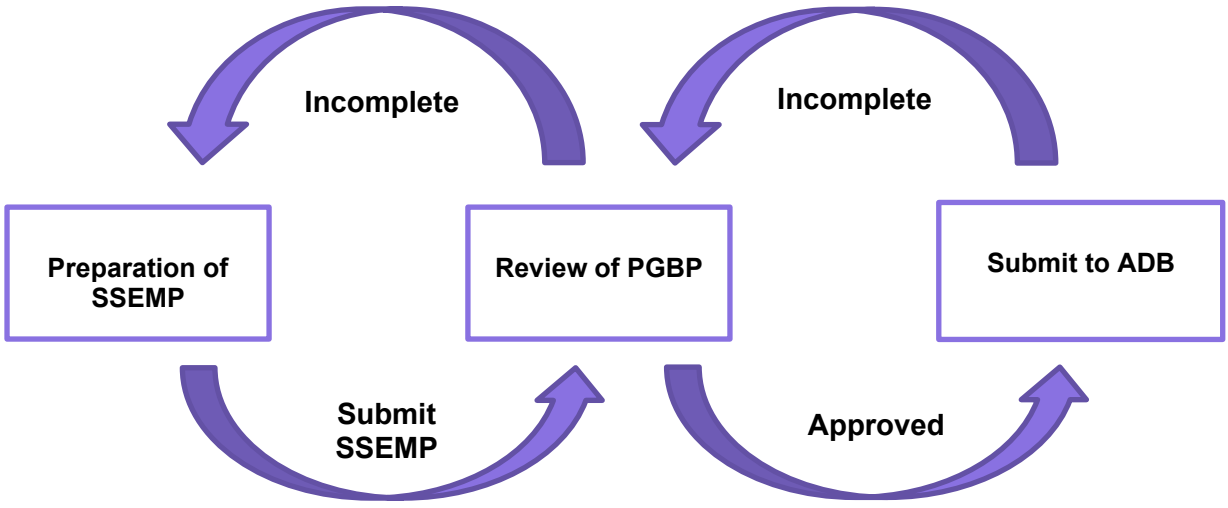


Figure 9: SSEMP management review and amendment

7.2 Environmental Monitoring Work Schedule

121. The implementation schedule of SSEMP activities, monitoring and reporting is shown below.

NOTES	
Continuing Activity	
Activity Implementation Period	

Table 43: Environmental Work Schedule regarding SSEMP activities

SL. No.	Activities	Aug 23	Sep 23	Apr 24	Oct 24	Apr 25	Oct 25	Apr 26
1.	**Baseline Environmental Quality Testing[13]**							
1.1	Air Quality Monitoring	1 Nos						
1.2	Noise Level Monitoring	1 Nos						
1.3	Soil Quality Monitoring	1 Nos						
1.4	Water Quality Monitoring (Ground Water and Surface Water)	2 Nos						
2.	Monthly Environmental Monitoring	**Monthly Monitoring and Reporting**						
3.	**Semi-Annual Environmental Quality Testing**							
3.1	Air Quality Monitoring		1 Nos	1 Nos	1 Nos	1 Nos	1 Nos	1 Nos
3.2	Noise Level Monitoring		1 Nos	1 Nos	1 Nos	1 Nos	1 Nos	1 Nos
3.3	Soil Quality Monitoring		1 Nos	1 Nos	1 Nos	1 Nos	1 Nos	1 Nos
3.4	Water Quality Monitoring (Ground Water and Surface Water)		2 Nos	2 Nos	2 Nos	2 Nos	2 Nos	2 Nos
4.	**Environmental Mitigation Measures**							
4.1	Dust suppression in haul roads and material storage location							
4.2	Providing sewage tank/soak well in construction camps							

[13] *Note: All the Baseline Environmental Quality Testing Reports have been attached to FF ANNEX:**FF ANNEX:***

SL. No.	Activities	Aug 23	Sep 23	Apr 24	Oct 24	Apr 25	Oct 25	Apr 26
4.3	Installation of Tube well and safe drinking water supply							
4.4	Providing solid waste management facility in construction camp medium and small size dustbins							
4.5	Disposal of construction debris and other waste materials and transportation							
4.6	Protection of ponds							
4.7	Traffic management		As per EHS Plan					
4.8	Occupational safety appliances and PPE for workers	As per EHS Plan						
4.9	Informatory Signage for safety near sensitive locations and built-up sections							
5.	**Training for Workers and Institutional Strengthening**							
5.1	Training to workers and Project Personnel on occupational health and safety[14]	Monthly Basis Training (Each 1 Nos/ Month)						
6.	**Uninterrupted Operational Activities**							
6.1	Power Supply	As per Requirement						
6.2	Short Circuit/ Accident	As per Requirement						

122. The mitigation measures outlined are fully aligned with the **Environmental Conservation Rules (ECR) 2023** of Bangladesh, ensuring that all environmental safeguards are met during the project. These measures address key environmental concerns, such as air and noise pollution, waste management, water quality, and worker safety, in accordance with national standards. By implementing these measures, the

[14] Pictorial Evidence of Training Session's and attendance sheets have been attached to **Error! Reference source not found.**

project will effectively minimize adverse impacts on the environment, including the degradation of air, soil, and water quality, and ensure the protection of local ecosystems and public health. The measures also follow best practices for environmental management, supporting the sustainable development of the transmission grid while maintaining compliance with both national and international environmental regulations.

7.3 SSEMP Implementation Budget

123. The estimated costs for environmental pollution monitoring, mitigation measures, training, and operational support have been developed in alignment with the approved Initial Environmental Examination (IEE) and Environmental Management Plan (EMP). The BoQ with Environmental Management activities budget is shown below.

Table 44: Environmental Management Plan Budget

Sl. No.	Description	Unit	Quantity	Estimated Cost
A.	**Environmental Pollution Monitoring**			
1	Air	No.	06	BDT 2,00,000 - BDT 2,20,000
2	Noise	No.	06	
3	Soil quality	No.	06	
4	Water (ground water and surface water samples)	No.	12	
B.	**Environmental Mitigation Measures**			
1	Dust suppression in haul roads and material storage location			BDT 5,00,000 - BDT 5,50,000
2	Providing sewage tank/soak well in construction camps and yards	No.	1	
3	Installation of Tube well and safe drinking water supply	No.	2	
4	Providing solid waste management facility in construction camp medium and small size dustbins	No.	13	
5	Disposal of construction debris and other waste materials and transportation	Month	24	
6	Protection of ponds	Month	24	
7	Traffic management			
8	Occupational safety appliances and PPE for workers	Month	12	
9	Informatory Signage for safety near sensitive locations and built-up sections			

Sl. No.	Description	Unit	Quantity	Estimated Cost
C.	**Training for Workers and Institutional Strengthening**			
1	Training to workers and Project Personnel on occupational health and safety	No.	15	BDT 3,00,000
D.	**Uninterrupted Operational Activities**			
1	Power Supply			BDT 5,00,000-6,00,000
2	Short Circuit/ Accident			BDT 200,000
3	EMF			BDT 300,000

Note: *The estimated costs for various environmental and safety measures in the **Dhaka and Western Zone Transmission Grid Expansion Project** include air quality and noise monitoring, soil and water quality testing, and dust suppression along haul roads and material storage sites. Additional costs cover sewage tank/soak well construction, tube well installation for drinking water, solid waste management facilities, and disposal of construction debris. Measures for protecting ponds, implementing traffic management, and providing occupational safety appliances and PPE are also accounted for. Furthermore, the project includes training for workers on health and safety, and installing informatory signage at sensitive locations. The operational phase includes costs for uninterrupted power supply, managing short circuits, accidents, and monitoring electromagnetic fields to ensure safety and compliance.*

124. To ensure uninterrupted operational activities in the transmission line project, an estimated budget is allocated for power supply continuity, addressing potential short circuits or accidents, and mitigating electromagnetic field (EMF) effects. This comprehensive allocation covers the implementation of backup power systems, safety measures, emergency response protocols, and adherence to regulatory guidelines for EMF exposure, thereby maintaining system reliability and safeguarding public health.

7.4 Reporting

125. In addition to the baseline monitoring data, a comprehensive monitoring and reporting framework can be developed to ensure the ongoing tracking of environmental conditions throughout the construction and operational phases of the project. The framework will outline the frequency and methods for regular environmental monitoring, which will include continued data collection for air, water, soil, and noise parameters. Post-construction monitoring will also be carried out to assess the long-term environmental impacts and recovery. This phase will focus on comparing the post-construction conditions to the baseline data to evaluate the project's impact over time and identify any areas requiring further mitigation.

126. Should any significant deviations from the baseline conditions occur, corrective actions will be taken and incorporated into subsequent reports. Only the list of reports mentioned in the contract document will only be reviewed and approved by **Power Grid** to ensure the project continues to meet its environmental objectives. The SSEMP will also be updated as necessary to reflect changes in environmental performance and any new risks that may arise during the project's lifecycle. All reports and data, including baseline findings and updates, will be compiled and included in the Annexure of the report for easy access by **Power Grid** and other relevant stakeholders.

127. The DWZTGEP project follows a structured environmental reporting system in line with the ADB Safeguard Policy Statement (2009), national environmental laws, and standards set by the Department of Environment (DoE). Monitoring reports—prepared monthly, quarterly, and semi-annually—cover air, noise, water, and soil quality, following national standards and international guidelines such as WHO and IFC. Contractors are contractually required to implement Environmental Management Plans (EMPs) and obtain prior approval of Site-Specific Environmental Management Plans (SSEMPs). Non-compliances are addressed through Corrective Action Plans (CAPs), and all reports are shared with ADB, DoE, and disclosed publicly. A site-specific Grievance Redress Mechanism (GRM) ensures community feedback is logged and resolved.

Table 45: Environmental Safeguards Reporting Activities

Reporting Activity	Responsible Person
Monthly and Quarterly Environmental Monitoring Reports	Contractors
Semi-annual Reports to ADB	Contractors and **Power Grid**
Monitoring Air, Noise, Water, and Soil Quality	Contractors
Implementation of Environmental Management Plans (EMPs)	Contractors
Approval of Site-Specific Environmental Management Plans (SSEMPs)	Contractors
Corrective Action Plans (CAPs) for Non-compliance	Contractors
Submission of Reports to DoE (including ECC renewals)	Contractors
Emergency Incident Notifications to DoE	Contractors
Grievance Redress Mechanism (GRM) Management	Contractors and **Power Grid**

Reporting Activity	Responsible Person
Public Disclosure of Environmental Documents	Contractors and **Power Grid**

7.5 Training for the Project Site Staff

7.5.1 General

128. All Project workers will undergo EHS knowledge training prior to start of work with the project. The training will cover EHS management system, operation procedure training, EHS risk and prevention measures in working areas, correct wearing of protection articles, usage of special personal protection equipment.

129. The HCLK will conduct at least one occupational health training per month. Three Level (environmental/health/safety)) training and education pursuant to relevant documents. All equipment operators and drivers must have training with certificates and will be tested prior to assignment. The health and safety training will be done through formal training sessions, EHS induction, toolbox talks, training and awareness and daily pre-start meetings. Training and induction of workers will include topics such as, but not limited to the following:

- EHS Induction for New Workers
- Toolbox Talks and Daily Pre-start Briefings
- Environmental Management Training
- Hazardous Waste and Spill Control
- Occupational Health & Safety
- Grievance Redress Mechanism (GRM) Awareness
- Training on Ecological & Bird Protection
- Sanitation and Camp Hygiene
- Cultural Heritage Awareness
- Training on COVID-19 and Communicable Disease

130. Outside experts, lecturers and trainers for specialized topics like AIDS/HIV will be arranged as needed. The tentative training and induction schedule are as follows:

Table 46: Tentative Schedule of Training and Induction

Activities	Schedule and Frequency	Audience / Participants
EHS Induction	As per Training Plan	All workers and Project Personnel
Toolbox talks & training	As per Training Plan	All workers and onsite Site Manager
Daily pre start meeting	As per Training Plan	Each working section staffs
Training on HIV/AIDS/Covid-19	As per Training Plan	All workers and Project Personnel
Training on Environmental Management	As per Training Plan	All workers and Project Personnel
Training on Ecological Conservation	As per Training Plan	All workers and Project Personnel

7.5.2 Grievance Redress Mechanism (GRM) Training

131. In addition to the regular EHS and environmental management training programs, specific training on the Grievance Redress Mechanism (GRM) will be conducted for project personnel. This training is designed to ensure that all site staff understand how to recognize, record, respond to, and report grievances raised by community members, workers, or other stakeholders during the construction phase of the transmission line project. The training will also emphasize confidentiality, respectful communication, and timely resolution processes.

132. The GRM training will be tailored to the project context, especially considering the sensitive receptors located near the Right of Way (RoW), including schools, mosques, and residential areas. All staff members will be trained on the roles and responsibilities under the GRM framework.

Table 47: Tentative Grievance Redress Mechanism (GRM) Training Schedule

Activities	Schedule and Frequency	Audience / Participants	Training Focus
Introduction to GRM	Once during induction phase	All project workers and site management	Overview of grievance types, channels for grievance submission
Grievance Handling Process	Quarterly refresher sessions	Supervisors, safety officers, EHS staff	Steps to receive, document, escalate, and resolve grievances
Community Communication and Behavior	Bi-annually	Field-level staff interacting with public	Respectful and culturally sensitive grievance handling near sensitive receptors
GRM Documentation and Reporting	Once every six months	Site admin, contractor's GRM focal point	Record keeping, feedback timelines, and confidentiality

133. These trainings will be facilitated by the Contractor's EHS Officer in coordination with the **Power Grid**'s GRC member. Attendance records will be maintained and submitted as part of monthly compliance documentation.[15]

7.6 Corrective Action (Non-Compliance Report)

134. The mechanism for Corrective Action and Feedback is for purposes of knowing how to adjust the SSEMP to changes during construction that are necessary especially those that have not been taken into account in the formulation of the SSEMP. This will be done through the reporting process for non-urgent issues that may include those that will not have an

[15] *Note: The detailed Training Plan outlining specific timelines, content, facilitators, and training materials will be prepared and submitted as a standalone annex to this report prior to the commencement of construction activities. The schedule and frequency mentioned above will be aligned with that plan, which will be regularly updated in coordination with POWER GRID's EHS guidelines and contractor obligations. For details of each training's content, timeline, and responsibilities, details are attached in* ***Y ANNEX:***

immediate adverse impact on human health or the environment. For urgent issues that may have an immediate impact on health and safety or environmental resources, corrective actions will be issued and the executing agency informed.

135. Corrective Actions will be given to the Safeguards Officer of HCLK if required at any stage during the construction program if there is evidence to indicate that the SSEMP is not adhered to.

136. The HCLK will disseminate monthly progress reports as appropriate and should the PIU, **Power Grid**, ADB or other stakeholders identify an area of concern, the SSEMP will be adjusted accordingly.

7.7 Institutional Arrangement with the Role & Responsibilities

7.7.1 Organizational Set-Up of Project and SSEMP Implementation Team

137. The implementation of the Site-Specific Environmental Management Plan (SSEMP) is facilitated by a well-structured team under the HCLK. The Environmental Specialist plays a central role in ensuring that all environmental safeguards are adhered to throughout the project execution. This specialist will collaborate closely with the Site Manager and Manager (Construction) to seamlessly integrate SSEMP requirements into daily site operations. The Safety Expert will support the enforcement of health, safety, and environmental protocols, ensuring compliance across all activities. Field-level implementation will be led by civil supervisors, surveyors, and transmission line (T/L) supervisors, each responsible for maintaining environmental compliance in their respective areas of work. This coordinated structure ensures that environmental responsibilities are embedded across all project roles, with oversight and regular reporting managed by the Environmental and Social Monitoring Unit, in alignment with POWER GRID and national regulations. The proposed Institutional Arrangement to implement the overall project and the SSEMP is present in a flow diagram below-

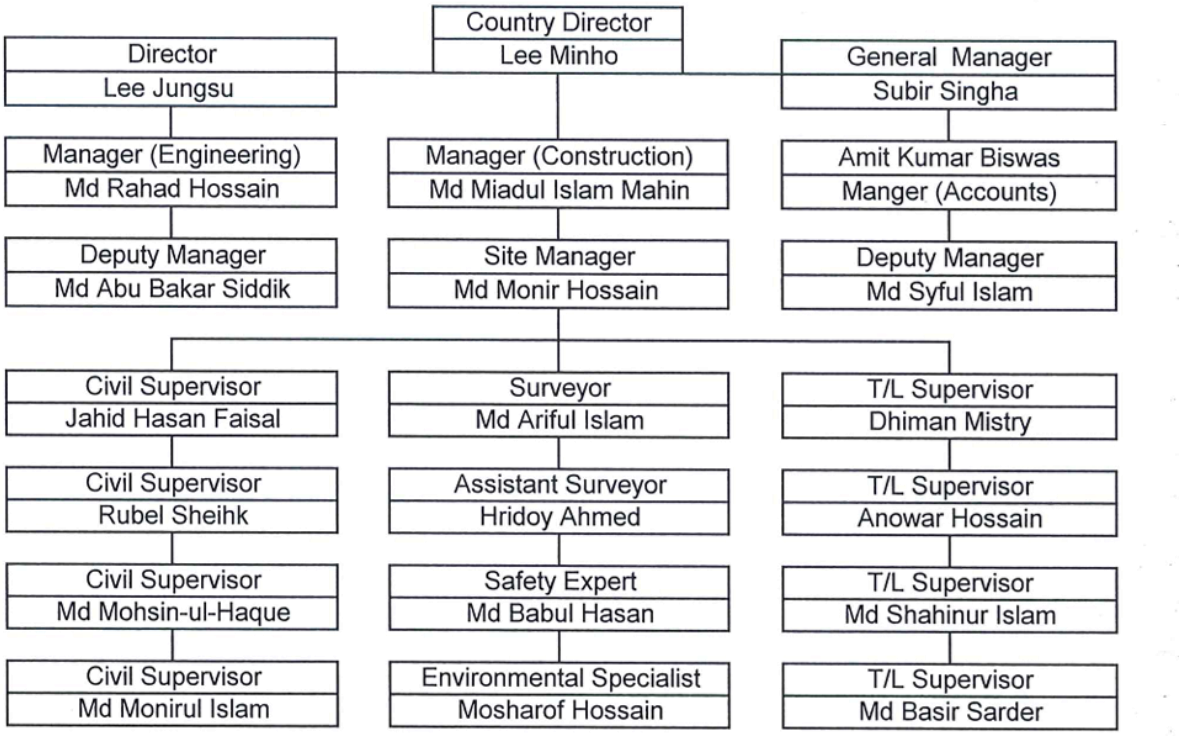


Figure 10: Organizational Chart for Project Implementation (Overall)

138. The SSEMP implementation is led by the Country Director, with direct oversight from the Manager (Construction), who ensures that environmental safeguards are integrated into construction activities. The Site Manager manages daily operations, ensuring compliance with environmental protocols on-site. The Surveyor and Assistant Surveyor monitor site-specific conditions and collect environmental data, while the Safety Expert enforces health, safety, and environmental measures. The Environmental Specialist ensures that environmental monitoring and mitigation measures are in place, guaranteeing that all activities align with the SSEMP requirements and ensuring ongoing compliance and effective oversight throughout the project.

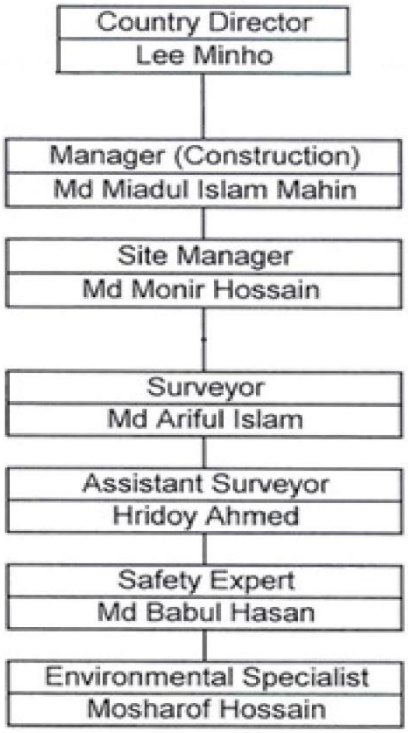


Figure 11: Organizational Chart for SSEMP Implementation

7.7.2 Roles and Responsibilities of SSEMP Implementation Team

139. The description of Key responsibilities of various agencies and parties for implementing environment safeguards are provided below:

Table 48: Roles and Responsibilities of SSEMP Implementation Team

Sl. No.	Designation	Key Responsibilities
1	**Manager (Construction)**	- Provides strategic leadership for environmental and social safeguard compliance. - Ensures integration of SSEMP in all construction activities. - Reviews team reports and communicates with Power Grid/ADB.
2	**Deputy Manager**	- Coordinates field-level implementation of environmental and social safeguards. - Supervises environmental monitoring (air, water, noise). - Ensures contractor compliance with SSEMP and regulations.
3	**Site Manager**	- Oversees day-to-day site activities with a focus on safeguard adherence.

Sl. No.	Designation	Key Responsibilities
		- Reports site issues to Deputy Manager and supports inter-agency coordination. - Ensures timely implementation of mitigation measures.
4	**Environmental Specialist**	- Leads environmental monitoring and documentation. - Validates compliance with DoE and ADB standards. - Conducts environmental training and awareness sessions for site staff. - Prepares environmental reports.
5	**Safety Expert**	- Ensures occupational health and safety (OHS) protocols are in place. - Conducts toolbox talks, safety briefings, and emergency preparedness drills. - Investigates incidents and maintains safety logs.
6	**Civil Supervisors**	- Monitor civil work compliance with environmental safety practices. - Ensure implementation of physical safeguards (e.g., sediment control, dust suppression). - Report issues to Site Manager.
7	**T/L Supervisors**	- Ensure transmission line-related construction complies with SSEMP guidelines. - Identify and mitigate ecological risks (e.g., bird diverters, buffer zones). - Coordinate with Civil and Safety teams.
8	**Surveyor/Asst. Surveyor**	- Support in ecological and site assessment surveys. - Assist in mapping sensitive areas and tracking vegetation clearance. - Provide baseline data for environmental monitoring.
9	**Sub-Assistant Engineer**	- Assist in collecting field data and maintaining site environmental logs. - Support setup of environmental mitigation devices (e.g., drainage, noise barriers). - Maintain grievance and consultation records. - Assist in logistics during audits or missions.
10	**Accounts Manager**	- Manage and allocate budget for safeguard-related resources (e.g., PPE, signage, mitigation infrastructure). - Track fund disbursement for CSR/community-related initiatives.

8 Grievance Redresses Mechanism

8.1 Introduction

140. A Grievance Redress Mechanism (GRM) will be established in alignment with ADB's SPS 2009 to proactively address community concerns, mitigate risks, and enhance the project's environmental and social benefits. Beyond resolving grievances, the GRM will serve as a platform for open communication, helping to identify new environmental concerns, demonstrate commitment to community well-being, and prevent or minimize any adverse impacts. It will be accessible to all, including vulnerable groups such as women and youth, while ensuring confidentiality and privacy where needed.

141. During construction and operation, unforeseen issues may arise, leading to concerns from affected persons. These may include land-related grievances or non-land issues such as impacts on livelihoods due to tree clearance, standing crop damage, property devaluation from transmission lines, and temporary inconveniences like restricted access, noise, dust, or labor influx.

142. As existing legal frameworks may not fully address all grievances, some issues, particularly those related to land acquisition, may fall beyond the jurisdiction of the Deputy Commissioner. Additionally, not all affected individuals can pursue legal action due to costs and time constraints, particularly those from economically disadvantaged backgrounds.

143. To ensure fair and efficient resolution, the project will establish an accessible, transparent, and accountable GRM. This mechanism will swiftly address concerns, build trust among affected parties, and prevent delays that could impact project timelines or stakeholder relationships. A well-functioning GRM will help resolve issues locally, reducing the need for prolonged legal proceedings.

144. By implementing the Site-Specific Environmental Management Plan (SSEMP), maintaining ongoing stakeholder consultations, and collaborating with the contractors, and local authorities, **Power Grid** will ensure effective grievance handling. Contact details for filing complaints will be publicly posted in each village within the project area to encourage accessibility and responsiveness.

8.1.1 Objectives of Grievance Redress Mechanism

145. GRM is a locally based, project-specific extra-legal way to deal with and resolve complaints and grievances faster and thus enhance project performance standards in terms of environmental, social and resettlement management. The fundamental objectives of the GRM, implemented through a Grievance Redress Committee (GRC) serving as a para-legal body, are to resolve any environmental and resettlement related grievances in consultation with the aggrieved party to facilitate smooth implementation of environmental and resettlement plans and establish accountability of the affected people.

8.2 Guidelines to Redress Grievances

146. A policy and/or guideline will be prepared and adopted for assessing and mitigating potential social and environmental impacts through the GRM. A GRC will be formed to receive and resolve complaints as well as grievances from aggrieved persons from the local stakeholders including the Project-affected persons. Based on consensus, the policy or

guideline will help to resolve issues/conflicts amicably and quickly, saving the aggrieved persons from having to resort to expensive, time-consuming legal actions. The policy or guideline will, however, not prevent a person's right to go to the courts of law. The Grievance Redress Committee (GRC) will be established through a Ministry of Power, Energy and Mineral Resources gazette notification to make it a legally mandated institution with a specific mandate. The official notification will constitute an official public declaration of its formation, outlining its function, duties, and jurisdiction in addressing grievances related to the project.

8.3 Complaints and Grievance Mechanism

147. Affected persons may appeal any disagreeable decision, practice or activity arising from project related activities to the GRC. Affected persons will be fully informed of their rights and of the procedures for addressing complaints, either verbally or in writing during consultation, survey, and time of compensation.

8.4 Grievances Redress Committees

148. The project will establish a GRM, which will function throughout the life cycle of the project implementation and the contractor will ensure its accessibility to affected parties, and transparency and efficiency in grievance resolution. However, it will not deal or interfere with any matters which are already placed before the country's courts of law. The Project will provide wider publicity for the GRM established using a variety of media such as brochures and leaflets printed in Bengali, and through community level awareness raising programs. The roles and functions of the GRM and its different tiers, specific locations where the different tires are established, grievance reporting procedures, time frames for grievance resolution at each level etc. will be disseminated to the affected persons as well as the general public using the above-mentioned modes of communication.

149. Grievances can first be reported to contractor focal persons. Their contact details, will be posted at all construction sites. Minor issues will be recorded and resolved on-site within two weeks. If not resolved, the matter will be referred to the Grievance Redress Committee (GRC). Meetings will be held at the **Power Grid** or union office, and complainants or their nominees may attend. Resolutions will be documented and signed. Summaries will be included in reports to ADB.

150. Unresolved grievances will be handled by the HCLK. The complainant or their representative may present the case. The representative from HCLK may conduct field inspections and will provide a resolution within one month. Urgent matters will be addressed immediately, with escalation to the **Power Grid** if necessary.

151. The GRM does not impede access to the legal system. Affected persons can resort to legal action through the country's judiciary system at any time. They can also submit their grievances to ADB's Accountability Mechanism, which both a problem-solving function to respond to concerns of project affected people and a compliance review function where there is discrepancy with implementation of ADBs operational policies.

152. The member secretary of GRCs will be regularly available and accessible for affected persons to address concerns and grievances. The legal advisor of the **Power Grid** will support the GRCs if necessary.

8.5 Scope and Jurisdiction of GRC

153. The scope of work and jurisdiction of the GRC are:

i) The GRC shall evaluate, consider and resolve grievances, related to social/resettlement and environmental mitigations during implementation, received by the committee;
ii) Major grievances that might require mitigations include construction site waste disposal, soil erosion to agricultural lands, access roads, and site preparation activities; fugitive dust and other emissions (e.g. from vehicle traffic, land clearing activities, and materials stockpiles), noise from heavy equipment and traffic, materials and oil spills associated with heavy equipment operation and fueling activities. Any grievances presented to the GRC should ideally be resolved on the first day of the hearing, and no more than a period of two weeks, in cases of complicated cases requiring additional investigations. Grievances of indirectly affected persons and/or persons affected during project implementation will also be reviewed by GRC;
iii) The GRC will not engage in any review of the legal standing of an “awardee” other than in direct losses or distribution of shares of acquired property among the legal owners and associated compensation or entitlement issues;
iv) GRC decisions should ideally be arrived at through consensus, failing which resolution will be based on majority vote. Any decision made by the GRC must be within the purview of social, resettlement and environmental policy framework;
v) The GRC will not deal with any matters pending in the court of law. However, if the parties agree through a written appeal, GRC can mediate. The parties will withdraw the litigation;
vi) A minimum of three members shall form the quorum for the meeting of the GRC; and
vii) The Legal Adviser will not play role as a member but will put his/her lawful advice/ suggestion during GRC sessions

8.6 Filing Grievance Cases and Documentation

154. Grievances will be filed without any fear and stress. The contractors will support the affected persons in drafting the grievances. All grievances must be submitted in writing to the Chair, GRC. The affected person himself/herself or appointed agent such as local elected officials/legal advisors are to represent the complainants. The judgment made by GRC will be communicated to the concerned affected person mainly in writing, also will be made allowances for those that are illiterate to be able to access. If dissatisfied, and with the agreement of the GRC, the affected person may request a further review of the judgment of GRC by the Project-level GRC. In such cases, the case will be forwarded to the Convener of the project-level GRC with all documentations. If he/she remains unsatisfied, he/she can go to the formal court of law or accountability mechanism for SPS related grievances. SPS-related grievances refer to complaints concerning compliance with the Safeguard Policy Statement, which ensures environmental and social protections in development projects. These grievances typically involve issues like land acquisition, resettlement, environmental impacts, and community rights.

155. Through community meetings, notices and pamphlets in the local language (Bangla) and the GRC procedures and operational rules will be publicized widely, so that affected personnel are aware of their rights and obligations, and procedure of grievance redresses.

156. GRC meetings will be held as agreed by the Committee, in the respective field offices of the contractors or other location(s). If required, GRC members may carry out field visits to

verify and review the issues at dispute, including titles/shares, the reason for any delay in payments or other relevant matters. Through the process described below the affected persons will address the complaints and grievances.

Table 49: Grievance Resolution Process

Step 1	• Complaint relating to the environmental impacts such as construction site waste disposal, soil erosion to agricultural lands, access roads, and site preparation activities, fugitive dust and other emissions (e.g. from vehicle traffic, land clearing activities, and materials stockpiles), noise from heavy equipment and traffic, materials and oil spills associated with heavy equipment operation and fueling activities will be entertained by the GRC
Step 2	• The contractor assists the aggrieved affected persons to produce a written complaint to the convener of GRC with stories and expectations. The contractor counsels the aggrieved persons on the mandate and procedure of grievance resolution.
	• GRC scrutinize the case records and sort out cases to be referred to the Deputy Commissioner or the court of law and those to be resolved in GRC. • Hearing is organized on cases with merit at the GRC secretariat or at Union Parishad/Municipality Offices at local level and resolution is given by the GRC in one month of receiving the complaints. • Aggrieved APs satisfied with the resolution approach the executing agency for assistance under the provision of the EMP/ RP. The agreed resolution is forward to **Power Grid** for approval by the Project Director. • In case the resolution is not acceptable to the aggrieved person, he/she approaches the Project Director through the GRC convener with assistance from the contractor for further review. • Aggrieved APs may opt to approach to the Court of Law, if the resolution at **Power Grid** is not acceptable to him/her.
Step 3	• The resolution accepted by the aggrieved persons at any level (local, PMU) is approved by the Project Director and forwarded back to the Conveners' office keeping records at his/her office.

EA = executing agency, DP = Displaced Person, GRC = grievance redress committee, NGO = non-governmental organization, PMU = Project Management Unit.

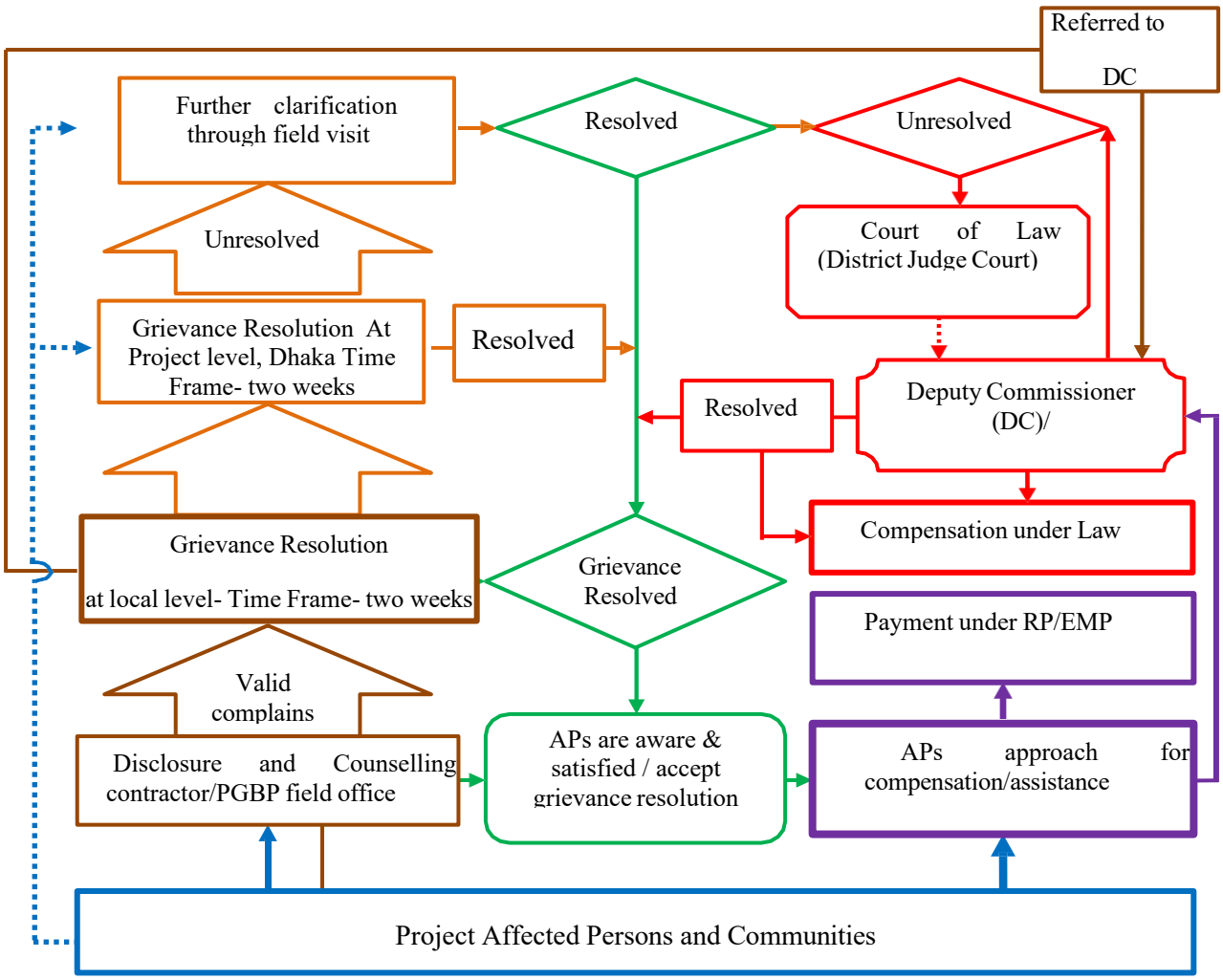


Figure 12: Grievance Redress Flow Chart

157. The project level GRC at headquarters will keep records of complaints received for its use, as well as for use by ADB during regular supervisions. The GRM does not impede access to the legal system. Affected persons can resort to legal action through the country's judiciary system at any time. They can also submit their grievances to ADB's Accountability Mechanism.

8.7 Approval of GRCs and Entitlements of GRC Members

158. All the decisions and proceedings of GRC meetings at any level will be finally approved by **Power Grid** only. The detailed office order for GRC of **Power Grid** is attached to the **W ANNEX**:

159. All GRC members will attend a training and orientation meeting earlier, before commencement of their work. Project staff and consultants'/environment specialists will conduct the training.

160. Grievances will be heard once a month by GRC. Before starting project work, the resettlement process must be completed, the GRC may meet more than once in every 30 days depending upon the number of such cases. Within two weeks of the hearing of the grievances the LGRC will inform the concerned aggrieved persons of their decision. If necessary, GRC will conclude its proceedings based on field inspection within a period of one month since the submission of grievances.

8.8 Grievance Redress Monitoring

161. The HCLK will keep records of all the grievances and their redress in monthly cumulative formats, which will be provided by the contractor and to be signed by the convener of the GRC. The format will contain information on the number of grievances received with nature, those resolved, and the number of unresolved grievances.

9 Current Operational Status and Management Plans

9.1 Renewal of ECC

162. The project has successfully received a renewal of its Environmental Clearance Certificate (ECC) from the Department of Environment (DoE), Ministry of Environment, Forest and Climate Change, Government of Bangladesh. The renewal, which is valid until 27th July 2025, ensures the continued compliance of the project with the country's environmental regulations.

163. The renewed ECC confirms that the terms and conditions outlined in the original Environmental Clearance, granted on 28th July 2020, remain applicable. This includes the necessary environmental management measures and adherence to the Environmental Conservation Rules (ECR, 2023) during the project's implementation.

164. Both the primary and the renewed ECC copies have been attached to **U ANNEX:**

9.2 Current Status with Environmental Laws and Protection of Endangered Species

165. The Dhaka and Western Zone Transmission Grid Expansion Project has developed a comprehensive Site-Specific Environmental Management Plan (SSEMP) to ensure compliance with national and international laws aimed at protecting endangered species and their habitats. The project adheres to key legislation, including the Bangladesh Wildlife (Preservation) Act, 1974, The Forest Act, 1927, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). These laws require that critical habitats for endangered species are protected, and the project has incorporated mitigation measures such as avoiding sensitive areas and implementing biodiversity conservation strategies throughout the construction and operational phases.

166. To monitor and safeguard biodiversity, the project includes a biodiversity monitoring plan which tracks the potential impacts on both terrestrial and aquatic ecosystems. The environmental management strategies are continuously updated based on the findings from site-specific ecological surveys and regular environmental assessments. Additionally, the project site is equipped with an **Invasive Species Management Plan** which focuses on preventing, controlling, and mitigating the spread of invasive species that could threaten native ecosystems. By engaging with local environmental authorities and adhering to international treaties like the Ramsar Convention on Wetlands, the project ensures that it complies with all environmental regulations, minimizing risks to wildlife and ensuring the preservation of protected habitats throughout its lifecycle.

9.3 Labor Management Plan

167. The Labor Management Plan (LMP) for the Dhaka and Western Zone Transmission Grid Expansion Project ensures worker safety and well-being by focusing on safe drinking water, health and safety, and sanitation. The project adheres to WHO water quality standards, provides PPE, conducts regular safety training, and ensures hygiene in construction camps. A **Grievance Redress Mechanism (GRM)** is in place for worker concerns. The **Communicable Disease Management Plan (CDMP)** addresses health risks like diarrhea, influenza, and malaria, with measures such as vaccination checks,

sanitation, and mosquito control. These plans are aligned with Bangladesh's labor laws and international standards, ensuring a safe and healthy work environment throughout the project.

168. The detailed management plans have been attached to **H ANNEX:**

9.4 Code of Conduct and Ethical Standards

169. The **Code of Conduct (COC)** of **HCLK** is a well-structured framework designed to guide the behavior and actions of all employees, directors, agents, and contractors. It sets clear expectations for ethical conduct, emphasizing safety, compliance with laws, transparency, and accountability. The COC ensures that employees understand the importance of maintaining high standards in areas such as **conflict of interest**, **discrimination**, and **disclosure of information**. By providing clear guidelines on how to handle gifts, business opportunities, and time management, the code helps employees make responsible decisions that align with the company's goals. The COC also fosters a **positive work environment**, where the welfare and rights of all stakeholders, including shareholders and local communities, are respected. This comprehensive structure promotes a culture of integrity and professionalism, ensuring that everyone in the company is aware of their responsibilities and the consequences of non-compliance.

170. The detailed CoC is attached in local language to the **BB ANNEX:**

9.5 Documentation and Reporting for the Project

171. For effective environmental management, monitoring, and compliance, the Dhaka and Western Zone Transmission Grid Expansion Project requires a well-organized system for documentation and reporting. Various reports and documents will be submitted to **Power Grid Bangladesh** for oversight, while some documents will be maintained on-site for immediate access and reference. This ensures transparency, proper monitoring, and adherence to both national and international regulations throughout the project lifecycle.

9.5.1 Documents to be Submitted to Power Grid

172. The following types of documents will be submitted to Power Grid as per the project requirements for review, compliance tracking, and documentation purposes.

Table 50:Types of Documents to be submitted to Power Grid

Sl. No.	Document	Purpose	Submission Frequency
1	Environmental Monitoring Reports	To monitor environmental impacts and mitigation progress	Quarterly
2	Health & Safety Compliance Reports	To ensure workplace safety and compliance with health regulations	Monthly
3	Grievance Redress Mechanism (GRM) Reports	To track grievances raised by local communities and their status	Monthly
4	Soil Quality and Water Quality Monitoring Reports	To monitor the quality of soil and water during construction	Quarterly
5	Waste Management Reports	To track waste generation, disposal, and recycling efforts	Monthly

Sl. No.	Document	Purpose	Submission Frequency
6	Air and Noise Quality Monitoring Reports	To monitor air and noise quality levels during construction	Quarterly
7	Compensatory Plantation and Tree Cutting Reports	To report on tree plantation and compensatory measures for affected trees	As required
8	Environmental Impact Assessment Updates	To track environmental impacts and their mitigation	As required
9	Monthly Construction Progress Reports	To provide updates on construction activities and milestones	Monthly
10	Emergency Response Reports	To track accidents, emergencies, and response effectiveness	As required
11	Compliance with Environmental and Social Safeguard Plans	To verify the implementation of safeguard measures	As required

173. The specific detailed list of documents that will be submitted to Power Grid is attached to **V ANNEX:**

9.5.2 Documents to be Kept at the Construction Site

174. In addition to submitting reports to Power Grid, certain documents need to be maintained on-site for immediate access, daily tracking, and compliance monitoring. These records will be available in a site-specific register for transparency and easy reference.

Table 51: Types of Documents to be Kept at the Construction Site

Sl. No.	Document	Purpose	Access Frequency
1	Daily Construction Logs	To track daily work progress, manpower, and issues faced	Daily
2	Health and Safety Checklists	To ensure workers are following safety protocols	Daily
3	Incident and Accident Reports	To document any accidents, injuries, or near misses	As required
4	Grievance Register	To document grievances raised by local communities and their status	Ongoing
5	Environmental Compliance Records	To track adherence to environmental standards on-site	Weekly
6	Equipment Maintenance Logs	To ensure that all equipment is maintained and compliant	Weekly
7	PPE Distribution and Usage Logs	To track the distribution and usage of personal protective equipment	Daily
8	Waste Management Logs	To document waste disposal activities and recycling efforts	Daily
9	Monitoring of Environmental Mitigation Measures	To ensure that all mitigation measures are properly implemented	Weekly
10	Safety Signage and Warning Notices	To ensure all safety signs are in place and accessible	Ongoing

Sl. No.	Document	Purpose	Access Frequency
11	Training Attendance Records	To document training sessions conducted for workers	Ongoing
12	Emergency Response Drills and Preparedness Logs	To document emergency drills and preparedness activities	Monthly

175. Maintaining clear documentation both at the construction site and through regular submissions to POWER GRID is essential for ensuring environmental, social, and safety standards are met.

9.6 Proposed Tree Plantation and Habitat Restoration Plan

176. The Tree Plantation Plan developed for the Project has been designed to mitigate environmental impacts caused by the construction activities, particularly the loss of vegetation and its effect on biodiversity. The plan specifies the identification of planting areas along the transmission line route, substations, and sensitive areas. Native, drought-resistant species such as Shimul, Neem, and Acacia are selected for compensatory planting, with a plantation ratio of 1:3, meaning for every tree removed, three trees will be planted.

177. The plan includes steps for site preparation, tree planting, irrigation, protection from pests and animals, and ongoing monitoring to ensure the survival and growth of the saplings. Additionally, the plan ensures the restoration of habitats post-construction and addresses the prevention of invasive species. These actions comply with the project's environmental standards and ECR regulations, effectively minimizing the environmental footprint, restoring ecosystems, and ensuring the long-term sustainability of the project's ecological impact. The detailed plan has been attached to M ANNEX:

9.7 Safety Procedures for Material Handling and Equipment Maintenance

178. The project proponent has developed and is actively implementing a comprehensive safety plan that includes LIFO, FIFO, and Lock Out & Tag Out (LOTO) procedures across the site. These safety measures are designed to effectively manage materials and equipment while ensuring the highest level of worker safety. By adhering to these well-established protocols, the project demonstrates full compliance with international safety standards and national regulations. Regular training, site inspections, and audits are conducted to ensure continuous adherence to these procedures, safeguarding both the workers and the integrity of the project operations.

179. The detailed Handling Plan has been attached to O ANNEX:

9.8 Compliance to EMP for Substations and Transmission Lines

180. The following tables outline the scope of works and corresponding compliance status for both substations and transmission lines as part of the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGE). These scopes address critical aspects such as environmental protection, waste management, noise control, health and safety, and tree plantation. The compliance status reflects the efforts made by the project team to adhere to environmental standards and best practices.

Table 52: Compliance Status for Substations

Sl. No	Scope of Work (Substations)	Compliance Status	Remarks
1	Land acquisition and requisition	Complied	No site development activities initiated before land acquisition. Compensation for land acquisition and requisition handled efficiently.
2	Topsoil management (avoid chemical spills)	On Going	Secondary containers used to prevent oil and chemical spillage. On-site monitoring ensures no contamination.
3	Tree felling and clearing of vegetation	On Going	Compensation for tree removal and tree plantation planned for post-construction.
4	Wildlife (fauna) protection	Not Required	No significant wildlife found in the substation area, but habitat restoration planned.
5	Waste management	On Going	Waste segregation and removal by municipal authorities. Waste management plan implemented on-site for better monitoring and handling.
6	Noise control	On Going	Noise management protocols enforced during daytime construction. Noise barriers set up where necessary.
7	Air quality and dust control	On Going	Water spray systems and machinery covering for dust suppression during construction and dry seasons.
8	Soil quality management	On Going	Secondary containers used for fuel and chemical storage. No signs of significant contamination.
9	Construction camp site management	Complied	Camps located away from sensitive areas, with adequate sanitation and amenities.
10	Traffic and road safety	On Going	Traffic management implemented for construction site access. Flagmen and controlled speed limits in place.
11	Health and safety	Complied	PPE provided to workers; workers briefed on site hazards and emergency procedures. Ongoing safety training sessions conducted.
12	Emergency response and fire safety	Complied	Fire safety equipment and emergency drills conducted regularly at the site.
13	Employment generation	Complied	Local workers employed and trained for various roles. Local vehicles hired for transportation of materials and personnel.
14	Environmental restoration and compensation	On Going	Tree plantation will be done according to the 1:3 compensatory plantation ratio post-construction. Habitat restoration in sensitive areas.

Table 53: Compliance Status for Transmission Lines

Sl. No	Scope of Work (Transmission Lines)	Compliance Status	Remarks
1	Land acquisition and requisition	Complied	No land acquisition required for transmission lines. Compensation for affected landowners during tower erection.
2	Tree felling and vegetation clearance	On Going	Compensation for tree removal; restoration measures in place post-construction.
3	Fauna (wildlife) protection	Not Required	Minimal impact on local wildlife. Ongoing monitoring of fauna.
4	Construction waste management	On Going	Waste collected, segregated, and removed by authorized waste collectors. Hazardous waste disposed of according to regulatory guidelines.
5	Noise control	On Going	Construction work limited to day hours (9 AM to 5 PM). Regular noise monitoring near sensitive areas.
6	Air quality and dust management	On Going	Water spraying and proper material covering systems used to control dust at work sites.
7	Soil quality and spillage control	On Going	Secondary containment for oils and chemicals used at transmission tower sites. No soil contamination found.
8	Siting and management of construction camps	Complied	Camps located away from sensitive areas. Proper compensation paid to landowners.
9	Traffic and road management	On Going	Proper traffic management for construction vehicles, with speed restrictions in place around construction zones.
10	Health and safety	Complied	Safety protocols enforced, with PPE provided. Workers briefed on construction site hazards and emergency procedures.
11	Emergency response and fire safety	Complied	Emergency response protocols in place, with firefighting equipment readily available at all work sites.
12	Worker welfare and engagement	On Going	Welfare programs for workers, including recreation and health awareness activities.
13	Habitat restoration and compensatory plantation	On Going	Tree plantation activities undertaken according to environmental guidelines. Compensatory planting ratio of 1:3 in place.
14	Line safety and monitoring	On Going	Line monitoring conducted using drones and ensuring all safety measures for workers.

9.9 Site-Specific Management Plans for Safety, Waste, and Hazardous Materials

181. The project has developed comprehensive, site-specific management plans that address fire safety, waste management, and the handling and storage of hazardous materials. These plans have been tailored to meet the specific needs and challenges of the project site, taking into account the surrounding environment, local conditions, and the nature of the project activities. The **Fire Management Plan** includes detailed measures for fire prevention, emergency response, fire-fighting resources, and evacuation procedures, particularly for high-risk areas like substations and construction camps. The **Waste Management Plan** outlines the segregation, storage, disposal, and recycling of different waste types, ensuring compliance with environmental standards and reducing the environmental footprint. Additionally, the **Hazardous Materials Handling and Storage Plan** defines the proper protocols for the safe storage, use, and disposal of chemicals, fuels, and other hazardous materials to minimize environmental and safety risks. All these plans have been developed in strict accordance with relevant national and international guidelines and will be implemented at the site to ensure safe and environmentally responsible operations.

182. The detailed versions of these plans have been attached to the relevant annexures for further review and reference.

9.10 Comprehensive Environmental Monitoring Plan

183. A comprehensive Environmental Monitoring Plan checklist is vital for ensuring that the project adheres to its environmental commitments and compliance standards. This checklist will cover all the necessary environmental parameters, which include air quality, water quality, noise levels, soil quality, and other ecological factors. Each monitoring task will be clearly defined with its respective guidelines, responsibilities, and monitoring frequency to ensure timely and accurate reporting. The checklist will be reviewed periodically to ensure its accuracy and effectiveness in managing environmental impacts during the construction and operation phases. By adhering to this structured checklist, the project can mitigate potential environmental risks, ensuring a sustainable approach aligned with the project's goals and national and international standards.

Table 54: Comprehensive Environmental Monitoring Plan

Sl. No.	Environmental Parameter	Monitoring Method	Frequency	Responsible Party	Location	Standard	Remarks
1	Air Quality (SO2, NOx, PM10)	Sampling/ Lab Analysis	Quarterly	Site Manager (Contractor)	Construction Site, Substations	ECR 2023	Ensure air quality is within acceptable limits for residential zones
2	Noise Level (Leq Day/Night)	Noise Meter	Monthly	Site Manager (Contractor)	Near Work Sites, Sensitive Areas	SPCR 2006	Ensure noise levels are maintained within permissible limits
3	Water Quality (BOD, COD, DO)	Water Sampling	Bi-Annually	Site Manager (Contractor)	Nearby Water Bodies	ECR 2023	Regular monitoring to prevent

Sl. No.	Environmental Parameter	Monitoring Method	Frequency	Responsible Party	Location	Standard	Remarks
							contamination of water resources
4	Soil Quality (pH, EC, Nitrogen)	Soil Sampling	Quarterly	Site Manager (Contractor)	Near Construction Site	ECR 2023	Maintain soil health and prevent contamination from construction materials
5	Waste Management (Construction Waste)	Segregation/ Disposal Logs	Monthly	Site Manager (Contractor)	Construction Sites	ECR 2023	Ensure waste is disposed of through authorized waste collectors

9.11 Compliance with Environmental Management Plan (EMP)

184. The project is currently being implemented in compliance with the approved Environmental Management Plan (EMP), which is part of the contractual obligations under the Dhaka and Western Zone Transmission Grid Expansion Project. As per SCC Clause-47 and Clause-9.8(c), contractors are required to follow environmental safeguards detailed in the EMP, including provisions for pollution control, waste management, occupational health and safety, and community protection. While the Site-Specific Environmental Management Plan (SSEMP) is under review and pending formal approval, all ongoing construction activities are being monitored against the EMP requirements. Power Grid's environmental and social monitoring unit is overseeing environmental compliance. All safeguard measures and observations are being documented and reported to ADB through periodic monitoring reports to ensure that environmental performance remains aligned with project standards.

ANNEXURES

A ANNEX: AIR QUALITY MANAGEMENT PLAN

A.1 Importance

185. Employees working on transmission line construction sites on a regular basis are at a higher risk of developing health complications due to poor air quality. The dust generated from excavation, vehicular movement, and other construction activities can cause respiratory issues such as coughing, wheezing, and shortness of breath. Prolonged exposure may lead to more serious health issues, including cardiovascular and respiratory diseases, lung cancer, strokes, and asthma exacerbation.

186. Implementing an air quality management plan on transmission line construction sites is crucial to mitigating these health risks. Measures such as dust suppression (e.g., spraying water on access roads), using low-emission construction equipment, and monitoring air quality regularly can help prevent health issues among workers.

187. Beyond health concerns, air pollution from transmission line construction also impacts the environment, contributing to soil degradation, habitat disruption, and pollution of nearby water sources. A well-implemented air quality management plan will not only safeguard human health but also reduce the environmental footprint of the project, preserving surrounding ecosystems and communities from excessive air pollution.

A.2 Relevant Legislations

i. Environment Conservation Act, 1995 and its amendment in 2000, 2002, and 2010: It describes “Regulation for vehicles emitting smoke harmful for the environment; Formulation of environmental guidelines relating to control and mitigation of environmental pollution, conservation, & improvement of the environment” that is applicable to during the construction phase of this project.

ii. Air Pollution Control Rules, 2022: This rule includes national environmental quality standards (NEQS) for air *(“NEQS for ambient air, vehicle exhaust, odor, water transport, Stack air, Construction Dust Control”)* which is applicable in this project during the construction phase.

A.3 Objectives and Scope

188. Deterioration of air quality due to construction activities associated with transmission line installation may adversely affect the health of site employees, workers, and nearby residents. To manage potential air pollution impacts (particularly gaseous pollutants) during the construction phase, an Air Quality Management Plan has been prepared. The following objectives are critical in developing the plan:

- Identify potential air pollutant sources related to transmission line construction and implement measures to control pollution accordingly.
- Minimize gaseous pollutant emissions from activities such as excavation, material transport, and the operation of heavy equipment, as far as feasible and reasonable.
- Maintain ambient air quality standards in compliance with the Air Pollution Control Rules-2022.

A.4 Sources of Emission

189. The potential sources of emissions from transmission line construction activities include:

- ❖ Dust generation from excavation, grading, and levelling of tower foundations, vehicular movement, and the handling of construction materials.
- ❖ Air pollution from machinery and equipment, such as cranes, drilling rigs, and excavators used for installing transmission towers and laying cables.
- ❖ Gaseous emissions from vehicles transporting materials, site workers, and heavy machinery involved in stringing transmission lines and other associated activities.

A.5 Potential Receptor

190. The potential receptors are as follows;

- ❖ Adjacent residential areas
- ❖ Institutions (Educational, religious)
- ❖ Local Market

191. Details of the sensitive receptors are provided in section 5.4 of Chapter 5.

A.6 Assessment Procedure

192. The existing ambient air quality of the project area will be monitored quarterly. The ambient status of the major air pollutants viz. Particulate Matter (PM_{10} and $PM_{2.5}$), Gaseous substance (SO_x, NO_x, CO, and O_3) will be measured for sampling period of 8hour and then it will be converted to the standard period as described in section (Paragraph-59).

A.7 Methodology for Ambient Air Quality Monitoring

193. The air samples will be collected by using High Volume Sampler (GTI-FPS-375) with Impinger attachment for 8-hours of sampling period. Then, the 8-hour sampling data will be converted to the 24hour data using conversion factor.

Table 55: Methodology of Ambient Air Quality

No.	Parameter	Methodology	Device/Equipment	Sampling
1	PM_{10}	Gravimetric	GTI-FPS-375	8hours
2	$PM_{2.5}$	Gravimetric	GTI-FPS-375	8hours
3	Nox	Modified West and Gaeke Method	GTI-FPS-375 with Impinger attachment	8 hours
4	SOx	Modified Jacob & Hochhseiser Method	GTI-FPS-375 with Impinger attachment	8 hours
5	CO	Iodine Pentoxide Method	GTI-FPS-375 with Impinger attachment	8 hours
6	O_3	KI Chemical Method	GTI-FPS-375 with Impinger attachment	8 hours

Table 56: Description of the methodology of Ambient Air Quality

SL/No	Name of the Parameters	Methodology
1	PM10, PM2.5	Gravimetric method; Air sampler is the simplest of the direct weight methods and has been adopted by the USEPA and British Standard Institution (1969). Typically, EPA's validated reference test methods for PM (EPA Methods 5 and 17) measure only material that is collected on and ahead of the filter media of a sampling device.
2	SOx	Modified West & Gaeke Method (IS 5182 Part 2 Method of Measurement of Air Pollution: Sulphur dioxide). Sulphur dioxide from air is absorbed in a solution of potassium tetrachloromercurate (TCM). A dichlorosulphitomercurate complex, which resists oxidation by the oxygen in the air, is formed. Once formed, this complex is stable to strong oxidants such as ozone and oxides of nitrogen and therefore, the absorber solution may be stored for some time prior to analysis. The complex reacts with pararosaniline and formaldehyde to form the intensely colored pararosaniline methyl sulphonic acid. The absorbance of the solution is measured by means of a spectrophotometer at 560 nm.
3	NOx	Modified Jacob & Hochheiser Method (IS 5182 Part 6 Methods for Measurement of Air Pollution: Oxides of nitrogen). Ambient nitrogen dioxide (NO_2) is collected by bubbling air through a solution of sodium hydroxide and sodium arsenite. The concentration of nitrite ion (NO_2) produced during sampling is determined colorimetrically by reacting the nitrite ion with phosphoric acid, sulfanilamide, and N-(1-naphthyl)-ethylenediamine dihydrochloride (NEDA) and measuring the absorbance of the highly colored azodye at 540 nm.
4	O_3	Method 411, Air Sampling and Analysis, 3rd Edition (Determination of oxidizing substances in the atmosphere, Chemical Method). Micro-amounts of ozone and oxidants liberate iodine when absorbed in a 1% solution of potassium iodide buffered at pH 6.8 ± 0.2. The iodine is determined spectrophotometrically by measuring the absorption of tri-iodide ion at 352 nm. The stoichiometry is approximated by the reaction: $O_3 + 3KI + H_2O \rightarrow KI_3 + 2KOH + O_2$.
5	CO	Iodine pentoxide easily oxidizes carbon monoxide to carbon dioxide at room temperature: $5CO + I_2O_5 \rightarrow I_2 + 5CO_2$. This reaction can be used to analyze the concentration of CO in a gaseous sample. The liberated iodine is finally titrated with sodium thiosulfate using a starch indicator.

A.8 Environmental Impacts, Mitigation and Management Plan

194. The contractor will take all necessary mitigation measures for the protection of the air and the existing environment to comply with all the legislation, the IEE, EMP and contract requirements. The potential environmental impacts and mitigation measures are oriented in following table:

Table 57: Potential Impact with Management Plan for the Air quality

Issues	Remedial Measures	Implementation
Air pollution and dust generation due to construction activities, especially during the operating of generators and construction vehicle movement.	❖ All vehicles (e.g., trucks, equipment, and other vehicles that support construction works) shall be well maintained and not emit dark or smoky emissions in excess of the limits described in the Environment Quality Standards (EQS). ❖ Specific training will be focused on minimizing dust and exhaust gas emissions from heavy construction vehicles. Drivers of vehicles used during construction will be under strict instructions to minimize unnecessary trips and minimize idling of engines. ❖ Dust suppression facilities (back pack water sprayer) shall be available where earth and cement works are required. Spray water on dry and loose surfaces of the construction sites regularly to minimize dust. ❖ Maintain adequate moisture content of soil during transportation, compaction and handling. ❖ Construction materials (sand, gravel, and rocks) and spoil materials will be transported in trucks covered with tarpaulins. Sprinkle and cover stockpiles of loose construction materials (e.g., fine aggregates, sand). ❖ Dust masks should be provided to all personnel in areas prone to dust emissions throughout the period of construction	Contractor

A.9 Air Quality Monitoring Program

Table 58: Air Quality Monitoring Program during Construction Period

Mitigation Measures/ Parameter	When/ Frequency	Location	Output To Be Provided	Key Performance Indicator	Implementation
Particulate Matters (PM_{10} & $PM_{2.5}$), Carbon Monoxide (CO), Oxides of Nitrogen (NOx), Sulphur Dioxide (SO_2), and O_3	Quarterly	Active construction site, base camp and representative sample one each for residential, commercial/Industrial and Sensitive Locations.	Complete data table, GPS coordinates, test Report shall be submitted to the POWER GRID.	Keeping all the parameters within the baseline value	Contractor
Regular Water Spraying	Daily basis as and when required	Active construction site, earthworks, unpaved haulage roads and other dust prone areas	Daily basis checklists and pictorial evidence with time stamp	Keep the dust particle parameters within standard limit and No complaint from the community	Contractor
Visual check on soot/ black smoke	Daily basis	Base Camp, Right of Way	Daily basis checklists, photographic evident with time stamp, maintenance records of the equipment.	Keep updated of the maintenance record	Contractor
Regular check-up of the machineries to keep the machineries in good condition	Weekly	Vehicles maintenance area	Maintenance records	Keep updated of the maintenance records	Contractor

A.10 Capacity of Equipment and Manpower

195. The contractor has a dedicated environmental team at the project site to manage environmental issues and implement an environmental management plan. The environmental team with the help of EHS team (if required) will inspect and mitigate air pollution issues on regular basis according to the air quality management plan. To monitor air quality issues besides monthly visual observation and mitigation measures, quarterly air quality assessments will be done at selected sites based on construction activities. Air quality monitoring machines (Greintech (GTI-FPS-375) with impinger attachment) will be used for air quality sampling.

A.11Training

196. The workforce and management will get training as the environmental training schedule for the awareness of air pollution and management. Staff will complete and sign an attendance sheet for all courses attended, including the toolbox talks training.

197. Workforce training on several environmental management will be conducted and all records, including attendance sheets, will be held in a central location by the Contractor and made available during any audit conducted as part of the audit program. Air pollution sources, impacts and management measures will be included in the environmental training.

A.12 Review and improvements

198. This **Air Quality Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID

A.13 Checklist and Log Sheets

Table 59: Quarterly Air Quality Management Monitoring Checklist (Quantitative Aspects)

Parameters	Value	Unit	Compliance Status	Comments
Ambient Air Quality				
Particulate Matter ($PM_{2.5}$):		$\mu g/m^3$		
Particulate Matter (PM_{10}):		$\mu g/m^3$		
Nitrogen Oxides (NO_X):		$\mu g/m^3$		
Sulfur Dioxide (SO_2):		$\mu g/m^3$		
Carbon Monoxide (CO):		mg/m^3		
Ozone (O_3):		$\mu g/m^3$		

B ANNEX: NOISE LEVEL MANAGEMENT PLAN

B.1 Importance

199. Transmission line project employees are at risk of developing health complications due to regular exposure to high levels of noise, which can lead to permanent hearing damage, stress, hypertension, and heart diseases. A noise level management plan can help prevent and reduce these risks, as well as improve communication among employees, job satisfaction, and work efficiency. In addition to the health benefits, implementing such a plan can also reduce noise pollution and its impact on surrounding communities and wildlife. Therefore, it is important to prioritize the safety and well-being of employees by implementing a noise level management plan during transmission line construction and maintenance activities.

B.2 Relevant Legislations

i. Environment Conservation Act, 1995 and its amendments in 2000 & 2002

It describes "Framing of standards for air, water and noise quality, Formulation of guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment "that is applicable to during the construction phase of this project

ii. Environmental Conservation Rules, 2023;

"*This Act* is applicable during the construction phase of this project.

iii. The Vehicle Act, 1927; The Motor Vehicles Ordinance, 1983; The Bengal Motor Vehicle Rules, 1940

These aim to "*Exhaust emission; Vehicular air and noise pollution; Road/traffic safety; Vehicle Licensing and Registration; Fitness of Motor Vehicles; Parking bylaws"* which can be applied during the construction phase of this project.

iv. Sound Pollution Control Rules, 2006

It describes *"Prevention of Noise pollution Standards for noise levels"* It can be applicable during the construction phase of this project.

B.3 Objectives and Scope

200. High levels of noise due to construction activities may adversely affect the health of site employees, workers, and the residents adjacent to the transmission line project site. The Noise Level Management Plan has been prepared to manage potential noise pollution impacts during the construction period. The following objectives have been considered as significant while developing the plan:

- Identify the potential noise pollution sources and control pollution accordingly; assess and monitor noise levels, and implement appropriate measures to control and reduce noise exposures to safe levels.
- Mitigate and avoid noise pollution from transmission line construction activities as far as feasible and reasonable.
- Maintain the national and international guidelines regarding noise pollution management, such as the Sound Pollution (Control) Rules, 2006.

B.4 Sources of Noise

201. The potential sources of high noise level at project area are discussed as below:

- ❖ Active construction sites such as tower foundation excavation, base camp construction, stockyards, and access road construction.
- ❖ Operational activities of heavy equipment and machinery such as excavators, pile drivers, cranes, and augers used for tower installation and cable stringing.
- ❖ Operational activities of power tools such as drills, saws, and hydraulic bolt tensioners, when used for prolonged periods during tower assembly and installation.
- ❖ Demolition or clearing activities such as the removal of existing structures, trees, or vegetation, which can produce high noise levels when performed with heavy machinery.
- ❖ High noise from temporary facilities such as generators, welding equipment, and pumps, as well as nearby activities such as traffic, construction logistics, or equipment movement at the staging area.

B.5 Potential Receptor

202. The potential receptors are as follows;

- ❖ Adjacent residential areas
- ❖ Institutions (Educational, religious)
- ❖ Healthcare facilities
- ❖ Local Market
- ❖ Public spaces

Details of the sensitive receptors are provided in section 5.4 of Chapter 5.

B.6 Assessment Procedure

203. The existing ambient noise level of the project area will be monitored as per EMP and IEE. The ambient status of the noise level monitoring is based on equivalent noise levels on dB(A) scale for day and night) are measured using the Sound level meter, measurement 24-hour daytime and night time. Analysis to be done L_{eq} (day), L_{eq} (night). Noise level data also will be compared with DoE standard. Ambient noise level samples will be collected to understand the existing condition of the noise level of residential, commercial and silent area nearby to the project area. The sampling locations are considered based on the nearest receptors and the occupational health and safety issues in the construction yard and accommodation site.

B.7 Environmental Impacts, Mitigation and Management Plan

Table 60: Potential Impact with Management Plan for the Noise Level

Issues	Remedial Measures	Implementation
Noise pollution due to construction activities, generators, and construction vehicle movement	❖ It is recommended that no construction should be allowed during night time (9 PM to 6 AM). ❖ Avoid using of construction equipment producing excessive noise at any time. ❖ Avoid prolonged exposure to noise (produced by equipment) by workers. ❖ Regulate use of horns and avoid use of hydraulic horns in project vehicles. ❖ Follow the government rules and regulations, EHS guidelines and WHO noise guidance whoever is more stringent on noise	Contractor
Noise pollution during the stringing process	❖ Use noise-dampening equipment and schedule work during less disruptive hours to minimize community disturbance	Contractor
Noise during commissioning	❖ Inform nearby communities about the commissioning schedule and limit the noise duration	Contractor

B.8 Noise Level Monitoring Program

Table 61: Noise Level Monitoring Program during construction period

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
Timing of noisy construction activities shall be done during daytime near residential areas	Daily basis	Active Construction site	Maintenance records	Keep updated of the maintenance record	Contractor
Noise monitoring as per EMP/IEE	Semi-annual basis for 24hour period	As per IEE/EMP/SSEMP	Complete data table, GPS coordinates, test Report shall be submitted to the POWER GRID.	Keeping all the parameters within the baseline value	Contractor
Provide PPEs to workers at sites.	Requirement basis	Project site	Records of the PPE List	Keep updated record	Contractor's EHS

B.9 Capacity of Equipment and Manpower

204. The contractor has a dedicated environmental team at the project site to manage environmental issues and implement an environmental management plan. The environmental and health safety team will inspect and mitigate noise pollution issues on regular basis according to the noise level management plan. To monitor noise level issues besides monthly visual observation and mitigation measures, semi-annual noise level monitoring will be done at selected sites based on construction activities. Portable Noise Meter with Data Recording System (SLM-25) will be used to measure the noise level.

B.10 Training

205. The workforce and management will get training as the environmental training schedule for the awareness of noise pollution and management. Staff will complete and sign an attendance sheet for all courses attended, including the toolbox talks training.

206. Workforce training on several environmental managements will be conducted and all records, including the attendance sheets, will be held in a central location by the Contractor's EMO and made available during any audit conducted as part of the audit program. Noise pollution sources, impacts and management measures will be included in the environmental training.

B.11 Review and improvements

207. This **Noise Level Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts.

208. This document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID

B.12 Checklist and Log Sheets

Table 62: Quarterly Noise level Management Monitoring Checklist (Quantitative Aspects)

Parameters	Value	Unit	Compliance Status	Comments
Ambient Noise Level				
Ambient Noise Level (Day)		Leq		
Ambient Noise Level (Night)		Leq		

C ANNEX: LAND USE AND SOIL MANAGEMENT PLAN

C.1 Importance

209. A Land Use and Soil Management Plan is an essential component of any transmission line project. It is designed to assess the potential impact of the project on the surrounding environment, particularly the soil and vegetation. This plan is critical because it helps to identify and manage potential risks associated with land use changes and soil disturbances caused by the construction and operation of transmission lines.

210. Here are the key points highlighting the importance of a Land Use and Soil Management Plan for a transmission line project:

- **Soil Protection:** The construction of transmission lines involves activities such as excavation, pole foundation installation, and the use of heavy equipment, which can severely impact soil structure. Soil compaction, excavation, and grading can lead to soil erosion and a reduction in soil fertility. A Land Use and Soil Management Plan outlines best practices to protect the soil during construction, helping to minimize erosion, prevent sedimentation, and preserve the soil's natural integrity.
- **Vegetation Protection:** Transmission line projects often require clearing vegetation along the right-of-way. In sensitive ecosystems, this can have a lasting environmental impact, including loss of habitat and biodiversity. A Land Use and Soil Management Plan helps identify methods to reduce vegetation removal, protect sensitive ecosystems, and promote regrowth in areas where vegetation is cleared. It also addresses measures to minimize disruption to local flora and fauna.
- **Water Quality Protection:** Transmission line construction can impact water quality. Soil disturbances from excavation and grading can lead to erosion, which can increase sedimentation in nearby water bodies. The plan provides strategies to control sediment runoff and manage water drainage to avoid contaminating nearby water sources, ensuring that water quality is preserved both during and after the construction process.
- **Compliance with Regulations:** Regulatory authorities often require a Land Use and Soil Management Plan for transmission line projects to ensure compliance with environmental laws. This plan ensures that the project adheres to all relevant regulations concerning land use, soil conservation, and environmental protection, reducing the risk of delays, penalties, and non-compliance with local and national environmental standards.

C.2 Relevant Legislations

211. In Bangladesh, there are several relevant legislations related to land use and soil management, which are enforced by various government agencies. The applicable legislations are as followed.

i. The Bangladesh Environment Conservation Act, 1995 (Amended 2010)

This act provides for the conservation and improvement of the environment, prevention and control of pollution, and sustainable management of natural resources, including soil. It establishes the Department of Environment (DOE) as the regulatory body responsible for implementing the provisions of the act.

ii. The Forest Act, 1927

This act regulates the use and management of forest resources in Bangladesh, including soil conservation in forest areas. The Forest Department is responsible for enforcing the provisions of the act.

iii. The Bangladesh Agricultural Development Corporation Ordinance, 1973

This ordinance establishes the Bangladesh Agricultural Development Corporation (BADC) as the main agency responsible for promoting agricultural development in the country, including soil conservation and land use planning.

iv. The National Land Use Policy, 2012

This policy provides a framework for the sustainable use and management of land resources in Bangladesh. It aims to ensure the equitable distribution of land resources, improve land productivity, and conserve natural resources, including soil.

v. National Agriculture Policy, 2018:

This policy addresses soil fertility and the prevention of land degradation, particularly for agricultural lands. It emphasizes conservation farming, the prevention of erosion, and the maintenance of soil quality, which are important when developing land use and soil management plans.

vi. National Adaptation Programme of Action (NAPA), 2005:

As a climate adaptation framework, NAPA outlines strategies to prevent land degradation due to climate change impacts, including erosion, sedimentation, and flooding. This is relevant for transmission line projects, as soil management should consider climate resilience.

C.3 Objectives and Scope

212. The objectives and scope of a Land Use and Soil Management Plan (LUSMP) for a transmission line project are:

Objectives:

- To assess the potential impact of the transmission line project on the surrounding environment, particularly the soil and vegetation.
- To identify potential risks associated with land use changes and soil disturbances caused by the construction and operation of the transmission line.
- To provide guidance for the proper management and use of soil resources during and after the construction of the transmission line.
- To identify and prioritize measures to minimize the impact of the project on the environment and natural resources, including soil and vegetation.
- To ensure compliance with relevant environmental regulations and permitting requirements for the transmission line project.

Scope:

- Soil assessment: The LUSMP will include a soil assessment that identifies the soil types, characteristics, and erosion potential along the transmission line route.
- Vegetation assessment: The LUSMP will include a vegetation assessment that identifies types of vegetation in the project area and evaluates the impact of vegetation clearing for the transmission line on the surrounding environment.
- Land use planning: The LUSMP will assess how the transmission line project may alter land use patterns and identify appropriate land use measures to mitigate any negative impacts.
- Soil management practices: The LUSMP will provide guidance on soil conservation and protection measures during construction, soil stabilization techniques, and methods for handling any contaminated soil encountered during the project.
- Sediment and erosion control measures: The LUSMP will outline sediment and erosion control strategies to minimize soil erosion and sedimentation during and after the construction of the transmission line.
- Monitoring and reporting: The LUSMP will include a monitoring and reporting framework to assess the effectiveness of the plan in protecting soil and other natural resources during and after the transmission line construction.

C.4 Sources of Contamination

213. Potential sources of soil contamination during the transmission line project include:

- Agricultural activities: Agricultural operations near the transmission line route may contaminate the soil with chemicals and heavy metals from pesticides, herbicides, and fertilizers.
- Waste disposal: Improper disposal of waste, such as discarded equipment or hazardous materials from construction, can lead to soil contamination with toxic substances.
- Construction activities: Construction processes such as excavation, drilling for poles or foundations, and equipment usage can introduce pollutants and chemicals into the soil.
- Transportation activities: Fuel and lubricant spills from vehicles and machinery used during transmission line construction can contaminate the soil with hydrocarbons and heavy metals.
- Natural disasters: Natural disasters like floods, storms, or landslides could cause soil contamination by spreading hazardous substances into the project area.

C.5 Potential Receptor

214. Potential receptors impacted by soil contamination and land use changes during the transmission line project include:

- Soil microorganisms: Contaminated soil can affect microorganisms, which play a crucial role in soil health and fertility.
- Plants: Vegetation in and around the transmission line project area may be affected by soil contamination or habitat disruption, impacting their growth and survival.

- Wildlife: Wildlife species that rely on the ecosystem, including birds, mammals, and other fauna, may be impacted by habitat fragmentation and soil contamination along the transmission line route.
- Humans: People living, working, or farming near the transmission line project area could be exposed to contaminated soil and water resources, posing health risks from toxic chemicals and heavy metals.

C.6 Assessment Procedure

215. The existing land use and soil quality of the project area will be monitored. The ambient status of the major soil quality pollutants is measured using various procedures. Soil samples will be collected as per quarterly basis to understand the existing condition of the soil and land use project. The sampling location is considered based on the nearest receptors and the occupational health and safety issues in the construction base camp and agricultural land use area.

C.7 Environmental Impacts, Mitigation and Management Plan

216. The Environmental Impacts, Mitigation and Management Plan for Land Use and Soil Management Plan is given below.

Table 63: Environmental Impacts, Mitigation and Management Plan for a Land Use and Soil Management

Issue	Remedial Measures	Implementation
Loss of land permanently for 12 tower bases of the TL/LILO lines	Prior to commencement of construction activities, the owners of the affected land must be notified and provided proper compensation as per DoE and ADB guidelines. As per DoE and ADB guidelines, RP should be prepared for land acquisition/requisition/compensation and follow it	Contractor
Trees will be directly affected by cutting and trimming, as well as standing crops (if any) and bushes along the RoW will also be affected.	Prior to the start of clearing of vegetation, provide adequate compensation to the owners	Contractor
Soil Pollution	Prevention of spillage and leakage of liquid at tower sites	Contractor
Soil erosion and loss of topsoil	Implement erosion control measures like silt fencing and re-vegetate disturbed areas	Contractor
Indigenous tree species can be planted in home gardens and govt. lands	Planting of 350-400 saplings to replace felled trees, on the side slopes of the access roads, during the monsoon period.[16] The number of saplings which die within 3 years of planting should be replaced by new saplings. Nursing period of planted saplings should not less than 3 years.	Contractor
Land Conflicts	Engage communities in route planning and compensate for land use properly	Contractor

[16] According to IEE Report (Table 9-1, (b) Operational stage), total length of Component 1 and 2 is 408 KM (40 and 368 KM). If 75,000 saplings have to planted for 408 KM then for 2 KM (Package - 1), it should be around 368 Saplings.

C.8 Soil Quality Monitoring Program

Table 64: Monitoring Program for a Land Use and Soil Management

Indicators	Parameters	Method/ Guidelines	Locations	Frequency and Duration	Implementation
Soil Quality	pH, EC, Nitrogen, Phosphorus, Potassium, Calcium, Arsenic, Copper, Lead, Iron, Zn	As specified by the site engineer from contractor end. **Parameters** pH, EC, N, P, K, Ca, As, Cu, Pb, Fe, Zn	3 to 5 soil samples per kilometer along the transmission line route.	Quarterly	Contractor
Soil Erosion	Visual check for Soil erosion and siltation	Soil erosion after rain fall will be specified by site engineer of POWER GRID if it seems a problem after visual inspection.	Throughout the project corridor	After first rain	Contractor

C.9 Capacity of Equipment and Manpower

217. The project proponent, has established a dedicated environmental team at the project site responsible for overseeing environmental compliance and implementing the Site-Specific Environmental Management Plan (SSEMP). To monitor soil quality effectively, the team will conduct monthly visual inspections based on predefined indicators, such as signs of erosion, compaction, oil or chemical spills, and changes in soil color or texture, in line with national environmental guidelines. In addition to these regular checks, biannual laboratory assessments of soil samples will be carried out at strategically selected locations during construction activities to evaluate parameters such as pH, heavy metal concentration, and organic content, ensuring that soil quality remains within acceptable environmental standards.

C.10 Training

218. The workforce and management will get training as the environmental training schedule for the awareness of the plan. The staffs will complete and sign an attendance sheet for all courses attended.

219. Workforce training on several environmental management will be conducted as per the EMP and all records, including the attendance sheets, will be held in a central location by the Contractor’s and made available during any audit conducted as part of the audit program.

C.11 Review and improvements

220. This **Land Use and Soil Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID

C.12 Checklist and Log Sheets[17]

221. The checklist and log sheet for the Land Use and Soil Management Plan is given below. The parameters have been determined by following IEE and later finalized from guidance of Power Grid.

Table 65: Bi-Annual Checklist for Land Use and Soil Management (Quantitative Aspects)

Parameters	Value	Unit	Compliance Status	Comments
Soil Quality				
pH		-		
K (Potassium)		mg/kg		
N (Nitrogen)		mg/kg		
P (Phosphorus)		mg/kg		
Cu (Copper)		mg/kg		
Zinc (Zn)		mg/kg		
Iron (Fe)		mg/kg		
Arsenic (As)		mg/kg		
Calcium (Ca)		mg/kg		
EC		µS/cm		
Lead (Pb)		mg/kg		

[17] According to IEE

- Laboratory analysis of the river bed materials to be confirmed prior to starting collection from the river by existing licensed suppliers.
- Prevention of spillage and leakage of liquids at construction sites and camp.
- Ensure no use of transformers containing PCB to avoid soil and air pollution. Oil storage in drums stored on impermeable surface with 100% bunded capacity.

D ANNEX: WATER RESOURCES MANAGEMENT PLAN

D.1 Importance

222. A water resource management plan is crucial for transmission line projects as it ensures the efficient and sustainable use of water resources throughout the construction and operation phases. The plan typically involves identifying potential water sources along the transmission line route, assessing the quantity and quality of available water, and developing strategies to minimize water use and waste. By implementing a water resource management plan, the project can reduce water consumption and waste disposal costs, while also protecting local water bodies and ecosystems and complying with regulatory requirements. Additionally, the plan enhances site safety and productivity by mitigating the risk of water-related accidents and the spread of waterborne diseases during construction activities, such as excavation, foundation work, and concrete pouring for transmission towers.

D.2 Relevant Legislations

223. The following legislations are applicable to the project which are discussed as below:

i. Environment Conservation Act, 1995 (amendments in 2000, 2002 & 2010):

"Framing of standards for air, water and noise quality, Formulation of guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment.

Amendment 2010 - This Act aims to provide for further amendments to the Bangladesh Environment Conservation Act No. 1 of 1995. Amendments regulate and give new definition to several aspect of the original Act, such as: wetland"

ii. The Protection and Conservation of Fish Act 1950 (subsequent amendments in 1982)

"Protection and conservation of fish in Government owned water bodies"

iii. Bangladesh Water Act 2013

- "Right to water
- Adoption of National Water Policy and National Water Resources Plan
- Clearance Certificates
- Water Stressed Areas and Safe Yield
- Restricting abstraction, Protection Orders and Compliance Order
- Right to information and false information
- Water resource protection / pollution control and water quality standard"

iv. Water Supply and Sanitation Act, 1996

"Management and Control of Water Supply and Sanitation in Urban areas"

v. National Water Policy, 1999:

This policy emphasizes integrated water resources management (IWRM), focusing on the sustainable use of water, equitable access, and the protection of water ecosystems.

vi. Bangladesh Water Resources Planning Act, 2000:

This act outlines the framework for water resources planning and management in Bangladesh, emphasizing coordinated development among different sectors

vii. **The Bangladesh Water Rules 2018**:

It is suitable for a Water Resource Management Plan as it provides a comprehensive framework for sustainable water management, including guidelines for water use, conservation, and pollution control. The rules establish water quality standards, promote the sustainable use of resources, and require licensing for water extraction, ensuring compliance with legal standards. They emphasize stakeholder engagement and align with integrated water resource management (IWRM) principles, facilitating community involvement and addressing conflicts related to water usage. By incorporating these elements, the rules support effective management practices that protect local water resources during construction projects.

D.3 Objectives and Scope

224. The main objectives and scope of the Water Resource Management Plan for the transmission line project are:

- To ensure the efficient and sustainable use of water resources during construction and maintenance activities.
- To minimize water, use and waste throughout the project lifecycle.
- To meet all relevant regulatory requirements related to water management.
- To ensure the safety of workers and the public by reducing the risk of water-related accidents.
- To reduce the overall costs associated with water consumption and waste disposal.

D.4 Sources of Contamination

225. Potential sources of water contamination during the transmission line project include:

- Construction Activities: Various materials and chemicals used during construction, such as fuels and paints, can mix with water.
- Soil Erosion: Erosion caused by excavation and land clearing can lead to sedimentation, increasing suspended solids in nearby water bodies.
- Improper Waste Disposal: Illegal dumping of waste materials can contaminate local water resources.
- Accidental Oil Spills: Spills from machinery and equipment can introduce harmful substances into water bodies.
- Inadequate Wastewater Treatment: Ineffective treatment of wastewater generated on-site can lead to contamination of nearby water sources

D.5 Potential Receptor

226. During the construction, operation, and maintenance of a transmission line, various environmental and social receptors may be impacted. These receptors include natural ecosystems, human settlements, public infrastructure, and sensitive areas that may experience physical, ecological, health, or socio-economic effects due to project activities. The table below identifies specific receptors and justifies their relevance to the project, ensuring that potential risks and necessary mitigation measures are clearly outlined.

Table 66: Potential Receptors and Justification

Receptor	Specific Examples	Justification
Water Bodies	Rivers, Lakes, Ponds, Canals	Risk of water contamination from soil erosion, construction debris, and accidental oil or chemical spills. Overhead lines may also pose collision risks to migratory birds.
Project Workers	Site Engineers, Linemen, Construction Laborers	Direct exposure to electrical hazards, high-voltage equipment, and risks from working at heights, requiring strict adherence to safety measures.
Adjacent Residential Areas	Villages, Housing Complexes near the Right-of-Way (ROW)	Potential disturbances from EMF exposure, noise, dust, and temporary access restrictions. Land acquisition for towers may also affect property owners.
Educational Institutions	Schools, Colleges, Madrasas	Proximity to transmission lines may pose safety risks. Construction activities can cause noise disturbances, affecting learning environments.
Healthcare Facilities	Hospitals, Clinics, Community Health Centers	Requires a stable power supply; construction noise, dust, and EMF exposure may impact patient recovery and healthcare operations.
Local Markets	Wholesale and Retail Markets, Bazaars	Potential disruptions to commercial activities due to road closures, dust, and temporary power interruptions during construction.
Public Spaces	Parks, Playgrounds, Community Halls	Construction activities may limit recreational use, and transmission towers could alter aesthetics and usability.
Agricultural Land	Crop Fields, Irrigation Channels	Possible crop loss and land-use restrictions due to tower installations, impacting farmers' productivity. Heavy machinery may also lead to soil compaction.
Industrial Zones	Factories, Textile Mills, Manufacturing Hubs	Transmission line routing should avoid interference with industrial operations. Power reliability is critical for production, and disruptions can cause financial losses.
Wildlife Corridors	National Parks, Protected Areas, Bird Migration Routes	Overhead lines may pose electrocution and collision risks to birds and wildlife. Careful tower placement and mitigation measures such as bird diverters are necessary.
Cultural and Religious Sites	Mosques, Temples, Heritage Sites	Construction should avoid visual, structural, or cultural impacts on religious and heritage sites. Respect for traditional sensitivities is necessary.
Transport Infrastructure	Highways, Railways, Bridges	Transmission lines must comply with clearance regulations to ensure they do not interfere with transport operations or cause safety hazards.

Receptor	Specific Examples	Justification
Sensitive Populations	Elderly, Children, Persons with Disabilities	These groups are more vulnerable to noise, air pollution, and EMF exposure, requiring additional safeguards in residential or public spaces.

D.6 Assessment Procedure

227. The existing water quality of the project area will be monitored quarterly. The major water pollutants viz. pH, Turbidity, Mn, Fe, As, EC, FC, Chloride, Ammonia, BOD5, COD, TDS, TSS, DO, Total Coliform, Oil & Grease will be measured based on the requirements from POWER GRID. Groundwater samples and Surface water samples will be collected to understand the existing condition of the water quality of the both construction sites and the ambient environment. The sampling locations are considered based on the nearest receptors and the occupational health and safety issues in the construction site and accommodation site.

D.7 Environmental Impacts, Mitigation and Management Plan

228. The construction can induce significant environmental impacts, but appropriate management and mitigation measures will reduce/control/minimize the impacts. The contractor will take all necessary mitigation measures for the protection of the water resources and the existing environment to comply with all the legislation, the contract requirements. The potential environmental impacts and mitigation measures are oriented in below table:

Table 67: Potential Impact with Management Plan for the Water Resources

Issues	Remedial Measures	Implementation
Groundwater contamination from fuel/oil spills	❖ Prevent spills, store fuel away from water sources, and use containment measures	Contractor
Water contamination from improper waste handling	❖ Implement a waste management plan for segregation, recycling, and proper disposal of hazardous materials	Contractor
Water pollution from cement runoff or improper disposal	❖ Use contained mixing areas and treat wastewater before discharge	Contractor

D.8 Monitoring Program

Table 68: Water Resources (Surface and Ground Water) Quality Monitoring Program during construction period

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
To Monitor Ground water quality parameters	Quarterly	In the Project area. The actual location, date and time of sampling will be determined by the site manager.	Complete data table, GPS coordinates, test Report shall be submitted by HCLK to POWER GRID.	Keep updated of the maintenance record	Contractor
All wastes and effluents to be disposed in accordance with existing waste water disposal regulations.	Daily basis	Project site	Photographic evident, records	Keep updated of the maintenance records	Contractor

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
To monitor surface quality parameters	Quarterly	In the Project area. The actual location, date and time of sampling will be determined by the contractor	Complete data table, GPS coordinates, test Report shall be submitted by HCLK to POWER GRID.	Keep updated of the maintenance record	Contractor
No vehicles or equipment should be parked or washed near existing surface water body	Daily basis	Project site	Monitoring records	Keep updated of the monitoring records	Contractor

D.9 Capacity of Equipment and Manpower

229. The contractor has a dedicated environmental team at the project site to manage environmental issues and implement an environmental management plan. The environmental and health safety team will inspect and mitigate water resources pollution issues on regular basis according to the water resources management plan. The environmental team will visit the construction sites bi-annually to identify environmental issues comprising water pollution and suggest mitigation measures. To monitor water resources pollution issues besides monthly visual observation and mitigation measures, quarterly water quality assessments will be done at selected sites based during construction activities. Water quality monitoring devices such as pH meter, AAS, multimeter, MFM will be used for water quality testing via authorized laboratory.

D.10 Training

230. The workforce and management will get training as the environmental training schedule for the awareness of water resource pollution and management. Staff will complete and sign an attendance sheet for all courses attended, including the toolbox talks training.

231. Workforce training on several environmental managements will be conducted as per training schedule and all records, including the attendance sheets, will be held in a central location by the Contractor and made available during any audit conducted as part of the audit program. Water pollution sources, impacts and management measures will be included in the environmental training.

D.11 Review and improvements

232. This **Water Resources Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts.

233. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID

D.12 Checklist and Log Sheets

Table 69: Bi-Annual Water Resources Management Checklist (Quantitative Aspects)

Parameters	Value	Unit	Compliance Status	Comments
Surface Water Quality				
COD		mg/L		
BOD_5		mg/L		
pH		-		
Oil and grease		mg/L		
DO		mg/L		
TSS		mg/L		
Turbidity		NTU		
TDS		mg/L		
NH_3		mg/L		
Total coliform		CFU/100 mL		
Groundwater Quality				
pH		-		
Arsenic (As)		mg/L		
Electric Conductivity (EC)		µS/cm		
Iron (Fe)		mg/L		
Turbidity		NTU		
Mn		mg/L		
EC		us/cm		
Cl^-		mg/L		
Coliform (Faecal)		CFU/100 mL		

234. The selected water quality parameters for testing in both surface water and groundwater have been carefully chosen to reflect the environmental impacts associated with the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP). These parameters are key to assessing potential contamination from construction activities, including excavation, runoff, and waste disposal. COD (Chemical Oxygen Demand), BOD5 (Biochemical Oxygen Demand), and TSS (Total Suspended Solids) are monitored to evaluate organic pollution and oxygen depletion in nearby water bodies. Parameters like pH, DO (Dissolved Oxygen), and Turbidity are essential for understanding the overall water quality and its suitability for aquatic life. Oil and Grease, Ammonia (NH3), and Total Coliform levels are tested to monitor possible industrial contamination during construction activities. For groundwater, Arsenic, Iron, and Manganese are specifically checked due to regional concerns over groundwater contamination and the project's potential impact on local water supplies. The selected parameters ensure comprehensive monitoring of water quality, in line with the project's environmental safeguards, and allow for early detection of contamination risks that could affect both the construction process and the surrounding communities.

E ANNEX: ECOLOGICAL RESOURCES (FLORA AND FAUNA) MANAGEMENT PLAN

E.1 Importance

235. An Ecological resource (flora and fauna) management plan is important for construction sites because it helps to ensure compliance with environmental regulations, reduce environmental impacts, protect endangered species, mitigate risks to human health and enhance sustainability. This plan outlines the strategies and measures that must be implemented to manage and protect ecological resources within the construction site, making it an essential tool for managing and protecting ecological resources during the construction activities.

E.2 Relevant Legislations

i. The Forest Act, 1927 (subsequent amendments in 1982 and 1989)

"Categorization of forests as reserve, protected and village forests"

ii. Bangladesh Wild Life (Preservation) Act, 1974

"Preservation of Wildlife Sanctuaries, Parks, and Reserves"

iii. The Protection and Conservation of Fish Act 1950 (subsequent amendments in 1982)

"Protection and conservation of fish in Government owned water bodies"

iv. National Biodiversity Strategy and Action Plan (2004)

- "Conserve, and restore the biodiversity of the country for wellbeing of the present and future generations;
- Maintain and to improve environmental stability for ecosystems;
- Ensure preservation of the unique biological heritage of the nation for the benefit of the present and future generations;
- Guarantee the safe passage and conservation of globally endangered migratory species, especially birds and mammals in the country; and
- Stop introduction of invasive alien species, genetically modified organisms and living modified organisms"

E.3 Objectives and Scope

- Appropriate site selection for construction activities and protect and conserve the environment;
- Conducting environmental assessment to identify and minimize potential impacts of construction activities on the ecological resources;
- Compliance with regulations;
- Preserving biodiversity by protecting and conserving habitats for plants and animal species;
- Promote sustainability

E.4 Sources of Impacts

Table 70: Ecological Impact Sources & Potential Effects on Flora and Fauna

Source of Impact	Remarks
Land use change	Clearing vegetation and altering landscapes for tower construction can lead to habitat loss and fragmentation, affecting terrestrial flora and fauna.
Air and noise pollution	Emissions from machinery and high noise levels can disturb animal behavior, particularly breeding and feeding patterns in wildlife.
Water pollution	Runoff from construction sites, including fuel or chemical spills, can contaminate nearby water bodies, harming aquatic plants and animals.
Habitat fragmentation and loss	Installation of access roads and towers can divide habitats, making it difficult for species to migrate, breed, or find food.
Cultural heritage destruction	While primarily social, disturbance in culturally significant ecological zones (e.g., sacred groves) can disrupt protected biodiversity pockets.
Increased traffic	Movement of heavy machinery and vehicles can compact soil, damage vegetation, and disturb wildlife corridors.

E.5 Potential Receptor

Table 71: Sensitive Ecological Receptors and Anticipated Project Impacts

Ecological Receptor	Remarks
Natural habitats	Project activities may lead to destruction or degradation of forests, wetlands, or vegetative zones essential for biodiversity.
Aquatic life in nearby water bodies	Potential runoff of sediment, oil, or construction materials could degrade water quality and disrupt fish breeding cycles.
Migratory bird flyways	Towers and overhead lines may obstruct traditional bird flight paths, increase collision risks and alter migration patterns.
Native flora	Vegetation removal for access paths and tower bases can threaten native plant species, especially if not replanted or restored.
Terrestrial wildlife	Increased noise, human presence, and habitat loss may cause animals to relocate or experience stress, impacting their populations.
Soil organisms and microhabitats	Excavation and land compaction may disturb underground biodiversity, affecting nutrient cycling and soil health

E.6 Assessment Procedure

236. Assessing the ecological (flora and fauna) resource management for the transmission line project is an essential step towards ensuring that the project is sustainable and environmentally responsible. The following are some of the assessment procedures that can be used to evaluate the ecological resource management:

- Conducting Ecological Survey which involves mapping out the different plant and animal species in the project area, identifying their habitats, and assessing their population sizes.
- Identify Key Ecological Features: After conducting the ecological survey, identify the key ecological features that need to be protected during the Transmission Line project. These features could be important habitats, migration routes, breeding sites, and rare or endangered species.
- Develop an Ecological Management Plan: Based on the ecological survey and identification of key features, develop an ecological management plan for the project. The plan should outline the measures to be taken to protect and manage the ecological resources during the construction period.
- Implement the Environmental Safeguards activities such as erosion and sediment control measures, stream crossings, and wildlife corridors.
- Monitoring and evaluating the ecological management plan are critical to ensure that the measures put in place are effective in protecting the ecological resources during the construction period of the project.

E.7 Environmental Impacts, Mitigation and Management Plan

Table 72: Environmental Impacts, Mitigation and Management Plan

Issues	Remedial Measures	Refers to Laws/Guidelines	Location	Monitoring Indicators (MI)/Performance Target (PT)	Monitoring Methods	Implementation
Terrestrial and aquatic flora and fauna loss due to site preparation and construction activities	The Contractor will ensure the following- • Only the bare minimum trees to be felled from the total impacted trees. All attempts shall be taken to save tree felling like saving trees impacted at the toe line, avenue plantation areas or other less-essential areas during construction. • Transplantation or shifting of small plants <30cm dia to be attempted before felling ensuring its highest rate of survival. • Limit the construction works to within proposed RoW of Project and minimize use of land/wetland outside of the RoW. • Mandatory compensatory planting of at least 368 will be carried out as agreed to among POWER GRID, DoF, NGO and local communities and regular nursing. • Prohibit the use of any herbicides or fungicides or any other toxic substances especially during monsoon for clearing and grubbing of sites.	The Forest Act (1927), the Forest (Amendment Act 2000)	Project Location	MI: Number of trees Replanted as per plan and survival rate. PT: Additional compensatory afforestation done by contractor	Review of relevant documents – tree cutting permit, compensatory plantation plan and additional plantation strategy Field observations	Contractor
Terrestrial and aquatic flora and fauna loss due to	• Prohibit hunting of any bird, particularly vultures, species or damaging its nesting habitat to be avoided to the extent possible during tree felling. • Undertake Vetiver (grass) planting on the embankment slope to prevent embankment soil erosion.	The Forest Act (1927), the Forest (Amendment Act 2000)	Project Location	MI: Number of trees Replanted as per plan and survival rate. PT: Additional compensatory afforestation done by contractor	Review of relevant documents – tree cutting permit, compensatory	Contractor

Issues	Remedial Measures	Refers to Laws/Guidelines	Location	Monitoring Indicators (MI)/Performance Target (PT)	Monitoring Methods	Implementation
	• Prohibit use trees in construction camp as fuel source					
	• Plantation of trees on both sides of the road where technically feasible will be done through Tree Plantation Plan of Social Forestry Program					
	• Fish migration route and spawn seasons should be considered during construction works particularly for bridges to control the damage of the fish resources.					
	• Prohibit killing or disturbing any wildlife or dolphin or turtles found during construction of bridges over big rivers.					
	• Coordinate with the Vulture Safe Zone Program on afforestation and awareness efforts					

E.8 Monitoring Measures

237. The following table outlines key ecological mitigation measures to be implemented during the project, focusing on tree protection, wildlife conservation, and minimizing impacts on migratory birds and aquatic ecosystems.

Table 73: Monitoring Measures

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
Trees felling, Compensatory plantation, Maintenance and survival rate	As suggested by POWER GRID	In the Project area	Complete data table, GPS coordinates, test Report shall be submitted to the POWER GRID	Keep updated the record	Contractor
Limiting the construction works within the row	As suggested by POWER GRID	Row	Reports shall be submitted to POWER GRID	Keep updated of the record	Contractor
Ensuring the use of no wood as fuel	As suggested by POWER GRID	In the Project area	Reports shall be submitted to POWER GRID	Keep updated of the maintenance record	Contractor
Restrict dumping and storage of wastes close to trees	As suggested by POWER GRID	In the project area	Reports shall be submitted to POWER GRID	Keep updated of the records	Contractor
Avoid planting of invasive species	As suggested by POWER GRID	Project site	Reports shall be submitted to POWER GRID	Keep updated of the records	Contractor
Replantation program	As suggested by POWER GRID	Project site	Reports shall be submitted to POWER GRID	Keep updated of the records	Contractor
Disturbance of migratory bird at construction area	As suggested by POWER GRID	Construction area	Reports shall be submitted to POWER GRID	Keep updated of the record	Contractor

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
Avoiding tree feeling during breeding, nesting & foraging period of bird	As suggested by POWER GRID	Project site	Reports shall be submitted to POWER GRID	Keep updated of the records	Contractor
Fishing production, Consideration of fish migration routes & spawn seasons	As suggested by POWER GRID	Water bodies nearby Project site	Reports shall be submitted to POWER GRID	Keep updated of the records	Contractor

E.9 Ecological Survey

Ecological Profile of the Area

238. A baseline environmental study was conducted in the area which is located in Kaliganj, Gazipur District. The ecological survey was conducted around the Transmission Grid Expansion project site to understand the current condition of the environment before project activities begin. The ecological environment consists of both non-living elements—such as climate, soil type, salinity, and water availability—and living elements, including sources of food, presence of predators or parasites, and other animals of the same species. So, the study aimed to collect detailed information about the local physical features (like land and water), biological features (such as plants and animals). It also included gathering local people's opinions about the proposed project. This section focuses on the existing biological environment of the project area. It presents findings on the types and locations of plants and animals found during the baseline survey. This information helps in understanding how the project may affect local biodiversity and will be used to plan necessary protection and management actions.

Objectives

239. The ecological survey in the project area was conducted to ensure that transmission line construction activities are aligned with biodiversity conservation objectives. It focused on identifying key habitats, understanding species distribution, and mitigating ecological risks arising from the project.

- Assess the existing ecological environment, including flora, fauna, and aquatic species, to identify potential risks and inform mitigation measures.
- Evaluate the socio-economic conditions of local communities, including their perceptions and concerns regarding the project’s impact.
- Gather baseline data on the distribution of plant and animal species to guide the development of biodiversity conservation strategies.
- Ensure compliance with environmental and social safeguards, national laws, and international standards for sustainable project implementation.

Technical Approach and Data Sets

Study Area

240. The selected study area is **Kaliganj in Gazipur District, Bangladesh**, chosen primarily for the implementation of the project. Its close proximity to Dhaka city further increases developmental pressures and makes it a strategic location for transmission grid expansion initiatives. Geographically, Gazipur is situated at **23° 59' 59.7876'' N latitude and 90° 25' 12.9828'' E longitude**. To conduct ecological survey, five sites has been visited near the project area Kaliganj to understand the ecological condition of the project surroundings. The project is located nearest border

Methodology

A checklist has been developed to identify the distribution and abundance of flora and fauna including fish species, and to make an assessment of the impacts for the Project activities on the ecological environment. These concentrated among others, on the wildlife (reptiles, amphibians, mammals and birds), separately on fishes and a floral species (Grass, shrubs, and timber/fruits, fruits. The total forest area of the Upazila is 35 hectors. The methods of ecological survey,

On-site Data Collection	Off-site Data Collection
➢ Direct Field Observation during daylight hours for most fauna. ➢ Random Day Observations for nocturnal birds, reptiles, and mammals. ➢ Cameras was used for distant and clear identification.	➢ Interviews with Local People using pictorial questionnaires to gather information on nocturnal and elusive wildlife. ➢ Habitat Utilization data were recorded by categorizing microhabitats like tree branches, water bodies, bushes, crop fields, etc. ➢ Lastly previous published research paper has been reviewed to get a holistic view.

Biological Resources of Kaliganj, Gazipur District

Table 74: Bio-Ecological Zone of the Project

Features	*Bio-Ecological Zone*
Physiography	**Madhupur Sal Tract** (Bio-ecological Zone-3)
Soil	Madhupur Red Soil Tract
Rainfall	**Annual 2030 to 2290 mm**
Temperature	Maximum 34℃, Minimum 11℃
Forest Area	**35 hectares**

Table 75: Information of Species in Bio-Ecological Zone of the Project

Category	Details
Total Vascular Plant Species	117 species
Total Genera	108 genera
Total Plant Families	47 families
Dicotyledons	97 species
Monocotyledons	18 species
Pteridophytes	2 species
Herbs	71 species (60.7%)
Shrubs	21 species (17.9%)
Climbers	13 species (11.2%)
Tree Seedlings	12 species (10.2%)
Top Plant Families (with species count)	Asteraceae (10), Euphorbiaceae (7), Poaceae (7), Fabaceae (7), Araceae (6)

Category	Details
Habitat Types	Forest edges, agricultural boundaries, wetlands, bushy/fallow lands
Ecological Characteristics	High undergrowth, native diversity, ecological resilience

Terrestrial Flora and Fauna

Flora

The project is in a rural setting with greenery. This includes homesteads horticulture, roadside forest, natural vegetation, and crops. Besides highland (elevated) afforestation and homesteads, the remaining area is mostly lowland and generally interconnected with certain manmade barriers and pakka roads here and there. Due to roadside plantation and certain homestead forests, the area is rich in floral diversities. Different fruit, and fuelwood trees along with various shrubs are abundant. Among the trees, the most widely available ones are Shilkoroi, fulkoroi, Shimul, etc. Also, there are some fruit trees such as Mango, Coconut, Jackfruit, Beetle nut, guava, starfruit, Amra, etc.

Trees

Coppice sal (*shorea robusta*), garjan (*Dipterocarpus turbinatus*), sheel koroy (*Albizzia procera*), kadam (*Anthocephalus cadamba*), ajuli (*Dillenia pentagyma*), jarul (Legerstroemia speciosa), banian tree (*Ficus benghalensis*), ashwatha (*Ficus religlosa*), bahera (*Terminalia bellirica*), haritaki (*Terminalia chebula*), black berry (*Syzygium cumini*), neem (*Azadirachta indica*), kanchan (*Bauhinia variegate*), sonalu (*Cassia fistula*), minjiri (*Cassia siamea*), kumbhi (*careya arborea*), mango (*Mangifera indica*), amra (*Spondias mangifera*). Amloki (*Phyllanthus emblica*), bonboroi (*Zizyphus rugosa*), sinduri (*Mallotas philippensis*), ashoka (*Saraca indica*), sheora (*Streblus asper*), gab (*Diospyros precatorius*),mahaneem(*Garugapinnata*), Woody climber (*spatholobus roxburghii)* etc.

Shrubs

kul (*Zizyphus mauritiana*), kumarika (*Smilax aspera*), gach alu (*Dioscorea sp*), wood (*Fordia fruticosa*) etc.

Herbs

Bailly Great Weed (*Ageratum conyzoides*), Spinach (*Basella alba*), Ash/White Gourd (*Benincasa hispida*), Soap Bush (*Calibanus hookeri*), Coriander (*Coriandrum sativum*), Pumpkin (*Cucurbita maxima*), Tomato (*Lycopersicon esculentum*), Hatisur (*Heliotropium indicum*), Water Spinach (*Ipomoea aquatica*).

Homestead Plants

Various types of commonly planted trees like mango (*Mangifera indica*), jackfruit (*Artocarpus heterophyllus*), kalojam (*Syzygium cumini*), betelnut pulm (*Areca catechu*), coconut palm (*cocos nucifera*), guava (*Psidium guajava*), jambura (*Citrus decumana*), mandar (*Erythrina veriegata*), kadam (*Anthocephalus cadamba*), sheel koroy (*Albizzia procera*), sajna (*Moringa obifera*), dalim (*Punica granatum*), palash (*Butea monosperna*) etc.

Agricultural or Crop Vegetation

Various types of agricultural crops are grown in the district. Among cereal crops, boro covers the largest area followed by aman, aus and wheat mixed aus and aman are also grown. Other crops include jute (*Corchorus*), mesta, mustard (*Brassica nigra*), vegetables and spices, sesame (*Sesamum indicum*), sugarcane (*Saccharum officinarum*), pineapple (*Ananascomosus*), guava (*Psidium guajava*) etc. Jack-fruit (*Artocarpus heterophyllus*) is extensively grown and is an important cash crop.

Road Side Plants

Common way side trees are tetul (*Tamaraindus indica*), neem (*Azadirachta indica*), hijol (*Barringtonia acutangula*), banyan (*Ficus bengalensis*), ashatha (*Ficus religlosa*), raintree (*Samanca saman*), pitraj (*Aphanamixls polystachia*), Simul (*Bobbax ceiba*), krishnachura (*Delonix regia*), debdaru (*Polyalathia longifolia*) etc.

Common terrestrial flora in the project area includes Coppice sal (*shorea robusta*), garjan (*Dipterocarpus turbinatus*), sheel koroy (*Albizzia procera*), Mango (*Mangifera indica*), Raintree (*Samanea saman*), etc. Three types of terrestrial floral habits - tree, shrub, and herb exist in the project area. Floral species particularly trees and shrubs are cultivated and ported and these have commercial values

Table 76: Identified Terrestrial Flora in the Study Area

SL. No.	Scientific Name	Family Name	Native Name
1	*shorea robusta*	Dipterocarpaceae	Sal
2	*Dipterocarpus turbinatus*	Dipterocarpaceae	Garjan
3	*Albizzia procera*	Fabaceae	Sheel Koroy
4	*Dillenia pentagyma*	Dilleniaceae	Ajuli
5	*Ficus benghalensis*	Moraceae	Banyan
6	*Ficus religlosa*	Moraceae	Bodhi
7	*Terminalia chebula*	Combretaceae	Haritaki
8	*Syzygium cumini*	Myrtaceae	Kalo jam
9	*Azadirachta indica*	Meliaceae	Neem
10	*Cassia fistula*	Leguminosae	Sonalu
11	*Mangifera indica*	Anacardiaceae	Am
12	*Smilax aspera*	Smilacaceae	Kumarika
13	*Fordia fruticosa*	Lythraceae	Dhataki
14	*Mallotas philippensis*	Euphorbiaceae	Sinduri
15	*Cassia siamea*	Leguminosae	Minijiri



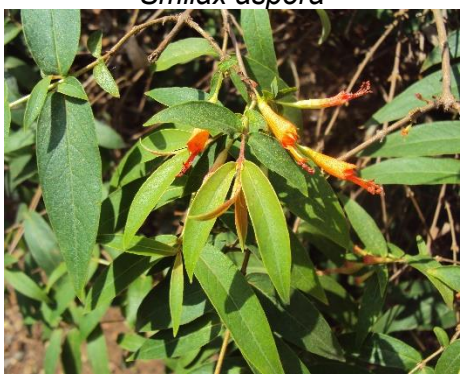
Cassia fistula



Smilax aspera



shorea robusta



Fordia fruticosa



Cassia siamea



Mallotas philippensis

Figure 13: Terrestrial Flora Diversity

Fauna

Mammals

With the ruthless destruction of forests in the Modhupur tract (Bhawal Garh), most of the wild animals have disappeared from this area. However, some animals belonging to mammalian fauna are still found in the Gazipur district. They are rhesus monkey (*Macacamullata*), wild boar (*Sus scrofa*), hispid hare (*Caprolagus hispidus*), jungle cat (*Felis chaus*), flying fox (*Pteropus giganteus*), shortnosed fruit bat (*Cynopterus spinx*), jackal (*Canis aureus*), common otter (*Lutra perspicillata*), common mongoose (*Herpestes edwardsi*), house mouse (*Musmusculus*), common house rat (*Bandicota bengalensis*), Indian porcupine (*Hystrix indica*), etc.

Amphibians & Reptiles

Reptiles that are commonly found in this district are peacock soft shell (*Trionyx hurum*), roofed turtle (*Kachuga tecta*), house lizard (*Hemidactylus frenatus*), shundh (*Gekko gecko*), bengal grey lizard (*Varanus bengalensis*), yellow speckled wolf snake (*Lycodonjara*), checkered keelback (*Xenochrophis piscator*), rat snake (*Ptyas nigromarginatus*), common smooth water snake (*Enhydris enhydris*), common krait (*Bungarus cacruleus*), banded krait (*Bungarus fasciatus*) etc. Amphibians are not rich in species but very much in numbers. Common amphibian includes Indian bull frog (*Rana trgerina*), skipper frog (*Rana cyanophlyctis*), cricketfrog (*Ranalimnocharis*), commontoad (*Bufomelanostictus*), ballonfrog (*Uperodonglobulosus*).

Aves

Different species of birds that are commonly found in this district are little cormorant (*Phalacrococan niger*), pond heron (*Ardeola grayii*), white breasted water hen (*Amaurornis phoenicurus*), spotted dove(*Streptopelia chinensis*), redbreasted parakeet (*Psittacula alexandari*), roseringed parakeet (*Psittacula enpatria*), koel (*Eudynamis scolopacea*), spotted owlet (*Athenebrama*), barn owl (*Tyto alba*), house swift (*Apus affinis*), whitebreasted kingfisher(*Helcyonsmyrnensis)*, green bee-eater (*Merops orientalis*), lesser golden backed Woodpecker (*Picusmyrmecophoneus*), black drongo (*Dicurus macrocercus*), greater racket-tailed drongo (*Dicrurusparadiseus*), common mayna (*Acridotheres tristis*), house crow (*Corvus splendens*), jungle mayna (*Acredotheres fuscus*), redvented bulbul (*Pycnotus cafer*), tailor bird (*Orthotomus sutorius*), magpie-robin (*Copsychus saularis*), shyama (*Copsychus malabaricus*), house sparrow (*Passerdomesticus*), weaver bird (*Ploceus phillippinus*), spotted munia (*Lonchurapunctulata*)etc.District Statistics 2011. Besides, different species of winter migrants that visit Bangladesh are also seen in the beel and char areas of the district. These include little ringed plover (*Charadrius hiaticus*), common sand piper (*Tringa hypoleucos*), common teal (*Anas crecca*), pintail (*Anas acuta*), common shelldduck (*Tadorna tadorna*), grey leg goose (*Anser anser*), common swallow (*Hirundo rustica*), large pariah kite (*Milvusmigrant lineatas*), brown shrike (*Lanius cristatus*), pied harrier (*Circus melenoleucos*), little stint (*Calidris minuta*), fantail snipe (*Gallinagogallinago)*, pintailedsnipe (*Gallinagostenura*), greywagtail (*Motacillacinerea*) etc.

Table 77: Identified Terrestrial Fauna in the Study Area

SL. No.	Scientific Name	English Name	Local Name
Class: Amphibia			
1	*Bufo melanostictus*	Common toad	Common toad
2	*Rana limnocharis*	cricketfrog	cricketfrog
3	*Uperodon globulosus*	Ballon frog	Indian Globular frog
Class: Reptilia			
1	*Kachuga tecta*	roofed turtle	Indian roofed turtle
2	*Varanus bengalensis*	bengal grey lizard	Indian Monitor
3	*Lycodon jara*	yellow speckled wolf snake	Wolf snake
Class: Aves			
1	*Eudynamis scolopacea*	koel	Koel
2	*Hirundo rustica*	common swallow	Common swallow
3	*Orthotomus sutorius*	tailor bird	Tuntuni

SL. No.	Scientific Name	English Name	Local Name
4	*Passer domesticus*	House sparrow	Charui
5	*Copsychus malabaricus*	shyama	Shyama
6	*Eudynamysscolopacea*	Asian cuckoo	Kokil
7	*Egrettagarzetta*	Little egret	Bok
8	*Gallus gallus*	Wild cock	Murgi
9	*Tringa hypoleucos*	common sand piper	Common sand piper
Class: Mammalia			
1	*Bostauras*	Cow	Goru
2	*Capra aegagrushircus*	Goat	Chagol
3	*Canis lupus familiaris*	Dog	Kukur
4	*Ovisaries*	Sheep	Bhera
5	*Bubalusbubalis*	Buffalo	Mohish
6	*Macacamullata*	rhesus monkey	rhesus monkey
7	*Herpestesedwardsii*	Mongoose	Beji
8	*Felis chaus*	jungle cat	Bon biral
9	*Sciuruscarolinensis*	Grey Squirrel	Kathbirali
10	*Mus musculus*	Mouse	Nengtiindur



Rana limnocharis



Lycodon jara



Tringa hypoleucos



Orthotomus sutorius



Copsychus malabaricus



Felis chaus



Pteropus giganteus



Macacamullata

Figure 14: Fauna Diversity

Aquatic Flora and Fauna

Aquatic Flora

Aquatic flora is divided into three major types - tree, shrub, and herb. Aquatic floral species grow in rivers, canals, ditches, seasonal wetlands, and low-lying agricultural lands in submerged, free-floating, or rooted floating states. Common aquatic floral species in the study areas include Water hyacinth - Eichhorniacrassipes, Khudipana - Lemnaperpusilla, and Kalmi - Ipomoea aquatic.

Table 78: Identified Aquatic Flora in the Study Area

Scientific Name	Family Name	Native Name
Alternanthera philoxeroides	Amaranthaceae	Helencha
Colocasia esculenta	Araceae	Katchu
Aponogeton natans	Aponogetonaceae	Ghenchu
Ipomoea aquatica	Convolvulaceae	Kalmi
Ipomoea fistulosa	Convolvulaceae	Dholkalmi
Enhydra fluctuans	Compositae	Helencha
Ceratophyllum dumersum	Ceratophytaceae	Jhanjhi
Hygroryza aristata	Gramineae	Phutki janglidhan
Hydrilla verticillata	Hydrocharitaceae	Janjhi, Kurcli
Vallisneria spiralis	Hydrocharitaceae	Patajhangi
Lemna perpusilla	Limnaceae	Khudipana
Nymphaea sp	Nymphaeaceae	Shapla
Eichhornia crassipes	Pontederiaceae	Kachuripana
Monochoria vaginalis	Pontederiaceae	Sarkachu
Fagopyrum hydropiper	Polygonaceae	Biskhatali
Utricularia aurea	Utriculariaceae	Jhangi



Colocasia esculenta



Ipomoea aquatic



Eichhornia crassipes



Fagopyrum hydropiper

Figure 15: Aquatic Floral Diversity

Aquatic Fauna

Fish is still reasonably available in the area, given the overall and increasing scarcity of fish in the country. Small fishes, which are very popular also in overall Bangladesh, are available, caught, and used widely, particularly during the early monsoon and pre-winter season. The fishes include catfishes (Magur and Shing), major carps (Katla, Rui, and Mrigal), minor carps (Puti), and others (Tengra, Boal, Mola, Taki, Shol). Also, prawns, particularly the popular small prawns, are locally known as Ichha, Wildlife, and Reptile



Tengra (*Mystus Tengara*)



Eel (*Anguilliformes*)



Rui (Labeo rohita)



Magur (Clarias batrachus)

Figure 16: Aquatic Faunal Diversity

E.10 Invasive Species Management Plan

241. Introduction and management of invasive species are key elements of biodiversity and ecological integrity conservation of the affected zones of the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP). Introduced invasive plants and animals would be highly detrimental to the indigenous ecosystem in that they typically dominate native species and leave permanent ecological damage. Since the project is so near to sensitive habitats and migratory corridors, it is essential that effective management controls are in place to prevent the introduction and dispersal of these types of species.

242. Asian Development Bank's (ADB) Biodiversity Action Plan puts at the forefront the avoidance, monitoring, and control of the invasive species, especially in the environmentally sensitive areas such as wetlands, forests, and wildlife corridors. In response, the plan outlines the project's specific strategy to avoid, manage, and mitigate against the risks of the invasive species with a vision that the project shall adhere to best environmental practices and to ADB's safeguards.

243. The following table summarizes the key aspects of the **Invasive Species Management Plan** (ISMP) for the project, outlining the strategies for controlling invasive species, monitoring their spread, and ensuring compliance with environmental and biodiversity protection standards.

Table 79: Invasive Species Management Plan

Sl. No.	Task/Activity	Action/Measure	Frequency	Responsible Party	Monitoring/Review
1	**Pre-Construction Survey**	Conduct a thorough ecological survey to identify and map invasive species along the project route.	One-time, before construction	Environmental Specialist (Contractor)	Review of survey data and mapping
2	**Control of Invasive Species in Construction Area**	Remove existing invasive plant species from the project area prior to construction. Use mechanical or manual methods for removal.	Pre-construction phase		Inspection of removal efforts and area clearance
3	**Selection of Non-invasive Plants for Plantation**	Use native species for all compensatory planting, ensuring no invasive species are introduced.	Ongoing, as planting occurs		Regular checks during planting and growth
4	**Monitoring of Invasive Species During Construction**	Monitor construction sites for the emergence or spread of invasive species, particularly in disturbed areas.	Bi-annually during construction		Site inspections and surveys for new invasive species
5	**Monitoring of Invasive Species After Construction**	Conduct post-construction ecological surveys to detect and control any regrowth of invasive species.	Post-construction phase		Annual review and corrective action if necessary
6	**Training and Awareness**	Train project staff, contractors, and local communities on identifying and preventing invasive species.	Quarterly		Attendance logs, training effectiveness assessment
7	**Waste and Material Management**	Prevent the introduction of invasive species through construction materials by sourcing certified materials free from contamination.	Ongoing during construction		Inspection of materials and procurement records
8	**Post-construction Habitat Restoration**	Ensure that habitat restoration efforts focus on non-invasive species, and any invasive species are removed.	Once during restoration		Final inspection and monitoring of restored habitats

E.11 Training

244. The workforce and management will get training as the environmental training schedule for the awareness of ecological resource management. Staff will complete and sign an attendance sheet for all courses attended, including the toolbox talks training.

245. Workforce training on several environmental managements will be conducted and all records, including attendance sheets, will be held in a central location by the Contractor's EMO and made available during any audit conducted as part of the audit program. Ecological resources, negative impacts on it and management measures will be included in the environmental training.

E.12 Review and improvements

246. This **Ecological Resources Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts.

247. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID. Where applicable, they will coordinate with relevant technical experts, government authorities, and local stakeholders to ensure proper implementation of the plan

E.13 Checklist and Log Sheets

Table 80: Bi-Annual Invasive Species Management Plan Monitoring Checklist

Actions to be Considered	Yes	No	Compliance Status	Comments
Flora Management				
Trees felling, Compensatory plantation, Maintenance and survival rate				
Turbidity Control				
Limiting the construction works within the row				
Ensuring the use of no wood as fuel				
Involving local community, NGO & Forest Department				
Restrict dumping and storage of wastes close to trees				
Avoid planting of invasive species				
Plantation of vetiver grass on the embankment slope, grass turfing & planting				
Replantation program				
Are disturbance to terrestrial flora minimized (e.g., plants to be preserved)?				
Fauna Management				
Disturbance of migratory bird at construction area				
Avoiding tree feeling during breeding, nesting & foraging period of bird				
Consideration of fish migration routes & spawn seasons				
Fishing production				
Controlling accidental spills & proper discharge of effluents from project offices, construction sites & labor camps				
Are disturbance to terrestrial fauna minimized (if rare species identified)?				

F ANNEX: MIGRATORY BIRD MANAGEMENT PLAN

F.1 Importance

248. Migratory bird movement management is crucial for transmission line projects because the installation of high-voltage lines can pose significant risks to avian species, particularly migratory birds. These birds often collide with power lines, leading to fatalities and disrupting their natural migration routes. Ensuring proper management helps to protect globally significant species, maintain biodiversity, and comply with conservation regulations. This plan plays an important role in reducing the risks associated with bird collisions, maintaining the ecological balance, and ensuring the sustainability of transmission line projects.

F.2 Relevant Legislations

i. Bangladesh Wild Life (Preservation) Act, 1974

"Protects wildlife, including migratory bird species, and restricts activities in designated protected areas."

ii. Convention on the Conservation of Migratory Species of Wild Animals (CMS)

"Bangladesh is a signatory, obligating the country to safeguard migratory species that cross its borders."

iii. National Biodiversity Strategy and Action Plan (2004)

"Emphasizes the conservation of biodiversity, including migratory species, and preventing habitat loss."

F.3 Objectives and Scope

F.3.1 Objective

- Protect migratory bird populations by mitigating risks of collision with transmission lines.
- Ensure the transmission line construction and operation are in harmony with migratory bird conservation efforts.

F.3.2 Scope

This plan will cover all areas where the transmission line crosses known migratory bird flyways and critical habitats, ensuring both construction and operational phases of the project mitigate impacts on bird movement.

F.4 Sources of Impacts

- **Transmission Line Structure**: Tall structures and wires create barriers to migratory birds, leading to potential collisions.
- **Lighting**: Illumination from construction sites and towers may disorient nocturnal migratory birds.
- **Noise Disturbances**: Construction-related noise can disrupt birds' migration behavior and navigation.

- **Vegetation Clearance**: Removing vegetation in migratory bird habitats may destroy nesting sites and rest areas.
- **Habitat Fragmentation**: The construction of access roads and other infrastructure may fragment bird habitats, affecting their migratory patterns.

F.5 Potential Receptor

249. In the context of the Kaliganj–Purbachal Transmission Line Project, several site-specific receptors have been identified that are sensitive to migratory bird movement. These receptors are situated within or near the project's right-of-way (RoW) and pose potential interaction points between the transmission infrastructure and avian species. The selection of these receptors is based on their ecological characteristics, proximity to known migratory corridors, habitat suitability, and field-level observations.

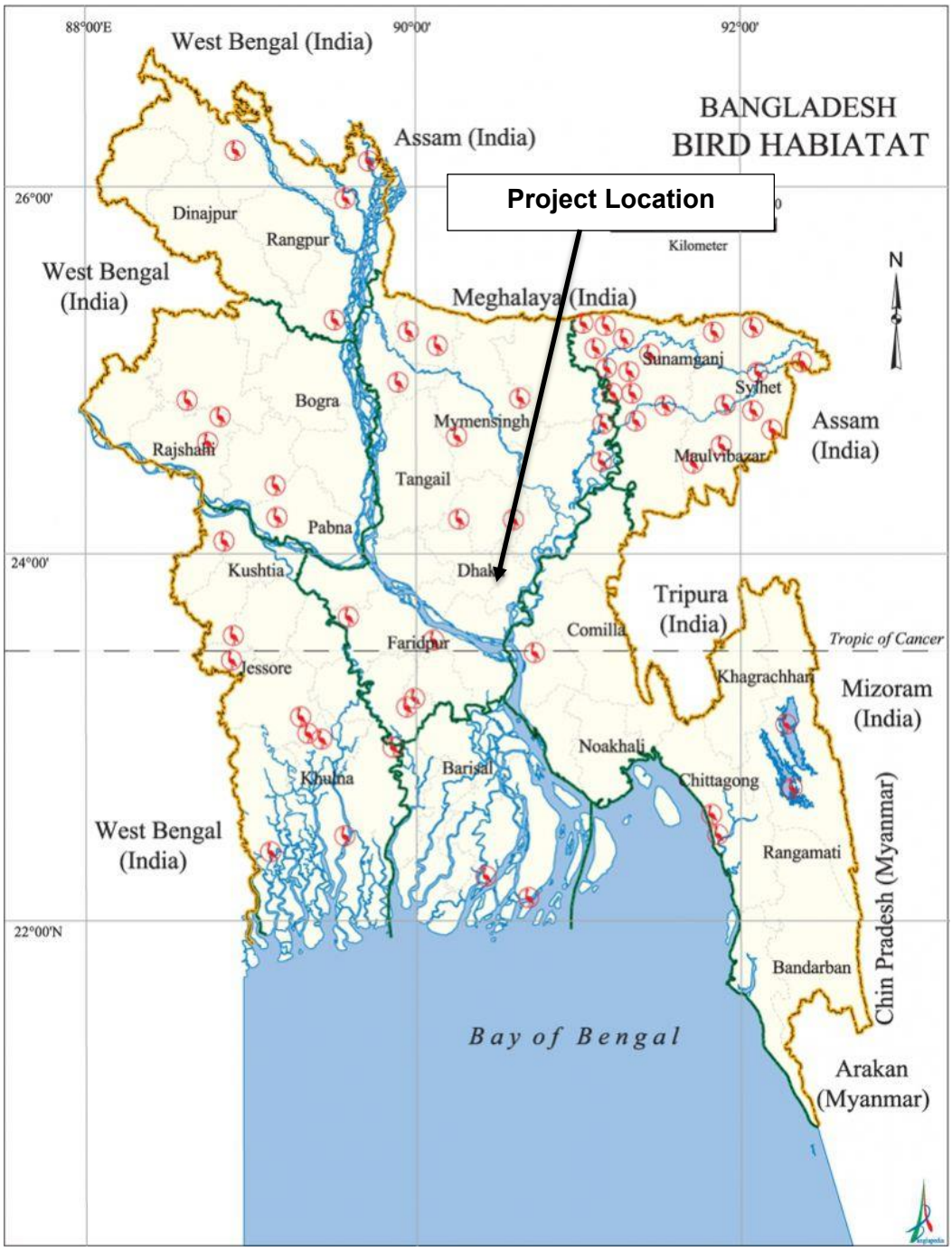
Table 81: Site-Specific Receptors Relevant to Migratory Bird Movement

Receptor Category	Site-Specific Receptors	Potential Risk
Wetlands / Seasonal Water Bodies	Low-lying floodplain pockets near Fuldi and Mohani areas (temporary water retention zones during monsoon)	These depressions serve as seasonal stopover and foraging habitats for migratory waterbirds such as herons, egrets, and sandpipers. Construction near these zones could lead to temporary habitat disruption or noise-related avoidance.
Open Agricultural Fields	Paddy and fallow fields between tower locations TL-07 to TL-12	These open fields are often used as resting or feeding grounds by migratory passerines and storks. Tower foundations and equipment storage in these zones may alter bird use patterns.
Vegetation Patches / Tree Lines	Roadside plantation strips near Bangali Govt. Primary School and Fuldi Bugpara Mosque	These linear vegetation zones provide perching, shelter, and possible roosting habitat during migration. Tree removal or disturbance near these areas could affect local and migratory bird behavior.
Community Ponds / Irrigation Canals	Small water bodies adjacent to tower alignments near Mohani Govt. Primary School	These man-made water sources attract waterfowl and waders during migration. Improper waste disposal or noise disturbance may degrade the attractiveness of these resources.
Existing Bird Movement Zones (Flyway Intersection)	General north–south flight corridor following the agricultural lowlands and seasonal water passages of the Kaliganj area	Based on ecological survey and regional flyway mapping, this section intersects secondary migratory routes, especially for small and mid-sized wetland-dependent birds. Collisions with wires or disorientation from lighting are potential risks here.

F.6 Assessment Procedure

- **Ecological Survey**: Conduct detailed surveys to identify migratory bird species, flight paths, and stopover sites in the project area, particularly during migration seasons.
- **Flyway Identification**: Map the main migratory routes (flyways) that overlap with the transmission line route and highlight high-risk collision areas.
- **Risk Assessment**: Evaluate the collision risk based on species, flight altitude, and behavior, using data from bird tracking studies or local ecological knowledge.
- **Impact Avoidance**: Modify the transmission line design where possible, considering alternatives like changing tower heights and placement to avoid critical flyways.
- **Plan Development**: Based on the survey data and risk assessment, develop a detailed mitigation plan for bird collision and habitat protection.
- **Monitoring and Evaluation**: Set up a long-term monitoring program during the construction and operational phases to assess the effectiveness of mitigation measures, including bird mortality tracking and seasonal observations.

F.6.1 Flyway Identification



Source: Banglapedia

Figure 17: Bird Habitat Map of Bangladesh

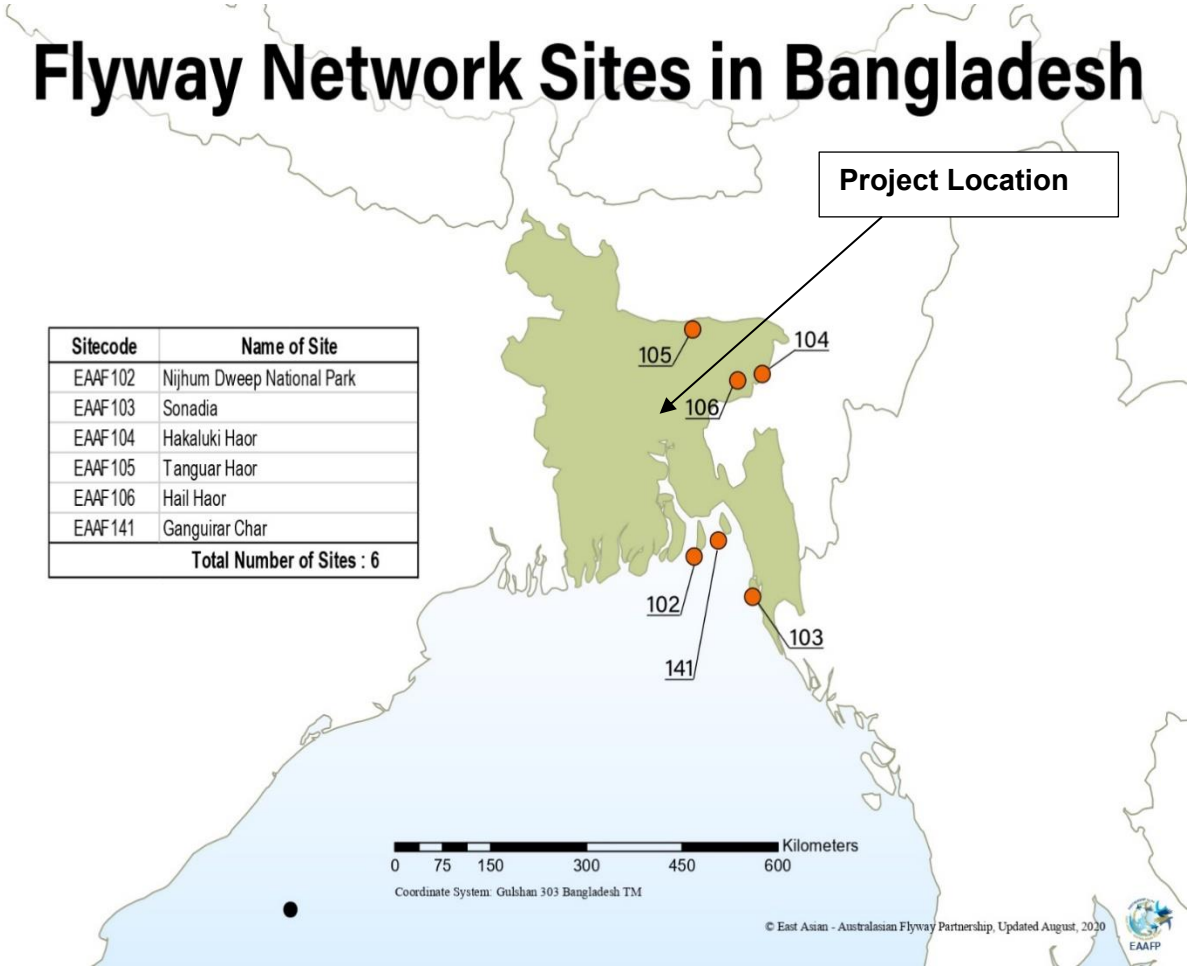


Figure 18: Flyway Network Sites of Bangladesh

250. Based on the provided maps, the project area of Kaliganj–Purbachal Transmission Line Project, is not situated within any designated bird flyway zone or critical bird habitat. The Bangladesh Bird Habitat Map shows that key habitats for migratory birds, such as wetlands and coastal areas, are primarily concentrated in the southern and southwestern parts of the country, including the Sundarbans and other riverine ecosystems. These habitats are far from the Gazipur region, indicating that the project site is not in close proximity to significant bird habitats.

251. Additionally, the Flyway Network Sites in Bangladesh map, which highlights critical migratory bird routes, shows that the designated flyway sites are located well to the south of Gazipur. Sites such as Nijhum Dwip National Park (EAFF102), Hakaluki Haor (EAFF104), and Tanguar Haor (EAFF105) fall far outside the project corridor. With no overlap between the project area and these critical bird flyways, it is clear that the construction and operation of the transmission line will not disrupt migratory bird routes or critical habitats.

252. Therefore, the project corridor area is not expected to have significant direct impacts on migratory birds, as it is not located within any identified flyway zones or key habitats.

F.7 Environmental Impacts, Mitigation and Management Plan

Table 82: Environmental Impacts, Mitigation and Management Plan

Issues	Remedial Measures	Refers to Laws/Guidelines	Location	Monitoring Indicators (MI)/Performance Target (PT)	Monitoring Methods	Implementation
Bird Collisions with Transmission Lines	- Install bird diverters (e.g., visual markers) on transmission lines to increase visibility. - Regular maintenance to ensure diverters and markers remain effective.	- Bangladesh Wild Life (Preservation) Act, 1974 - Convention on the Conservation of Migratory Species of Wild Animals (CMS) - National Biodiversity Strategy and Action Plan (2004)	Project route sections crossing major migratory flyways	**MI:** Number of bird collisions reported. **PT:** Reduce bird collisions by 80% within the first year of implementation.	- Conduct periodic bird collision surveys. - Analyze collision data to assess effectiveness of diverters.	- Contractor to install and maintain bird diverters. - Schedule regular inspections and maintenance activities.
Habitat Disruption and Fragmentation	- Maintain buffer zones around known migratory bird habitats. - Avoid construction during peak migration seasons. - Implement habitat restoration projects post-construction.	- Forest Act, 1927 (Amendments 1982, 1989) - Ramsar Convention on Wetlands - National Biodiversity Strategy and Action Plan (2004)	Areas identified as critical habitats and stopover sites	**MI:** Integrity of buffer zones maintained. **PT:** Zero unauthorized habitat encroachment. **MI:** Post-construction habitat restoration completed as per plan.	- Remote sensing and field inspections to monitor buffer zones. - Post-construction habitat assessments.	- Contractor to adhere to buffer zone guidelines. - Implement restoration activities as scheduled. - Contractor to retrofit or install appropriate lighting solutions.

Issues	Remedial Measures	Refers to Laws/Guidelines	Location	Monitoring Indicators (MI)/Performance Target (PT)	Monitoring Methods	Implementation
Light Pollution Affecting Nocturnal Migratory Birds	- Minimize or eliminate unnecessary lighting near transmission towers. - Use bird-friendly lighting solutions (e.g., motion-activated lights). - Shield existing lights to reduce light spillage.	- Bangladesh Wild Life (Preservation) Act, 1974 - International Dark-Sky Association (best practices) - National Biodiversity Strategy and Action Plan (2004)	Transmission tower sites and surrounding areas	**MI:** Reduction in artificial lighting levels. **PT:** Achieve a 90% reduction in unnecessary lighting. **MI:** Number of bird-friendly lighting installations completed.	- Conduct light level measurements. - Monitor installation and functionality of bird-friendly lighting.	- Ensure compliance with lighting guidelines during construction.[18]
Noise Disturbances During Construction	- Implement noise control measures such as using silencers on machinery. - Limit construction activities to daytime hours. - Use quieter construction techniques where possible. For instance, Use of torque	- National Environmental Policy (1992) - Local noise regulations and guidelines - National Biodiversity Strategy and Action Plan (2004)	Construction sites along the transmission line route	**MI:** Noise levels measured against standards. **PT:** Maintain noise levels below 55 dB during daytime. **MI:** Number of noise control measures implemented	- Regular noise monitoring using decibel meters. - Audits of construction practices for noise compliance.	- Contractor to adopt noise-reduction practices. - Schedule construction activities to minimize noise impact.

[18] https://www.cms.int/sites/default/files/document/cms_cop13_res.13.5_light-pollution-guidelines_e.pdf

Issues	Remedial Measures	Refers to Laws/Guidelines	Location	Monitoring Indicators (MI)/Performance Target (PT)	Monitoring Methods	Implementation
	augers or low-noise drilling rigs instead of impact equipment near sensitive areas like schools and mosques. Prefer manual or semi-mechanized excavation where possible, and schedule noisy tasks during mid-day to reduce disturbance.					
Disruption of Migratory Patterns Due to Construction Activities	- Schedule construction activities to avoid peak migration periods. - Implement temporary flight barriers or deterrents to guide birds away from active construction zones. - Conduct pre-construction and post-	- Convention on the Conservation of Migratory Species of Wild Animals (CMS) - National Biodiversity Strategy and Action Plan (2004) - Local wildlife protection regulations	High-risk migration corridors identified along the project route	**MI:** Timing of construction activities aligned with migration seasons. **PT:** No construction activities during peak migration periods. **MI:** Effectiveness of flight barriers measured by bird movement patterns.	- Bird movement will be monitored through regular site visits, visual observation during peak migration seasons, and consultation with local birdwatchers and community members to identify areas where birds frequently pass or nest.	- Contractor to adjust construction timelines based on migration studies. - Implement deterrent systems as required.

Issues	Remedial Measures	Refers to Laws/Guidelines	Location	Monitoring Indicators (MI)/Performance Target (PT)	Monitoring Methods	Implementation
	construction bird movement studies.				- Seasonal activity logs and construction schedules.	
Inadequate Awareness and Training on Migratory Bird Protection	- Provide training for construction workers on migratory bird protection. - Develop and distribute educational materials about the importance of migratory birds. - Establish a reporting system for bird sightings and incidents.	- National Biodiversity Strategy and Action Plan (2004) - Local environmental education programs - International Migratory Bird Day guidelines	All construction sites and operational areas	**MI:** Number of workers trained in migratory bird protection. **PT:** 100% of construction staff trained within the first month. **MI:** Number of bird-related incidents reported and addressed.	- Training sessions and workshops. - Distribution and acknowledgment of educational materials. - Incident reporting logs and reviews.	- Contractor to organize and conduct training programs. - Ensure all staff participate and understand their roles.

F.8 Monitoring Measures

Table 83: Monitoring Measures

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
Install and maintain bird diverters and visual markers	Monthly	Transmission line sections crossing migratory flyways	Maintenance logs and inspection reports	**MI:** Functionality of bird diverters and markers maintained. **PT:** 100% of bird diverters and markers operational.	Contractor
Conduct periodic bird collision surveys	Quarterly	Transmission line route	Collision survey reports and data analysis	**MI:** Number of bird collisions reported. **PT:** Reduce bird collisions by 80% within the first year.	Contractor
Monitor and maintain buffer zones	As suggested by POWER GRID	Affected habitat areas	Buffer zone integrity reports	**MI:** Buffer zones remain undisturbed. **PT:** Zero unauthorized encroachment.	Contractor
Light level measurements and adjustments	Monthly	Transmission tower sites and surrounding areas	Light level data and adjustment records	**MI:** Reduction in artificial lighting levels. **PT:** Achieve a 90% reduction in unnecessary lighting.	Contractor
Noise level monitoring	Monthly	Construction sites along the transmission line route	Noise monitoring reports	**MI:** Noise levels below 55 dB during daytime. **PT:** Maintain noise levels below 55 dB.	Contractor
Track construction activity timing relative to migration seasons	Seasonally aligned with migration periods	High-risk migration corridors	Construction schedule adherence reports	**MI:** No construction during peak migration. **PT:** 100% compliance with construction timing.	Contractor
Conduct pre-construction and post-construction bird movement studies	Pre-construction and post-construction phases	Bird movement study areas	Bird movement study reports	**MI:** Effectiveness of flight barriers measured. **PT:** Significant reduction in bird disturbances.	Contractor

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Key Performance Indicator	Implementation
Provide ongoing training and awareness sessions	Quarterly and as needed	All construction sites	Training attendance records and awareness materials	**MI:** 100% of construction staff trained. **PT:** Continuous improvement in bird protection awareness.	Contractor
Implement and monitor reporting system for bird sightings and incidents	Continuous	All construction and operational areas	Bird sighting and incident reports	**MI:** Number of bird-related incidents reported and addressed. **PT:** Timely resolution of all reported incidents.	Contractor
Evaluate effectiveness of mitigation measures	Annually	Entire project route	Effectiveness evaluation reports	**MI:** Overall reduction in bird collisions and disturbances. **PT:** Achieve and maintain mitigation goals.	Contractor

F.9 Training

253. The workforce and management will undergo training as per the environmental training schedule to enhance awareness regarding the protection of migratory birds and related ecological resource management. Each staff member will sign an attendance sheet for all courses attended, including toolbox talks focusing on migratory bird protection measures.

254. Specialized training on the management of migratory bird movement and habitat conservation will be conducted for all workforce members. All records, including attendance sheets, will be maintained by the Contractor's Environmental Monitoring Officer (EMO) or Environmental Specialist (ES) and will be readily available for any audits carried out as part of the audit program. The training will specifically cover the importance of migratory birds, potential negative impacts of construction activities, and mitigation strategies to avoid disturbances to these species.

F.10 Review and Improvements

255. **The Migratory Bird Movement Management Plan (MBMMP)** will remain a flexible and adaptive document, subject to regular review and updates. Modifications may be required in response to newly observed migratory bird movement patterns, revised best practices for bird protection, or changes in construction activities. The plan will continue to evolve to incorporate any additional mitigation measures identified during the detailed design phase or through continuous monitoring of bird behavior and their interaction with the project.

256. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID. Any necessary revisions or improvements to the plan will be implemented to ensure effective mitigation of impacts on migratory birds and alignment with the latest environmental protection standards. Where applicable, they will coordinate with relevant technical experts, government authorities, and local stakeholders to ensure proper implementation of the plan

F.11 Checklist and Log Sheets

Table 84: Bi-Annual Migratory Bird Movement Management Monitoring Checklist

Actions to be Considered	Yes	No	Compliance Status	Comments
Migratory Bird Habitat Management				
Are identified migratory bird habitats clearly marked and protected?				
Has tree felling been restricted during migratory bird breeding and nesting periods?				
Have construction activities been limited during key migratory periods (arrival, breeding, foraging)?				
Is the project adhering to the no-disturbance zones for bird nesting areas?				
Have alternative flight routes been provided (e.g., visual markers or diversion structures)?				
Is vegetation clearance being done carefully to avoid habitat destruction?				
Have any birds been recorded near construction areas, and were mitigation measures effective?				
Construction Impact Mitigation				
Are construction lights minimized or shielded to prevent disorientation of migratory birds at night?				
Are noise levels monitored and reduced during sensitive periods for birds (e.g., breeding and nesting)?				
Has waste disposal been managed to avoid attracting predators that could harm birds?				
Have proper barriers or nets been installed to prevent bird collisions with transmission lines?				
Is there evidence of bird collisions with project infrastructure, and has this been mitigated?				

Monitoring and Reporting				
Is regular monitoring of bird populations and movements being conducted?				
Have all bird sightings and nesting areas been documented?				
Are reports on migratory bird protection submitted to POWER GRID as required?				
Are awareness and training sessions for the workforce on bird protection being conducted?				
Are all complaints regarding bird disturbances logged and addressed?				
Community and Stakeholder Involvement				
Are local communities and bird conservation NGOs involved in the bird protection program?				
Has a feedback system been established to address community concerns related to bird protection?				

G ANNEX: SOCIO CULTURAL ENVIRONMENTAL ISSUES

G.1 Importance

257. Socio-cultural and environmental issues play a critical role in any transmission line project, as they can significantly impact both the community and the natural environment. The following are some main concerns:

258. Community Impact: The project can have both positive and negative effects on the community. For instance, the new transmission line can enhance energy accessibility and reliability, but it may also lead to the displacement of communities, loss of livelihoods, and increased traffic congestion during construction. It is essential to identify and address these potential impacts to ensure that the project benefits the community without causing harm.

259. Cultural Heritage: The project may affect cultural heritage sites, including historical landmarks, archaeological sites, and sacred places. Understanding the cultural significance of these sites to the local community is crucial, and steps should be taken to protect and preserve them throughout the project's implementation.

260. Environmental Impact: The transmission line project can have substantial effects on the natural environment, such as deforestation, soil erosion, habitat loss, and increased pollution. Assessing the potential environmental impacts is vital, and developing mitigation measures will help minimize these effects.

261. Stakeholder Engagement: Socio-cultural and environmental issues can be sensitive and emotional, making it critical to engage with stakeholders, including local communities, NGOs, and other interested parties, throughout the project's lifecycle. Effective stakeholder engagement can help identify potential issues, build trust, and ensure that the project aligns with the community's needs and values.

G.2Relevant Legislations

262. In Bangladesh, several laws and regulations have been enacted to address socio-cultural and environmental issues related to development projects, including Transmission Line Projects:

i. Environmental Conservation Act, 1995

This act provides for the conservation of the environment, including the prevention and control of pollution and the promotion of sustainable development.

ii. The Bangladesh Environment Conservation Rules, 2023

These rules provide for the implementation of the Environmental Conservation Act, including rules related to environmental impact assessments, environmental clearance certificates, and monitoring of environmental compliance.

iii. The Bangladesh Environment Court Act, 2000

This act provides for the establishment of environment courts to hear and resolve cases related to environmental violations.

iv. The Archaeological Sites and Monuments Preservation Act, 1956

This act provides for the preservation and protection of archaeological sites and monuments, including penalties for unauthorized excavation, destruction, or alteration of such sites.

v. The Forest Act, 1927

This act provides for the conservation and management of forests, including provisions for the protection of wildlife and prevention of deforestation. The Act is relevant to the project if the construction of transmission lines involves forested areas. It ensures compliance with regulations on forest land use, conservation, and protection of biodiversity, requiring necessary permissions for any non-forest activities.

vi. The Acquisition and Requisition of Immovable Property Act, 2017

The Acquisition and Requisition of Immovable Property Act, 2017 is applicable to this transmission line and substation development project in cases where land is required permanently for substation construction or temporarily for tower erection, stringing, access roads, or material storage. As per the Act, the Deputy Commissioner (DC) is responsible for issuing public notices, preparing land ownership records, assessing market value, and ensuring compensation to affected landowners.

The Act allows compensation up to 300% of the market value for privately owned land, along with additional provisions for relocation, resettlement, and loss of livelihood, where applicable. It also provides avenues for objection, appeal, and arbitration in case of disputes. In line with this legal framework, any land acquired for the project must be used strictly for its intended purpose and cannot be repurposed without government consent. Compliance with this Act ensures fair treatment of affected people and legal legitimacy of all land-related activities under the project.

vii. The Coastal Zone Policy, 2005

This policy provides guidelines for the sustainable development of coastal areas, including protection of natural habitats, promotion of eco-tourism, and regulation of industrial activities.

viii. The Constitution of Bangladesh (Article 18A)

Provides for the protection and conservation of the environment, ensuring that the rights of citizens to a healthy environment are upheld, including socio-cultural aspects related to land and heritage.

ix. Archaeological Sites and Remains Act, 1968

This act provides for the protection of archaeological sites and cultural heritage, ensuring that development projects consider and mitigate impacts on cultural resources.

x. National Policy for the Conservation of Cultural Heritage (2004)

Aims to safeguard the country's cultural heritage, including tangible and intangible cultural resources, and ensures that development activities consider these aspects

G.3Objectives and Scope

263. The objectives and scope of considering socio-cultural and environmental issues are:

- **To Ensure the Protection of Natural and Cultural Heritage:** The natural and cultural heritage of a region is of great importance and must be safeguarded. Considering socio-cultural and environmental issues in a transmission line project can help identify and protect cultural sites, including historical landmarks, archaeological sites, and sacred places, as well as natural habitats such as forests, wetlands, and wildlife.
- **To Promote Sustainable Development:** A transmission line project can enhance energy access and economic development in a region, but it can also have negative impacts on the environment and local communities. By considering socio-cultural and environmental issues, the project can be designed and implemented in a manner that promotes sustainable development and mitigates adverse effects.
- **To Ensure Compliance with Legal and Regulatory Requirements:** Various laws and regulations exist to protect the environment and cultural heritage within the context of development projects. The scope of socio-cultural and environmental issues in the transmission line project includes adhering to these legal and regulatory frameworks.
- **To Assess and Mitigate Potential Impacts:** Transmission line projects can have both beneficial and detrimental impacts on the environment and communities. The scope of socio-cultural and environmental issues includes identifying and assessing potential impacts and developing mitigation measures to minimize negative effects.
- **To Engage Stakeholders:** Engaging stakeholders, including local communities, NGOs, and other interested parties, is crucial to ensuring that a transmission line project aligns with the community's needs and values. The scope of socio-cultural and environmental issues encompasses active stakeholder engagement throughout the project's lifecycle.

G.4Sources of Impacts

264. The sources of impacts are

- Land use change
- Air and noise pollution
- Water pollution
- Habitat fragmentation and loss
- Cultural heritage destruction
- Increased traffic

G.5Potential Receptor

265. In alignment with the identified socio-cultural and environmental concerns outlined in Section G.1, the following receptors have been specifically identified based on their proximity to the transmission line alignment, their cultural or functional significance, their vulnerability to construction-phase impacts, and their relevance to community access and services. These receptors include religious institutions, educational facilities, cultural sites, and sensitive groups that may be directly or indirectly affected by the project’s activities.

Their inclusion ensures that potential risks are assessed and that appropriate mitigation measures are planned in a socially responsible and inclusive manner. The potential receptors are as follows

Table 85: Sensitive Socio-Cultural and Environmental Receptors Near Project Corridor

Category	Site-Specific Receptor	Rationale for Receptor Identification	Potential Impact from Project Activities
Religious Institutions	Fuldi Bugpara Jame Mosque	Located in close proximity to a transmission tower; a place of daily and weekly communal prayers.	Noise and dust during construction may disrupt prayers; movement of heavy machinery could impact access; visual and cultural sensitivity concerns.
	Jannatul Baky Jame Masjid	A known mosque near the transmission alignment used by local residents for regular prayer.	Risk of disturbance during prayer times; temporary obstruction of access during tower erection or cable stringing.
	Mohani Modhapara Central Jame Masjid	Central mosque for a densely populated area near the project corridor.	Possible community dissatisfaction if not properly engaged; exposure to dust and sound during construction.
Religious Institutions	Mosque PO	Mosque identified near one of the tower points (PO); culturally significant to the adjacent community.	Potential temporary vibration and dust emission concerns; must be respected during religious hours.
	Eidgah Field	Seasonal open-air prayer ground used during Eid festivals by large congregations.	Visual disruption and noise may impact sacred gatherings; work schedules must avoid religious occasions.
	Mosque (unnamed; general category)	Several small local mosques are situated within the 100–300m buffer of the right-of-way.	Need for respectful distance and consultation with local leaders to avoid perception of cultural intrusion.
	Islamic Unique Society	Known religious and educational center for religious training and youth education.	Exposure to noise, dust, and safety concerns; disruption of religious classes.
Educational Institutions	Emines College	Higher secondary institution located near a tower site.	Construction activity may cause distraction during classes; risk of limited access and dust exposure.
	Bangali Government Primary School	Government-run primary school in proximity to the alignment; serves young children.	Increased health risk from dust, reduced learning quality due to noise, and traffic risks during school hours.
	Mohani Government Primary School	Local primary school affected by movement of equipment and worksite proximity.	Similar impacts as above; emphasis on coordination with school authority to minimize disruption.

Category	Site-Specific Receptor	Rationale for Receptor Identification	Potential Impact from Project Activities
	Begum Rokeya Academy School	Educational institution within indirect influence zone.	Risk of environmental nuisance (noise, dust); care needed during exam periods and morning/evening entry-exit times.
Cultural Sites	Eidgah Field	In addition to religious significance, this field holds cultural value during national and community events.	Temporary disfigurement of landscape; potential loss of communal harmony if affected without community consultation.
Community Spaces	Village roads and footpaths (general)	Used by school children, worshippers, and local vendors to access daily services.	Heavy machinery movement may obstruct access and raise safety concerns.
Vulnerable Groups Nearby	Women-headed or elderly households near labor access points	Located close to the project corridor and vulnerable to restricted mobility, security risks, and disruption of daily routines.	Greater need for safety assurance and privacy protection, especially during night work or material transport.

G.6Assessment Procedure

266. The existing project area will be monitored monthly. The locations for the assessment are considered based on the nearest socio-cultural issues in the project corridor. The following will be applied for the assessment procedure.

- Provide special assistance to the vulnerable affected persons
- Orientation on core labor standards
- Train the staff on gender, COVID-19, HIV, human trafficking, avoidance of sexual harassment and exploitation, and climate and disaster resilience in Transmission Line Design

G.7Environmental Impacts, Mitigation and Management Plan

267. The following table outlines the identified socio-cultural environmental issues associated with the Kaliganj–Purbachal Transmission Line Project, along with corresponding mitigation and management measures. These actions are designed to minimize disruption to local communities, religious and educational institutions, public spaces, and vulnerable groups, while enhancing community engagement and ensuring inclusive project implementation.

Table 86: Environmental Impacts, Mitigation and Management Plan for Socio Cultural Environmental Issues

Issues	Remedial Measures	Implementation
Employment opportunities for the local people, especially for PAPs.	❖ Employ local people, especially PAPs, for the tower construction activities as much as possible.	Contractor
Lack of communication and grievance management	❖ Maintain a grievance redress mechanism and hold regular consultations with local stakeholders.	Contractor
Disruption to religious activities during construction near mosques and Eidgah grounds	❖ Coordinate with local religious leaders to schedule construction outside of prayer and congregation times. Maintain respectful distance from worship spaces and avoid noise-intensive activities during Jummah and festivals.	Contractor
Impact on educational institutions (e.g., noise, dust, and safety near schools)	❖ Limit high-noise and heavy-equipment activities during school hours. Use temporary fencing near school boundaries. Conduct awareness sessions in schools on construction safety.	Contractor
Restricted access to cultural and public spaces (e.g., Eidgah, graveyards, footpaths)	❖ Provide alternative safe routes where needed. Maintain temporary signage and security personnel to guide pedestrians. Avoid material storage near cultural or public spaces.	Contractor
Perceived disturbance to cultural harmony and community acceptance	❖ Ensure community-level disclosure of project activities before commencement. Engage with respected local leaders (imams, teachers, ward members) to explain construction phases.	Contractor
Vulnerable group exposure (women-headed households, elderly near RoW)	❖ Prioritize safety around these homes by limiting vehicle speeds, securing open trenches, and minimizing night-time activity. Offer escorted passage during peak construction if needed.	Contractor

Table 87: Environmental Impacts, Mitigation and Management Plan for Physical Cultural Resources Issues

PCR Issue	Mitigation / Protection Measures	Implementation
Proximity of transmission towers to Fuldi Bugpara Jame Mosque	Maintain a minimum buffer distance (30–50 meters where feasible). Conduct construction activities outside prayer times. Use noise-dampening sheets near active structures.	Contractor
Structural vibration risk near Jannatul Baky Jame Masjid	Avoid high-impact piling or drilling within 100 meters. Monitor vibration levels during excavation.	Contractor
Visual intrusion and structural sensitivity of Eidgah Field	Preserve open visual corridors. Avoid tower or pole installation within visual focus area of the congregation ground.	Contractor
Dust and debris impact on Islamic Unique Society and Mohani Modhapara Central Jame Masjid	Regular water spraying and use of dust screens. Schedule sensitive works during low-activity periods.	Contractor
Construction risk near graveyards (unnamed, within RoW buffer)	Mark and protect boundaries with fencing. Prohibit material storage or vehicular access over burial grounds. Respect cultural norms during funerals.	Contractor
Long-term structural integrity risk for religious buildings near RoW	Conduct a pre-construction condition survey. Offer structural retrofitting support if needed. Avoid line sag or tower placement over rooftops.	Contractor

G.8Training

268. The workforce and management will get training as the environmental training schedule for the awareness of socio cultural and management. Staff will complete and sign an attendance sheet for all courses attended.

G.9Review and improvements

269. This **Socio-Cultural Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts.

270. This document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID and necessary improvements will be done accordingly. Where applicable, they will coordinate with relevant technical experts, government authorities, and local stakeholders to ensure proper implementation of the plan

H ANNEX: CAMP, WORK SITE SAFETY, AND IMMIGRANT WORKERS MANAGEMENT PLAN

H.1 Importance

271. The purpose of the camp establishment and management plan is to ensure the following:

- ❖ Provide safe and healthy living conditions for staff and personnel involved in the transmission line construction and maintenance activities.
- ❖ Prevent or minimize adverse impacts of camp operations on the surrounding environment, ensuring that local ecosystems and habitats are preserved.
- ❖ Mitigate social impacts and potential conflicts between workers and the host community, fostering a harmonious relationship between the project team and local residents.
- ❖ Ensure that the camp is properly permitted and complies with all local regulations and standards governing construction and camp operations.

272. The plan provides the criteria for site selection, the guidelines for permitting, the required environmental facilities and environmental management i.e., liquid waste and solid waste management, sanitation and hygiene requirement for safety and security and abandonment plan.

H.2 Relevant Legislations

273. In Bangladesh, several laws and regulations are in place to ensure the safety of workers and the management of immigrant workers in the relevant project.

i. Bangladesh Labor Act, 2006

This act regulates the working conditions, welfare, and safety of workers in all sectors, including construction of Transmission Line projects. It outlines the responsibilities of employers and workers regarding work hours, wages, leave, health and safety, and dispute resolution.

ii. National Profile on Occupational Safety and Health in Bangladesh 2019

This act aims to ensure the safety and health of workers and the protection of the environment in all workplaces, including construction of Transmission Line projects. It outlines the responsibilities of employers and workers regarding the management of hazardous substances, personal protective equipment, and emergency response.

iii. The Bangladesh Building and Other Construction Workers Welfare Board Act, 2006

This act ensures the welfare and rights of construction workers, including those engaged in transmission line projects. It mandates the registration of workers with the welfare board and provides provisions for their health, safety, social security, and welfare benefits. Employers are required to adhere to workplace safety measures, ensure proper compensation, and implement necessary welfare programs to protect workers involved in the installation and maintenance of Transmission Line infrastructure.

iv. The Foreigners' Act, 1946

This This act governs the legal entry, stay, and employment of foreign nationals working on transmission line construction projects in Bangladesh. It requires employers to obtain proper work permits, visas, and registration for foreign experts, engineers, and skilled workers engaged in the project. The act also ensures that all foreign workers comply with labor laws, preventing unauthorized employment and promoting lawful workforce management in the energy sector.

v. The Bangladesh Bureau of Manpower, Employment and Training (BMET)

BMET regulates the recruitment, training, and management of both domestic and immigrant workers in Bangladesh, including laborers and technical personnel in transmission line construction. Employers must follow BMET's guidelines for worker registration, skill development, and compliance with employment policies. The bureau also facilitates workforce training programs to ensure the availability of a skilled workforce for large-scale infrastructure projects such as high-voltage transmission lines.

vi. The Bangladesh Road Transport Corporation (BRTC) Act, 1961

This act primarily governs the management of transport services but plays a crucial role in transmission line projects by regulating the transportation of heavy machinery, construction materials, and workforce. The act ensures that the movement of oversized loads, including transmission towers, conductors, and transformers, complies with road safety regulations and logistical planning, minimizing risks and disruptions during project execution.

vii. Bangladesh Labor Rules, 2015

These rules provide detailed regulations regarding labor management, including provisions for occupational health and safety, and the rights and obligations of both employers and employees.

viii. The Occupational Safety, Health and Environment (OSHE) Act, 2006

This act emphasizes the importance of health and safety at work sites, requiring employers to take necessary measures to prevent workplace accidents and illnesses

ix. **Environmental Conservation Act, 1995**

This act requires Environmental Impact Assessments (EIAs) for projects and mandates measures to mitigate environmental impacts, including those associated with worker camps.

x. **Environmental Conservation Rules, 2023**

These rules provide specific guidelines on managing environmental impacts from construction activities, including waste management and pollution control.

xi. **The Foreign Employment Act, 2013**

This act regulates the employment of foreign workers in Bangladesh and outlines the procedures for hiring immigrant workers, including their rights and protections.

xii. **National Labor Policy, 2012**

This policy emphasizes the rights of workers and aims to ensure their welfare, including provisions related to the safety and health of workers, both local and immigrant.

H.3 Objectives and Scope

274. The purpose of the Camp, Work Site Safety, and Immigrant Workers Management Plan is to ensure the following:

- ❖ Provide safe and healthy accommodation to the staff and personnel;
- ❖ Prevent or minimize adverse impacts of camp operations on the surrounding environment;
- ❖ Mitigate social impacts and potential conflicts between workers and the host community, fostering a harmonious relationship between the project team and local residents;
- ❖ The camp is properly permitted and compliant with the local regulations.

275. The plan provides the criteria for site selection, the guidelines for permitting, the required environmental facilities and environmental management i.e., liquid waste and solid waste management, sanitation and hygiene requirement for safety and security and abandonment plan.

H.4 Sources of Impacts

276. The sources of impact for the management plan are given below:

- ❖ Camp Site
- ❖ Workers Residence
- ❖ Construction Site

H.5 Potential Receptor

277. The potential receptors are:

- ❖ Camp workers
- ❖ Immigrant workers
- ❖ Nearby Communities
- ❖ Pedestrians

H.6 Assessment Procedure

278. The assessment procedure will be made upon on site observation upon monthly and quarterly site visits. The Contractor will also be in charge of the interaction with workers and local community while visiting the project corridor.

H.7 Environmental Impacts, Mitigation and Management Plan

Table 88: Potential Impact with Management Plan for the Camp, Work Site Safety, and Immigrant Workers

Issues	Remedial Measures	Implementation
Community H&S along the transmission line	❖ Safety barriers and warning signs surrounding the tower construction site. ❖ Formulate and implement an emergency risk management plan, for approval by POWER GRID before access to site reflecting national and EHS guideline requirements.	Contractor
Health and safety risks of construction workers.	❖ An experienced H&S Manager must be engaged on each work package with appropriate qualifications and experience and not doubling up on any other jobs by the contractor prior to the start of construction of the towers. ❖ Only permitting trained and certified workers to work with any electrical equipment. ❖ Before access to site granted, contractor to prepare H&S plan based on risk assessment for approval by POWER GRID following national and EHS guideline requirements. ❖ Safety instruction by the E&H Manager should be provided for the workers and visitors before they will be allowed to access the site. ❖ First aid box and personal protective equipment, PPE (such as helmet, safety shoes, eye protection glass, ear plugs, waist belt, mask, hand gloves, body protective apron, ear muff and insulating boots, as needed) must be provided to the workers, and ensure their use by workers. ❖ Safety signs as needed at the tower sites	Contractor
Worker safety (risk of falling, heavy equipment)	❖ Implement proper safety training, use personal protective equipment (PPE), and ensure regular maintenance of equipment and safety barriers.	Contractor

Issues	Remedial Measures	Implementation
Occupational health and safety risks (electrocution, falls)	❖ Enforce strict safety protocols, provide PPE, and conduct regular training on electrical hazards and fall prevention techniques.	Contractor
Health risks for workers from exposure to dust and chemicals	❖ Provide appropriate PPE (e.g., masks, gloves), ensure proper ventilation, and implement regular health monitoring and safety training	Contractor
Electrocution risks for workers and local communities	❖ Provide proper PPE and training for workers on electrical safety protocols	Contractor

H.8 Labor Management Plan

279. The project has successfully implemented measures for safe drinking water, health and safety (H&S), and sanitation, fully complying with national regulations and international standards. However, to further improve labor management, a **Labor Management Plan (LMP)** has been developed to enhance existing practices, ensure better monitoring, and address any emerging needs for worker welfare throughout the project lifecycle.

Table 89: Labor Management Plan

Sl. No.	Task/Activity	Action/Measure	Responsible Party	Frequency	Monitoring/Review
1	**Provision of Safe Drinking Water**	Regular testing of drinking water quality, ensuring all water sources are purified and potable.	Contractor's Site Manager	Monthly	Laboratory reports, site inspection reports
2	**Health and Safety Training**	Conduct regular EHS training sessions and emergency response drills for all workers.	Safety Officer	Bi-monthly	Training attendance records, safety drill logs
3	**PPE Compliance**	Provide PPE (helmets, gloves, boots, etc.) to all workers and enforce strict usage protocols.	EHS Supervisor	Ongoing	PPE distribution logs, worker inspections
4	**Sanitation Maintenance**	Ensure regular cleaning and upkeep of sanitation facilities and provide adequate waste management.	Contractor's Camp Manager	Weekly	Sanitation log sheets, waste collection reports
5	**Medical Facilities**	On-site medical facilities will be established with first aid and emergency treatment available.	Health Officer	Ongoing	Medical facility records, incident logs
6	**Grievance Redress Mechanism (GRM)**	Ensure workers can easily report grievances through a confidential and accessible system.	Community Liaison Officer	Ongoing	GRM logs, regular review of complaints and actions
7	**Worker Welfare and Engagement**	Organize regular welfare and engagement programs for workers, including recreational and awareness activities.	Contractor's HR Officer	Monthly	Program participation logs, feedback surveys

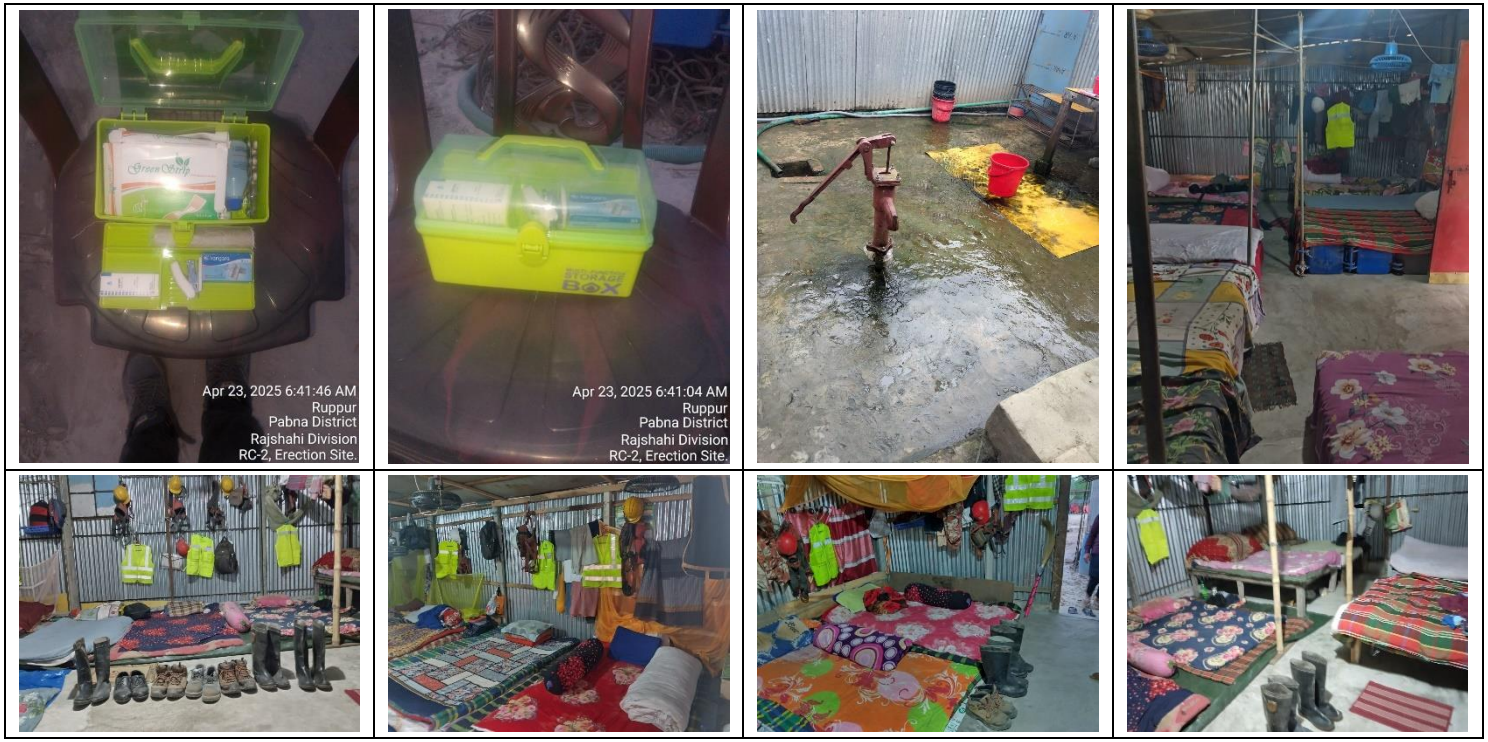


Figure 19: Pictorial Evidence of Health and Safety Management for Labor

280. The **First Aid Kit Box** on the construction sites for the Project is equipped with essential items to address common injuries and health emergencies. The kit includes adhesive bandages, sterile gauze pads, antiseptic wipes and creams, burn cream, instant cold packs, elastic bandages, cotton balls, scissors, tweezers, thermometers, pain relief medications, antihistamines, eye wash solution, burn dressings, a first aid manual, CPR face shield, and disposable gloves. These items ensure that workers can receive immediate care for injuries, minimizing health risks and maintaining safety on-site.

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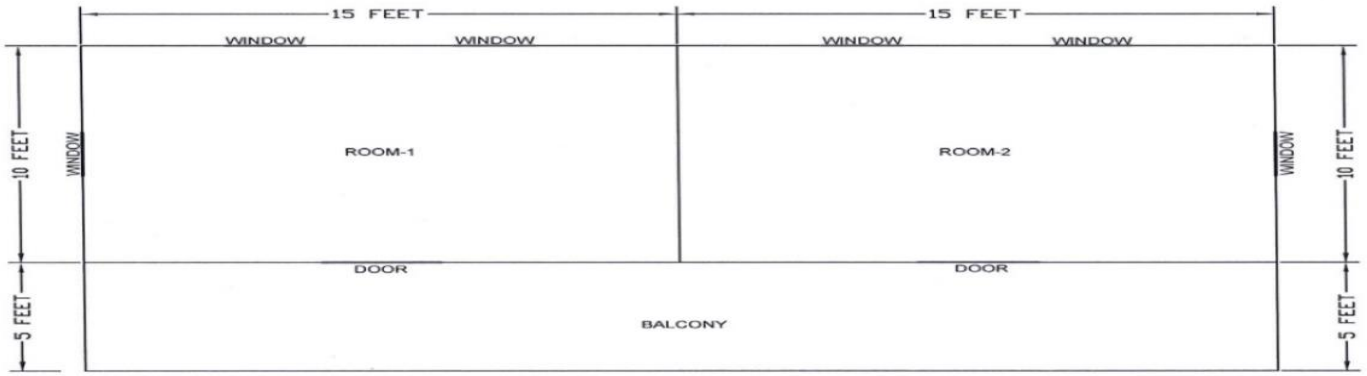


FIGURE: LAYOUT OF BASE CAMP (TINSHED) FOR LABOURS

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Figure 20: Layout of Base Camp (TINSHED) for Labors

H.9 Communicable Disease Management Plan for Labor Camps

281. Construction of transmission line projects often involves the deployment of large groups of laborers who live and work in shared spaces, such as temporary camps and field offices. These conditions present elevated risks for the spread of communicable diseases due to close contact, shared facilities, and limited access to healthcare infrastructure. If not addressed proactively, disease outbreaks can significantly disrupt project timelines, reduce labor productivity, and affect worker well-being. To mitigate these risks, a targeted communicable disease management plan is developed as part of the SSEMP. The plan identifies common diseases that may arise in labor camp settings, the specific causes related to project activities, the potential impact on workforce and operations, and effective, context-specific management measures.

Table 90: Communicable Disease Management Plan for Labor in Transmission Line Project

Disease	Cause (Project-Specific Context)	Potential Impact	Management Measures
Diarrhea/ Cholera	These diseases may result from consumption of contaminated drinking water and improper food handling in labor camp kitchens, particularly where hygiene practices are not adequately followed.	Outbreaks of gastrointestinal illness can lead to a high rate of absenteeism, low morale, and the potential need for emergency medical intervention.	Treated water should be provided and tested monthly. Kitchen staff must be trained in hygiene standards. Drinking water tanks should be cleaned weekly, and safe food preparation protocols enforced at all meal stations.
Influenza/ COVID-19	Close living quarters, shared tools, and limited ventilation in worker accommodations increase the risk of airborne respiratory infections.	Rapid transmission of viral infections could lead to temporary suspension of activities, workforce isolation, and delays in project delivery.	Workers should be screened daily for symptoms. Personal protective equipment (PPE), including masks, must be used in shared areas. Isolation protocols and adequate spacing in living arrangements must be ensured.
Tuberculosis (TB)	Long-term exposure in poorly ventilated dormitories and lack of early health screening can contribute to the spread of tuberculosis.	TB presents a serious risk of prolonged illness and may result in the permanent loss of skilled workers if not treated early.	Health checks should be conducted before employment and quarterly thereafter. Workers must be made aware of TB symptoms, and positive cases should be referred for treatment under the DOTS program.
Hepatitis A / E	Consumption of unclean food and water due to unsanitary kitchen practices or inadequate hand hygiene may cause these infections.	Liver-related complications and long recovery periods can reduce worker efficiency and increase pressure on local health facilities.	Handwashing stations with clear signage must be installed, food prep areas sanitized regularly, and toilet facilities properly maintained. Periodic health checks will also support early identification.

Disease	Cause (Project-Specific Context)	Potential Impact	Management Measures
Scabies / Skin Infections	Sharing of bedding, limited access to bathing, and lack of clean clothing contribute to skin disease outbreaks.	These conditions, while non-fatal, can lead to discomfort, low morale, and the spread of infection among workers.	Each worker should receive personal hygiene kits and have access to clean bedding and laundry services. Sleeping quarters must be disinfected regularly.
Typhoid	Typhoid often results from unwashed produce, use of expired food items, and improper food storage, particularly during the monsoon season.	Typhoid fever can cause severe illness, often requiring hospitalization, leading to labor shortages and increased health care costs.	Food procurement must follow safety guidelines. Perishable goods must be stored in cool, hygienic conditions. Weekly inspections of kitchens and food storage areas are necessary.
Dengue / Malaria	The presence of stagnant water near labor camps creates breeding grounds for mosquitoes, increasing the risk of vector-borne diseases.	Dengue and malaria can cause recurring illness and widespread absenteeism during peak transmission periods.	Regular removal of stagnant water, application of larvicides, distribution of mosquito nets, and coordination with local health authorities for fumigation must be ensured.
Measles/ Chickenpox	Influx of new workers from different regions without verified vaccination history poses a risk of spreading highly contagious diseases.	Such outbreaks can necessitate temporary isolation of workers and may also pose a risk to surrounding communities.	All new workers should be screened for vaccination status. Isolation rooms should be designated, and local health departments should be engaged to support targeted immunization campaigns.

H.10 Safety Protocol for Mosquito-borne Diseases and Harmful Fauna

282. To protect the health and well-being of the workforce and surrounding communities during the Dhaka and Western Zone Transmission Grid Expansion Project, the safety protocols include measures for preventing the transmission of mosquito-borne diseases and mitigating risks from harmful fauna. The project acknowledges that the proximity to wetlands and low-lying agricultural areas may expose workers and communities to increased risks of diseases like malaria and dengue, as well as encounters with potentially harmful wildlife, including reptiles and venomous species.

283. The following table presents a comprehensive set of protocols, outlining the specific measures to prevent mosquito-borne diseases, reduce the risks posed by harmful fauna, and ensure worker and community safety. These measures are in line with national health regulations, international guidelines, and best practices for managing health and safety risks in construction environments.

Table 91: Safety Protocols for Mosquito-borne Diseases and Harmful Fauna

Risk	Cause	Potential Impact	Preventive Measures	Responsible Party
Mosquito-borne Diseases (Malaria, Dengue)	Stagnant water and mosquito breeding grounds near the construction site contribute to the spread of mosquito-borne diseases.	The presence of mosquitoes in the area can lead to the spread of diseases such as malaria and dengue, resulting in illness and absenteeism among workers.	• Remove all standing water to prevent mosquito breeding. • Use mosquito nets and apply insect repellents to reduce the risk of bites. • Implement regular fumigation in high-risk areas. • Distribute insect repellent to workers for use in exposed areas.	Contractor
Snake Bite	The construction area is near habitats where venomous snakes, such as the Indian Cobra or Russell's Viper, are found although its rare	Exposure to venomous snakes can lead to snake bites, which could result in medical emergencies and potentially loss of workforce due to injuries.	• Conduct regular site inspections to identify and remove potential snake habitats. • Provide training to workers on recognizing and avoiding snakes, and on how to respond to a snake bite. • Ensure availability of first aid and anti-venom in case of snake bites.	Contractor
Wild Animal Encounters	The construction site may be located near areas inhabited by wild animals, such as wild boar and rhesus monkeys, which can pose a threat to workers.	Encounters with wildlife can result in injury from attacks or threats, leading to medical emergencies and a potential loss of workforce.	• Establish safety barriers around work areas to keep workers safe from wildlife. • Train workers to avoid approaching wildlife and to remain alert when in the vicinity of these animals. • Coordinate with local wildlife authorities to ensure proper safety protocols are in place.	Contractor
Venomous Insects (Bees, Wasps)	Nesting of bees or wasps near the construction site can create a hazardous environment for workers.	Bee or wasp stings can lead to allergic reactions, which could result in serious health	• Inspect work areas for nests before starting work to ensure the area is clear of harmful insects.	Contractor

Risk	Cause	Potential Impact	Preventive Measures	Responsible Party
		risks and require medical treatment.	• Use insect repellents and provide protective clothing such as long sleeves and gloves. • Provide training to workers on how to handle insect stings and allergic reactions.	
Exposure to Toxic Plants (Poison Ivy, Poison Oak)	Contact with toxic plants like poison ivy or poison oak in the construction zone can cause skin irritation.	Workers who come into contact with toxic plants may suffer from skin rashes, allergic reactions, and irritation, leading to discomfort and medical treatment.	• Educate workers on identifying toxic plants and the risks associated with them. • Provide PPE such as long sleeves, gloves, and boots to minimize direct contact with plants. • Ensure immediate access to first aid for workers who may be exposed to toxic plants.	Contractor

H.11 Monitoring Program

284. The Monitoring Program is given below.

Table 92: Monitoring Program during the Construction Period

Parameter	Frequency	Location	Implementation
Waste Disposal	Monthly	Project Corridor	Contractor
No liquor or prohibited drugs will be imported, sell, give and barter to the workers of host community	Weekly	Camp Sites Worker Residence	Contractor
Provide adequate First Aid Box in camps and worksite	Weekly	Camp Sites Worker Residence	Contractor
Conduct awareness raising on HIV/AIDS and COVID-19, Monkey pox prevention program and implement to reduce the risk and transmission of disease for the local and immigrant workers, project personnel and nearby population	Monthly	Project site	Contractor

H.12 Training

285. The designated camp manager is responsible or day to day management of the camp. Furthermore, he/she carries the responsibility of overseeing the implementation of the health, safety and environmental guidelines, rules and regulations put in place by the POWER GRID. The camp occupants are bound to abide by the rules and observe the guidelines and to report to management untoward incidents and prohibited activities. Training will be provided to such upon further plans.

H.13 Review and improvements

286. The review and updating of this **Camp, Work Site Safety, And Immigrant Workers Management Plan** sub-plan shall be done as part of the overall review of the SSEMP. Amendments will be made as necessary to improve the effectiveness of the EMP in general and the SSEMP sub-plan in particular. The amendments that will be instituted shall be subject to approval by the ADB and the POWER GRID.

287. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID and necessary improvements will be done accordingly. Where applicable, they will coordinate with relevant technical experts, government authorities, and local stakeholders to ensure proper implementation of the plan.

I ANNEX: WASTE MANAGEMENT PLAN

I.1 Importance

288. A waste management plan is important on construction sites to ensure compliance with regulations, protect the environment, improve safety, realize cost savings and enhance the company's reputation.

I.2 Relevant Legislations

The applicable legislation applicable for waste management are given below;

- National 3R Strategy for Waste Management, 2010;
- Solid Waste Management Rules 2021;
- Hazardous Waste Management Rules, 2011
- The Environmental Conservation Act, 1995
- The Environmental Conservation Rules, 2023
- The Biomedical Waste Management Rules, 2008
- The Local Government (City Corporation) Act, 2000
- The Public Health Act, 1935
- The National Environmental Policy, 1992
- Waste Management Policy, 2006

I.3 Objectives and Scope

- Reducing the number of wastes generated by the construction activities;
- Ensuring the waste is handled, stored, transported and disposed of safely and responsibly;
- Compliance with local regulations and legal requirements;
- Minimizing the impacts of construction activities on the environment;
- Minimizing the risk of accidents, injuries and exposure to hazardous waste.

I.4 Sources of Wastes

- Excess materials; Construction sites often order more materials than necessary, which can result in excess waste;
- Demolition waste;
- Packaging waste;
- Hazardous waste;
- Land excavation waste;

- Waste from equipment and tools

I.5 Potential Receptor

- Environmental parameters such as air, soil, water;
- Wildlife;
- Employees;
- Residential areas

I.6 Environmental Impacts, Mitigation and Management Plan

Table 93: Environmental Impacts, Mitigation and Management Plan

Issues	Remedial Measures	Implementation
Generation of construction wastes from the construction materials	❖ Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of construction waste generated over time. ❖ Provision of facilities for proper handling and storage of construction materials to reduce the amount of waste caused by damage or exposure to the elements ❖ Purchase of perishable construction materials such as paints incrementally to ensure reduced spoilage of unused materials Use of building materials that have minimal packaging to avoid the generation of excessive packaging waste. ❖ Use of construction materials containing recycled content when possible and in accordance with accepted standards.	Contractor
Pollution due to wastes (construction wastes from construction activities and general wastes from workers' camps).	❖ Solid wastes collection system will be essential, which should include separation and collection of solid wastes in the dustbins/waste containers throughout the tower work sites. ❖ Wastes, such as pieces of rods and wood, newspapers, containers etc. can be sold to vendors and the rest must be taken to the licensed, engineered sanitary landfill by the Contractors or licensed third party. ❖ A log of the disposal of toxic and other waste materials is to be kept by the Contractors. ❖ Contractor should prepare a waste management plan based on the EMP, for approval by POWER GRID before access to site reflecting national and EHS guideline requirements.	Contractor

Issues	Remedial Measures	Implementation
Waste Management and Disposal	❖ Implement a waste management plan for segregation, recycling, and proper disposal of hazardous materials	Contractor

I.7 Monitoring Program

Table 94: Environmental Impacts, Mitigation and Management Plan

Mitigation measures/ Parameter	When/ Frequency	Location	Output to be Provided	Implementation
Secure storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order minimize accidents and deter trespassers.	Daily	All dumping sites	Reports shall be submitted to POWER GRID	Contractor
Unproductive/wastelands can be selected for dumping sites	Once, before site selection and approval	All unproductive lands	Reports shall be submitted to POWER GRID	Contractor
Public perception and consent from Purashova have to be obtained before finalizing the location.	Once	All dumping sites	Report shall be submitted to POWER GRID	Contractor

I.8 Training

289. The workforce and management will get training as the environmental training schedule for the awareness of waste management. Staff will complete and sign an attendance sheet for all courses attended, including the toolbox talks training.

290. Workforce training on several environmental managements will be conducted as per training schedule and all records, including the attendance sheets, will be held in a central location by the Contractor and made available during any audit conducted as part of the audit program. Water pollution sources, impacts and management measures will be included in the environmental training.

I.9 Review and improvements

291. This Waste Management Plan is considered an adaptive document and as such will be reviewed on a regular basis. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts.

292. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID and necessary improvements will be done accordingly.

J ANNEX: OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY MANAGEMENT PLAN

J.1 Importance

293. The Occupational and Public Health and Safety Management Plan (OHSP) is crucial for the transmission line project to ensure the safety and well-being of workers, nearby residents, and the general public. Here are some key reasons why OHSP is important for the construction phase of the transmission line:

- **Prevention of accidents and injuries:** The construction of transmission lines involves working at heights, the use of heavy machinery, electrical hazards, and dangerous equipment, all of which pose significant risks to workers and the public. An OHSP helps identify and assess these potential hazards and develop strategies to mitigate or eliminate them, thus reducing the risk of accidents and injuries.
- **Compliance with legal and regulatory requirements:** Transmission line construction is subject to stringent legal and regulatory requirements, including health, safety, and environmental standards. An OHSP ensures compliance with these regulations and helps avoid legal or regulatory consequences.
- **Management of risks and liabilities**: The project involves significant risks, including those related to working near live electrical infrastructure, exposure to hazardous materials, and environmental impacts. An OHSP helps manage these risks and liabilities by identifying potential hazards and implementing strategies to control or eliminate them.
- **Protection of workers and nearby residents:** Transmission lines often run through or near residential and rural areas, putting nearby residents and wildlife at risk. The OHSP helps protect these communities by implementing measures to minimize electromagnetic exposure, noise, and construction disturbances like dust and debris.
- **Reputation and community relations:** The transmission line project will have a significant impact on local communities. Poor health and safety practices can damage the project's reputation and strain relations with the community. An OHSP demonstrates a commitment to the safety and well-being of both workers and the public, enhancing the project's reputation and fostering positive community relations.

J.2 Relevant Legislations

i. Bangladesh Labor Law, 2006; Bangladesh Labor Rules 2015

The rules describe about "the occupational rights and safety of workers and the provision of a comfortable work environment and reasonable working conditions" which is applicable to this project.

ii. National Occupational Health and Safety Policy, 2013

This policy outlines the government's vision for ensuring safe working conditions across industries.

iii. The Building National Building Code (BNBC), 2020

Governs construction safety, including transmission lines projects.

iv. Public Health (Emergency Provisions) Ordinance, 1944

This ordinance addresses the public health aspects related to safety and emergency responses.

J.3 Objectives and Scope

294. The contractor is obliged to implement all reasonable precautions to protect the health and safety of workers and nearby community. This Occupational and Public Health and Safety Management Plan is aimed at eliminating the occupational hazards, controlling the hazard at its source through use of engineering controls and minimizing the hazard through design of safe work systems and administrative or institutional control measures and additional measures of providing appropriate personal protective equipment (PPE) in supplemented by training in the use, and maintenance of the PPE.

295. The plan covers all the aspects of the construction of the project phase of package-01, all works sited and the facilities of the POWER GRID and contractors that are operated in relation to the construction of the project such as the transmission tower erection site, temporary material storage and stockpile areas, worker camp sites and construction camps, quarry sites and borrow pits for sourcing materials etc.

J.4 Sources of Impacts

296. The potential sources of the Occupational and Public Health and Safety impacts are identified as follows:

- ❖ Construction of Basecamp
- ❖ Construction activities at Material Storage Areas
- ❖ Construction of Access Roads
- ❖ Tower Erection and Stringing Activities
- ❖ Foundation Construction and Excavation
- ❖ Location requiring removal of private structures and vegetation
- ❖ Accidents, injuries to operational staff
- ❖ Traffic disruptions and incidents

J.5 Potential Receptor

297. The potential receptors are as follows;

- ❖ Adjacent residential areas
- ❖ Institutions (Educational, religious)
- ❖ Local Market

Details of the sensitive receptors are provided in section 5.4 of Chapter 5.

J.6 Impacts, Mitigation and Management Plan

Table 95: Impacts, Mitigation and Management Plan

Issues	Remedial Measures	Implementation
Community Health and Safety (H&S)	❖ Safety barriers and warning signs surrounding the tower construction site. ❖ Formulate and implement an emergency risk management plan, for approval by POWER GRID before access to site reflecting national and EHS guideline requirements.	Contractor
Occupational Health and Safety (H&S)	❖ An experienced H&S Manager must be engaged on each work package with appropriate qualifications and experience and not doubling up on any other jobs by the contractor prior to the start of construction of the towers. ❖ Only permitting trained and certified workers to work with any electrical equipment. ❖ Before access to site granted, contractor to prepare H$S plan based on risk assessment for approval by POWER GRID following national and EHS guideline requirements. ❖ Safety instruction by the E&H Manager should be provided for the workers and visitors before they will be allowed to access the site. ❖ First aid box and personal protective equipment, PPE (such as helmet, safety shoes, eye protection glass, ear plugs, waist belt, mask, hand gloves, body protective apron, ear muff and insulating boots, as needed) must be provided to the workers, and ensure their use by workers. ❖ Safety signs as needed at the tower sites	Contractor
Safety and security of workers	❖ Ensure security of transmission towers in collaboration with law enforcing agencies. ❖ Ensure availability of adequate safety gear for tower maintenance workers.	Contractor
Due to adequate reliability of power supply, social life and	❖ O&M of towers should be done in time to ensure their integrity.	Contractor

Issues	Remedial Measures	Implementation
economic condition of the people will be improved		
Due to EMF, human health may be affected	❖ For housing structures, clearance between the transmission line and roof tops should be 6.5 m - 8 m and for river crossings it will 14.6 m -15.9 m, warning signs of TL will be needed on the river for navigations/fishing. Note that no ❖ houses will be directly affected by the TL/LILO lines.	Contractor
Line Monitoring and Surveillance	❖ Use less intrusive methods like drones and inform communities in advance of any surveillance activities.	Contractor
Corona Effect	❖ Install insulating materials to reduce corona discharge. Regular monitoring of high-voltage lines for electrical emissions.	Contractor
Emergency Response (e.g., line faults, accidents)	❖ Train emergency response teams, install emergency shutdown systems, and inform the public of risks.	Contractor

J.7 Monitoring Program

Table 96: Monitoring Program

Remedial Measures	Location	Implementation
• Adopt and maintain safe working practices at sites by providing adequate PPE to workers, such as helmets, protective clothing, hand gloves, ear protector plug, life vests for those working on the construction etc.; • Imposing strict rules and procedures for the execution of specific tasks, enforcement of the applicable Acts and Rules on workmen's welfare and compensation. • Usage of fluorescent and retro refectory signage, in local language at construction sites for safety alarming. • Appointment of Health and Safety Officer and every morning he should carry out EHS toolbox talk on worksite safety with workers at sites • All regulations regarding safe scaffolding, ladders, working platforms, gangway, stair wells, excavations, trenches etc. shall be complied with Safety Standards. • Provision of a readily available first aid unit • The contractor will not employ any person below the age of 18 years. • Training to workers on safety procedures and precautions, basic sanitation and healthcare issues, general health and safety matters, and on the specific hazards of their work • Emergency plan shall be prepared to respond to any accidents or emergencies. • COVID-19 Prevention Plan shall be prepared and implement to reduce the risk and transmission of disease for the local and immigrant workers, project personnel and nearby population	All construction sites, Construction camps and operation equipment etc.	Contractor
• Ensure adequate protection to the general public by safety barriers and marking of hazardous areas, provided safety signs and symbols at the construction sites	All Construction sites	Contractor

J.8 Training

298. All Project workers will undergo HSE knowledge training prior to start of work with the project. The training will cover HSE management system, operation procedure training, HSE risk and prevention measures in working areas, correct wearing of protection articles, usage of special personal protection equipment. At least one occupational health and safety training per month will be conducted by PIU, as per the training plan approved by POWER GRID. Quarterly training records submitted to POWER GRID. Three Level (environmental/health/safety)) training and education pursuant to relevant documents. All equipment operators and drivers must have training with certificates and will be tested prior to assignment. The health and safety training will be done through formal training sessions, HSE induction, toolbox talks, training and awareness and daily pre-start meetings. Training and induction of workers will include topics such as, but not limited to the following

❖ Camp Rules and Regulations	❖ Emergency Preparedness
❖ Health and Safety at Work	❖ Sanitation and Personal Hygiene
❖ Environmental Management • Solid waste management • Wastewater and runoff management • Hazardous waste management and spill control • Ecological protection • Protection of cultural resources	

The tentative training and induction schedule is as follows

Table 97: Tentative Schedule of Training and Induction

Activities	Schedule and Frequency	Audience / Participants
HSE Induction	As per EHS Plan	All site staffs and workers
Toolbox talks & training	As per EHS Plan	All site staffs and workers
Daily pre start meeting	As per EHS Plan	Each working section staffs

J.9 Review and improvements

299. This **Occupational and Public Health & Safety Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID.

K ANNEX: TRANSPORTATION AND STORAGE MATERIAL MANAGEMENT PLAN

K.1 Importance

300. Transportation and storage material management plan (TSMP) is an essential part of the project. The importance of the plan has been discussed as follows:

- **Efficient Material Management:** The TSMP will facilitate the efficient management of the transportation and storage of materials required for the construction and installation of transmission lines. This includes a comprehensive plan for the handling, storage, and transportation of materials, ensuring they are available in the correct quantities and at the right times throughout the project.
- **Cost Optimization:** By optimizing the procurement and handling of materials, the TSMP will help minimize wastage and prevent pilferage. This proactive approach ensures that only the necessary amounts of materials are ordered and maintained, contributing to overall cost reduction for the project.
- **Risk Management:** The TSMP is designed to manage risks associated with the transportation and storage of materials, including the potential for accidents, spills, and other hazards. The plan outlines specific measures to minimize risks, thereby protecting both the environment and public safety.
- **Compliance with Regulations:** The TSMP ensures compliance with all relevant regulations governing the transportation and storage of materials in the context of electrical infrastructure development. It includes guidelines to ensure that all materials are transported and stored in accordance with local, state, and federal regulations.
- **Environment and Safety:** The plan prioritizes environmental protection and safety. It includes measures to prevent soil erosion, reduce the ecological impact of construction activities, and safeguard the public from hazards associated with material transportation and storage.

Overall, the management plan of transportation and storage materials is essential for the project to manage the transportation and storage of materials efficiently, optimize costs, manage risks, comply with regulations, and protect the environment and public safety.

K.2 Objectives and Scope

301. A Transportation and Storage Material Management Plan for a project aims to efficiently manage the transportation and storage of materials needed for the project to ensure that they are available at the right time and place, in the right quantity, and in good condition. The objectives of such a plan are to:

- **Identify Materials**: Determine the types of materials needed for the transmission line construction and establish their quantity and quality requirements.
- **Transportation and Storage Strategy**: Develop a comprehensive strategy for the transportation and storage of materials to ensure timely delivery, thus avoiding delays in project execution.

- **Safe and Secure Storage**: Ensure that all materials are stored safely and securely to prevent any damage, loss, or degradation.
- **Minimize Waste and Optimize Costs**: Implement practices to minimize waste and reduce material costs through optimized usage and handling.
- **Regulatory Compliance**: Ensure compliance with relevant regulations and standards governing the transportation and handling of materials specific to electrical infrastructure projects.

K.3 Sources of Impacts

302. A Transportation and Storage Material Management Plan for the project has several sources of impacts:

- **Environmental Impact:** Construction activities related to the transmission line can significantly affect the environment. The plan considers impacts such as dust, noise, and pollution on air, water, and soil quality. It also addresses the disposal of waste materials and the protection of natural habitats.
- **Traffic Impact:** The transportation of materials may disrupt traffic flow, leading to delays, congestion, and safety issues. The TSMP identifies potential traffic impacts and proposes mitigation measures, such as rerouting traffic or scheduling deliveries during off-peak hours.
- **Cost Impact:** The costs associated with the transportation and storage of materials can significantly influence the overall project budget. Transportation and storage costs impact the project budget through fuel, handling, and warehousing expenses. Delays increase labor and equipment costs, while improper storage leads to material damage. Bulk purchasing and reuse help optimize costs and improve efficiency. The plan outlines potential cost-saving strategies, such as bulk purchasing or the reuse of materials from previous projects**.**
- **Schedule Impact:** Transportation and storage processes can affect the project schedule. The plan identifies critical path items, particularly the delivery of key materials, ensuring they are scheduled to prevent any delays.
- **Safety Impact:** The transportation and storage of materials pose safety risks to both workers and the public. The plan addresses these risks and proposes mitigation measures, including the provision of appropriate personal protective equipment and clear signage.
- **Quality Impact:** The quality of transported and stored materials directly affects the quality of the completed transmission line. The plan ensures that materials meet necessary standards and are stored properly to avoid damage or degradation.

K.4 Potential Receptor

303. The potential receptors are as follows;

- Adjacent residential areas
- Institutions (Educational, religious)
- Healthcare facilities

- Local Market
- Public spaces

Details of the sensitive receptors are provided in section 5.4 of Chapter 5.

K.5 Training

304. The workforce and management will get training as the environmental training schedule for the awareness of transportation and storage materials management. Staff will complete and sign an attendance sheet for all courses attended, including the toolbox talks training.

305. Workforce training on several environmental managements will be conducted as per training schedule and all records, including the attendance sheets, will be held in a central location by the Contractor and made available during any audit conducted as part of the audit program. Water pollution sources, impacts and management measures will be included in the environmental training.

K.6 Review and improvements

306. This **Transportation and Storage Material Management Plan** is considered an adaptive document and as such will be reviewed and updated on a regular basis throughout the project. Updates to this plan may be necessary due to any changes in environmental management practices and/or contractors. In addition to further mitigation measures that may be identified as part of a detailed design and review in terms of Environmental Impacts.

307. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID. Where applicable, they will coordinate with relevant technical experts, government authorities, and local stakeholders to ensure proper implementation of the plan

L ANNEX: ANNEX: DISASTER AND EMERGENCY RISK RESPONSE PLAN

L.1 Importance

308. In the normal operation of the transmission line project, when all systems and measures function according to design specifications, there should be no significant environmental issues associated with the project. However, disasters may occur to a certain degree if the system and measure's function system fails under normal conditions. This situation may arise due to any of the following causes:

- **Abnormal Operational Situations**: For instance, if the equipment generates noise levels that exceed acceptable limits during operation.
- **Liquid Waste Management Issues**: If liquid waste from construction activities overflows and contaminates the surrounding environment.

309. Therefore, it is essential for the project proponent to implement an appropriate management plan to prevent any potential disasters associated with the transmission line project. This plan will include provisions for the immediate shutdown of the entire facility in the event of any process failure as described above.

L.2 Relevant Legislations

310. In Bangladesh, there are several laws and regulations that are relevant to disaster management in the context of construction and operation of Transmission Line projects. Here are some of the most important ones:

i. Bangladesh Disaster Management Act, 2012

This act provides for the creation of a national disaster management council, as well as district and local-level disaster management committees. It outlines the roles and responsibilities of these bodies in coordinating disaster preparedness, response, and recovery efforts.

ii. Bangladesh National Building Code (BNBC), 2020

This code sets out the standards for construction and safety of buildings and infrastructure in Bangladesh, including infrastructures like Transmission Towers. It includes provisions for earthquake-resistant design, fire safety, and other measures to reduce the risk of disasters.

iii. Bangladesh Environmental Conservation Act, 1995

This act provides for the conservation and protection of the environment in Bangladesh, including measures to prevent pollution and mitigate environmental impacts of infrastructure projects such as Transmission Lines and Towers.

iv. Bangladesh Road Transport Act, 2018

This act provides for the regulation and management of road transport in Bangladesh, including safety standards for vehicles and drivers, and penalties for traffic violations.

v. Bangladesh Road Transport Corporation (BRTC) Act, 1961

This act provides for the establishment and management of the Bangladesh Road Transport Corporation, which is responsible for the operation of public transport services on certain routes.

By complying with these laws and regulations, the proposed projects can ensure that they are taking appropriate measures to mitigate the risk of disasters and to respond effectively in the event of a disaster.

L.3 Objectives and Scope

311. The disaster management plan would consist of preventive measures including, among others, the following.

- Formulation and strict implementation of safety codes and measures;
- Preventive maintenance;
- Worker Awareness on Electric Shock Risks
- Establishing a “No smoking zone”
- Mock drills by the firefighting teams
- Provision and inspection of firefighting equipment in all the sections;
- Employee training of safety codes;
- Community training on emergency response.

L.4 Sources of Impacts

312. There are several sources of impact that need to be considered. Here are some of the most important ones:

- Natural disasters such as floods, earthquakes, landslides, and hurricanes can cause significant damage to infrastructure of Transmission Line and Towers, disrupt traffic, and cause injuries or fatalities.
- Man-made disasters such as terrorist attacks, industrial accidents, and civil unrest can also impact the project, causing damage to infrastructure and creating safety hazards.
- The proposed project can have a significant impact on the environment, including air and water quality, wildlife habitats, and natural resources.
- It can also have social impacts, such as displacement of communities or disruption of social structures.

L.5 Potential Receptor

313. Here are some potential receptors that may need to be considered.

- **Road users:** This includes drivers, passengers, cyclists, and pedestrians who may be traveling on or near the project. In the event of a disaster, road users may be at risk of injury or death and may need to be evacuated or provided with emergency services.
- **Residents and businesses:** People who live or work near the project may be impacted by a disaster, such as flooding or landslides, and may need to be evacuated or provided with emergency services. Businesses may also suffer financial losses as a result of a disaster.
- **Emergency responders:** Police, fire, and medical personnel may need to be involved in responding to a disaster and providing assistance to those affected.
- **Infrastructure:** Other infrastructure such as buildings, bridges, and utilities may be impacted by a disaster and may require repair or replacement.

L.6 Impacts, Mitigation and Management Plan

314. The following table shows the Impacts, Mitigation and Management Plan if any kind of disaster or emergency occurs.

Table 98: Potential Emergency & Environmental Risk Situation Identification

S/I	Potential Emergency Situation	Significant Impact	Preventive Measures	Responding Measures
01	**Fire**	❖ Injured or death of an employee ❖ Destruction of property ❖ Burn of machinery and equipment	❖ Establish and maintain a fire response team ❖ Conduct fire drills as per EHS plan ❖ Install firefighting equipment where required ❖ Create an emergency evacuation plan ❖ Preserve contact details of fire stations, hospitals, and ambulance services ❖ Keep a first aid box with necessary medicines on project sites ❖ Provide firefighting training for teams	❖ Notify the nearest fire station ❖ Fight fire to control ❖ Rescue trapped personnel ❖ Provide first aid to the injured ❖ Call an ambulance & contact nearest hospitals for treatment ❖ Produce an accident report
02	**Generator Explosion**	▪ Injured or death of personnel ▪ Destruction of property ▪ Potential fire ▪ Burn of machinery and equipment ▪ Hearing disorders due to excessive noise	❖ Follow manufacturer's instructions for installation, repair, and maintenance ❖ Use appropriate hearing protection ❖ Provide generator operator training ❖ Regularly inspect equipment and replace defective parts ❖ Keep fire extinguishers near generators ❖ Prevent exposure to fire near generators	❖ Shut off the power supply ❖ Alert personnel about the situation ❖ Attempt to control fire ❖ Rescue trapped personnel ❖ Provide first aid to the injured ❖ Call an ambulance & contact hospitals ❖ Produce an accident report
03	**Transport Accident**	❖ Injured or death of a project personnel ❖ Loss of wealth	❖ Aware to prevent an accident ❖ Provide necessary training to drivers on safe driving ❖ Post security with red plug during in & Out time	❖ Provide first aid to the injured project personnel and create a report ❖ Call ambulance & contact with nearest hospitals for treatment of the injured employee
04	**Electrical Short Circuit**	❖ Injured & death of a project personnel ❖ Cause of fire	▪ Check the electrical wire, switch connections ▪ Use appropriate wire, and a conductor to bear the load	▪ Shut off the power supply ▪ Alert employee explaining the situation ▪ If fire try to control

S/I	Potential Emergency Situation	Significant Impact	Preventive Measures	Responding Measures
		❖ Burn of Machines ❖ Destroy of Property	▪ Inspect all circuit breakers periodically to confirm all are ok. ▪ Use appropriate electric wear & switches ▪ Provide appropriate	▪ Rescue the trapped employee ▪ Provide first aid to the injured ▪ Call ambulance & contact with nearest hospitals for treatment of the injured employee ▪ A report of the accident will be produced
05	**Leakage**	❖ leaks result in injury & illness ❖ Cause of fire ❖ Causing damage to property	❖ Put gas detectors in project areas ❖ Inspect gas line to find out the leakage regularly ❖ Use proper PPE during work with a gaseous substance ❖ Proper necessary training to detect & repair gas leaks to the respective employee ❖ First aid box with necessary medicine kept in the chemical store ❖ Preserve Telephone & Mobile no. of Hospitals & Ambulance service.	❖ Rescue the trapped employee ❖ Provide first aid to the injured project employee ❖ Inform nearest fire station ❖ Fight fire to control
06	**Flood**	❖ Damage of property ❖ Endanger to lives of the project employee ❖ Water bond contagious diseases ❖ Breakdown of all utilities ❖ Disruption of Project works	❖ Get updated weather reports & disseminate accordingly ❖ Project based flood preparedness activities ❖ Evacuation plan during the disaster ❖ Emergency health & utility management plan ❖ Training & awareness program at the project area ❖ Preserve Telephone & Mobile no. of Hospitals & Ambulance service. ❖ A first aid box with necessary medicine should be kept on the project areas. ❖ Networking of local NGOs working in the area of disaster management.	❖ Evacuation of employee ❖ Recovery of dead bodies and their disposal ❖ Medical care for the injured ❖ Temporary supply of food and drinking water
07	**Earth Quake**	❖ Smash up of project developments	❖ Construction building following buildings ‘codes, guidelines, manuals, and by-laws	❖ Maintenance of law and order, prevention of trespassing, looting, etc.

S/I	Potential Emergency Situation	Significant Impact	Preventive Measures	Responding Measures
		❖ Injured & death of a project employee ❖ Cause of fire due gas leakage & electric short circuit ❖ Breakdown of all utilities ❖ Disruption of production	❖ Incorporating earthquake-resistant features in project buildings ❖ Making all utilities like water supply systems, communication networks, electricity lines, etc. earthquake-proof. ❖ Creating alternative arrangements to reduce damages to infrastructure facilities. ❖ Getting employees involved in the process of disaster mitigation through education and awareness. ❖ Emergency evacuation plan ❖ Preserve Telephone & Mobile no. of Hospitals & Ambulance service. ❖ A first aid box with necessary medicine should be kept on the project areas.	❖ Evacuation of employee ❖ Recovery of dead bodies and their disposal ❖ Medical care for the injured ❖ Supply of food and drinking water. ❖ Restoring transport routes ❖ Cordoning off severely damaged structures that are liable to collapse during aftershocks. ❖ Inform nearest fire station ❖ A report of the accident will be produced
8	Strom/ Nor' wester	❖ Injury & death of an employee ❖ Damage to project structures ❖ Breakdown of all utilities ❖ Disruption of project activities	❖ Preserve Telephone & Mobile no. of Hospitals & Ambulance service. ❖ First aid box with necessary medicine kept on the project areas. ❖ Networking of local NGOs working in the area of disaster management.	❖ Evacuation of employee ❖ Recovery of dead bodies and their disposal ❖ Medical care for the injured ❖ Temporary supply of food and drinking water ❖ Call ambulance & contact with nearest Fire service

L.7 Monitoring Program

315. It is imperative to develop an entire facility environment policy and display necessary documentation for ease of accessing information. Some of these documents include:

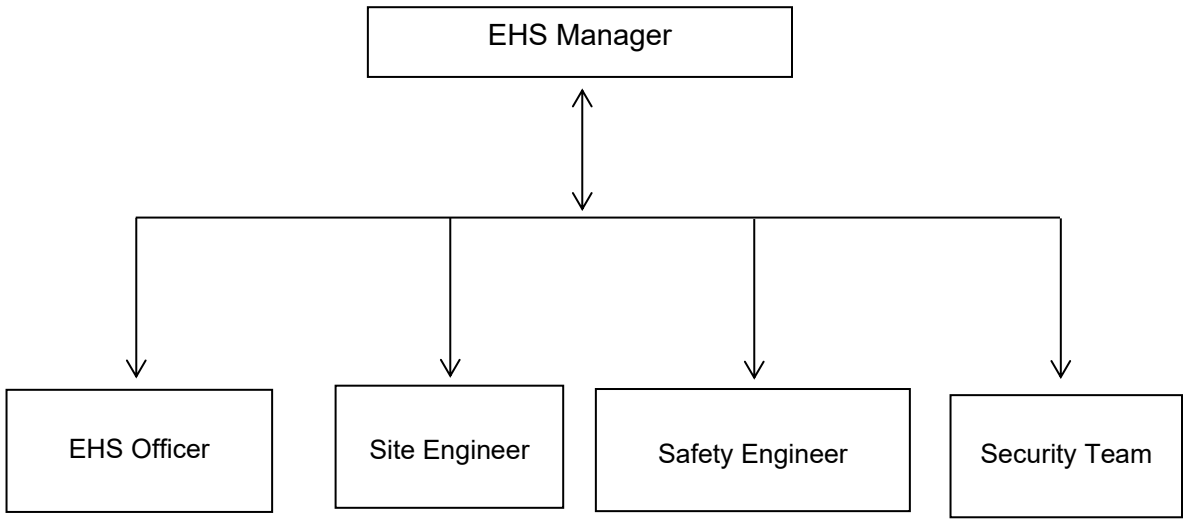
- ✓ Emergency contacts;
- ✓ Emergency response procedures for fires

316. The facility's operations and monitoring are carried out under the management and help from both the employees and relevant government lead agencies. To take care of any hazards the following control should be adopted:

317. All safety precautions and provisions cover the general cleanliness of the entire facility down to, ventilation, lighting, sanitary, waste collection, first aid box provision, adequate fire extinguishers, and site security by fencing.

L.8 Training

318. An emergency response team has been established to strategically coordinate the response to any emergency promptly following the emergency response steps mentioned above. The Emergency Response team are described below:



Proper and promt training will be provided to the above mentioned team as per the EHS Plan.

L.9 Community Liaison

319. Following are some key roles and responsibilities of a community liaison in a disaster management plan for the project:

- ❖ **Establishing relationships:** The community liaison will establish relationships with community leaders, residents, and other stakeholders in the area surrounding the project. This will help to build trust and ensure that the community is engaged and informed throughout the disaster management process.

- **Communicating information:** The community liaison will be responsible for communicating information about the project, including its potential impact on the community, safety measures, and emergency procedures. They should also provide regular updates to the community during a disaster and coordinate with emergency responders to ensure that accurate information is disseminated in a timely manner.
- **Identifying community resources:** The community liaison will identify and coordinate with local resources, such as community centers, schools, and religious organizations, that can be used as emergency shelters or other forms of assistance during a disaster.
- **Facilitating community participation:** The community liaison will facilitate the participation of the community in disaster management planning and decision-making. This can include conducting outreach and engagement activities, hosting community meetings and workshops, and providing opportunities for feedback and input.

320. By establishing an effective community liaison function, the disaster management plan for the project can ensure that the needs and concerns of the surrounding community are addressed and that the community is engaged and informed throughout the disaster management process. This can help to minimize the impact of disasters on the community and build trust and goodwill between the project team and the community.

L.10 Review and improvements

321. The plan will be updated as and when necessary, as per the suggestion of the POWER GRID and all the amended versions will be stored.

322. The document will be reviewed by the Environmental Specialist/Environmental Monitoring Officer of the contractor and will be approved by POWER GRID Where applicable, they will coordinate with relevant technical experts, government authorities, and local stakeholders to ensure proper implementation of the plan

M ANNEX: TREE PLANTATION PLAN

323. The tree plantation plan for the DWZTGE project is designed to mitigate the environmental impacts resulting from construction activities, particularly the loss of vegetation. This plan emphasizes the importance of compensatory planting along the transmission line route, substations, and surrounding sensitive areas. Additionally, the plan includes irrigation systems, protection measures for saplings, and regular monitoring to ensure the success of the plantation. The proposed actions aim to not only restore the vegetation lost during construction but also to contribute to the long-term sustainability of the project's environmental footprint. Below is a detailed breakdown of the actions, responsibilities, and costs involved in the tree plantation process.

Table 99: Proposed Tree Plantation Plan for the project

Sl. No.	Task/Activity	Action/Measure	Frequency	Responsible Party	Monitoring/Review	Number and Species of Trees to be Cut	Type and Number of Crops to be Affected	Tree Plantation Ratio, Methodology, and Schedule	Tentative Budget for Compensation
1	**Identification of Planting Areas**	Identify and map areas for tree planting along the transmission line route, substations, and sensitive areas.	One-time, before construction	Environmental Specialist (Contractor)	Review of map and approved areas for planting	350-400 Trees: **Shimul (Bombax ceiba)**, **Neem (Azadirachta indica)**, **Acacia (Acacia catechu)**	Affected crops may include **corn, rice**, and **vegetables** around the project affected area.	Compensatory planting ratio: 1:3 (1 tree cut, 3 trees planted). Methodology: Native, drought-resistant species. Planting schedule: During rainy season, estimated 500 saplings (can be changed according to the contract) within 3 months.	Estimated cost for compensation: BDT 3,00,000-3,50,000 for 350-400 trees and crops, including land restoration and labor costs.
2	**Selection of Tree Species**	Use native, drought-resistant species, such as **Shimul**, **Neem**, **Mango**, **Acacia**, and **Gamar**, for compensatory planting.	Ongoing, as planting occurs	Environmental Specialist (Contractor)	Regular checks during planting and growth	Same as above.	Same as above.	Non-invasive species selected. Continuous monitoring of plantation success.	Approx. BDT 2,000 per sapling, including planting, protection, and maintenance for 3 years.
3	**Site Preparation for Plantation**	Prepare soil, stabilize the site, and ensure optimal conditions for	Pre-plantation phase	Environmental Specialist (Contractor)	Field inspections and soil testing before planting	N/A (focus on site preparation)	N/A	Site grading, soil stabilization techniques in critical areas,	BDT 500,000 for site preparation (grading, soil stabilization).

Sl. No.	Task/Activity	Action/Measure	Frequency	Responsible Party	Monitoring/Review	Number and Species of Trees to be Cut	Type and Number of Crops to be Affected	Tree Plantation Ratio, Methodology, and Schedule	Tentative Budget for Compensation
		planting. Apply soil amendments if necessary.						especially near water bodies and sensitive habitats.	
4	**Planting of Trees**	Plant medium-sized saplings (2-3 meters) with a spacing of 2-3 meters for growth and to reduce competition.	Once, during construction	Environmental Specialist (Contractor)	Monitoring sapling survival and correct planting technique	N/A	N/A	Planting during the rainy season (monsoon).	BDT 8,00,000-10,00,000 for the first phase of plantation (labor, saplings).
5	**Irrigation and Watering Systems**	Install drip irrigation or water tanks for the first two years to ensure proper growth.	Ongoing, during plantation and early growth phase	Environmental Specialist (Contractor)	Inspection and maintenance of irrigation systems	N/A	N/A	Drip irrigation for each planted area. Ensure continuous water supply in dry seasons.	BDT 800,000 for irrigation installation.
6	**Protection of Saplings**	Install tree guards to protect saplings from animals and human activities, especially in sensitive areas.	Once, during plantation phase	Environmental Specialist (Contractor)	Regular inspections of protective measures	N/A	N/A	Use of tree guards in high-risk areas (near roads, public spaces).	BDT 300,000 for tree protection (guards, fencing).
7	**Monitoring and Maintenance**	Bi-annual monitoring of tree health, survival rate, and growth. Pruning and replanting dead trees as necessary.	Bi-annually	Environmental Specialist (Contractor)	Monitoring reports, corrective actions based on findings	N/A	N/A	Regular visits to check tree health. Pruning and replanting if needed.	BDT 500,000 for maintenance and replantation over 3 years.
8	**Post-Construction Habitat Restoration**	If applicable, focus on restoring habitats post-construction to remove invasive species and ensure biodiversity is maintained.	Post-construction phase	Environmental Specialist (Contractor)	Inspection and reporting of restoration efforts	N/A	N/A	Removal of invasive species, restoring native vegetation.	BDT 1,000,000 for habitat restoration and invasive species control.

N ANNEX: SITE-SPECIFIC TRAFFIC MANAGEMENT PLAN

324. The Site-Specific Traffic Management Plan (TMP) for the project is developed to manage and mitigate traffic-related impacts arising from both the construction and operational phases of the project. This plan focuses on minimizing disruptions to local traffic flow, reducing potential safety hazards, and ensuring that community access and safety are maintained throughout the project's lifecycle. The plan incorporates specific management measures that address key traffic issues such as congestion, safety risks near sensitive receptors, and the movement of large vehicles and equipment to and from the project site. The goal is to maintain a balance between efficient construction activities and the safety and well-being of the surrounding communities.

Table 100: Site-Specific Traffic Management Plan

S/N	Phase	Activity	Vehicle Type Involved	Traffic Issue	Management Measure	Responsible Party	Likelihood
1.	Construction	Site Preparation & Camp Setup	Trucks, Mini Trucks, Tractors, Pickups, Private Cars	Construction activities may lead to access road congestion, excessive dust generation, and obstruction of local pathways.	Deliveries should be planned outside peak traffic hours, with regular water spraying to control dust. Vehicle movements must be restricted during prayer times and school hours. Designated parking areas should be established.	Contractor	Likely
2.	Construction	Foundation Excavation and Concrete Work	Trucks, Tractors, Mini Tractors	Heavy construction vehicles can cause traffic blockages, elevated noise levels, dust pollution, and improper parking.	Follow designated routes with clear signage. Limit nighttime operations. Install noise barriers near educational and religious institutions.	Contractor	Likely
3.	Construction	Structure Assembly and Erection	Trucks, Mini Trucks, Pickups	Construction and material transport activities may result in road obstructions and safety hazards.	Deploy trained flagmen at key intersections, install temporary road diversion signage, and set up guard structures near sensitive receptors such as educational institutions and mosques.	Contractor	Possible

S/N	Phase	Activity	Vehicle Type Involved	Traffic Issue	Management Measure	Responsible Party	Likelihood
4.	Construction	Wire Stringing & Guard Pole Installation	Pickups, Trucks, Motorcycles	Wire stringing operations can create risks of sagging conductors and temporary blockages, impacting access routes.	Use guard poles at crossings, install warning signs near schools and mosques, and inform local communities in advance of stringing activities.	Contractor	Possible
5.	Construction	Electrical Equipment Transport & Installation	Trucks, Mini Trucks, Pickups	Delivery of materials and equipment may cause congestion and safety concerns, especially near CPRs.	Schedule major equipment deliveries during low-traffic periods, and coordinate with designated personnel at delivery points to streamline logistics.	Contractor	Likely
6.	Construction	Workforce Movement (daily transport)	Motorcycles, Private Cars	High volume of workforce transport may lead to frequent congestion and unsafe parking practices.	Establish designated parking zones for vehicles, regulate entry/exit times, and restrict nighttime movement near residential areas.	Contractor	Likely
7.	Construction	Movement Near Sensitive Receptors	All vehicles	Increased traffic near schools and religious institutions can jeopardize the safety of pedestrians.	Clearly mark pedestrian crossings, install cautionary signage, avoid work during school hours, and maintain a 0.5 km buffer from sensitive areas.	Contractor	Possible
8.	Construction	Emergency and Public Road Access	All vehicles	Large-scale equipment movement may lead to full road blockages, impeding emergency vehicle access.	Ensure at least one traffic lane remains open at all times, communicate planned large-equipment movements with local authorities.	Contractor	Certain

S/N	Phase	Activity	Vehicle Type Involved	Traffic Issue	Management Measure	Responsible Party	Likelihood
9.	Operation	Line Monitoring and Repair	Pickup, Motorcycle	Monitoring and maintenance activities may cause short-term traffic disruptions.	Plan activities during off-peak hours, use signage, and provide prior notifications to surrounding communities.	Contractor	Possible
10.	Operation	Regular O&M Vehicle Movement	Pickups, Motorcycles, Private Cars	Operation-phase vehicle movement can generate dust and noise, particularly affecting sensitive receptors.	Limit vehicular movement during prayer and school hours, ensure all vehicles are equipped with reflective tapes, and maintain reduced speeds in populated areas.	Contractor	Possible
11.	Operation	Emergency Repairs (e.g., Storm Damage)	Pickup, Mini Truck	Emergency repairs and rapid deployment may result in unplanned road blockages.	Develop an emergency response route map, deploy a rapid response team, and maintain close coordination with local communities.	Contractor	Rare

O ANNEX: SITE-SPECIFIC MANAGEMENT PLANS FOR SAFETY, WASTE, AND HAZARDOUS MATERIALS

325. The Fire Management Plan, Waste Management Plan, and Hazardous Materials Handling Plan collectively form a comprehensive approach to managing safety and environmental risks at the construction site. The Fire Management Plan includes daily fire hazard monitoring, ensuring that firefighting equipment is functional and accessible, conducting regular fire drills, and providing training to workers on fire safety and evacuation procedures. This plan also incorporates coordination with local fire authorities to enhance preparedness and response. The Waste Management Plan focuses on the efficient segregation, disposal, and recycling of waste generated at the site, ensuring compliance with local regulations and minimizing environmental impact. It includes regular waste monitoring and proper disposal through authorized collectors. Simultaneously, the Hazardous Materials Handling Plan addresses the safe management of potentially harmful materials such as oils, chemicals, and solvents. This plan ensures proper storage, labeling, and disposal of hazardous materials, alongside training for workers and emergency response measures. All the plans have been outlined in the following accordingly.

Table 101:Site-Specific Fire Management Plan

Sl. No.	Scope of Work	Management Measures	Frequency	Responsible Party	Monitoring
1	Daily Fire Hazard Monitoring	Conduct daily fire safety inspections and check equipment functionality.	Daily	Site Supervisor	Daily Logs and Reports
2	Fire Equipment Readiness	Ensure fire extinguishers, hoses, and alarms are functional and accessible.	Weekly	Contractor, Safety Officer	Equipment Inventory Check
3	Fire Drills and Evacuation	Conduct regular fire drills with all workers, practicing evacuation routes.	Monthly	Site Supervisor	Drill Attendance and Report
4	Fire Awareness Training	Provide fire safety and emergency response training for all workers.	Monthly	Safety Trainer, Contractor	Training Logs, Certificates
5	Fire Alarm and Notification System	Install fire alarms at critical locations and ensure proper emergency notification procedures are in place.	Before Site Use	Contractor	System Test Logs
6	Emergency Evacuation Plans	Post emergency evacuation routes at key locations and ensure they are up to date.	Before Site Use	Site Manager, Contractor	Evacuation Route Inspection

Sl. No.	Scope of Work	Management Measures	Frequency	Responsible Party	Monitoring
7	Coordination with Local Fire Authorities	Establish collaboration with local fire departments for joint drills and real-time response.	Quarterly	Site Manager	Collaboration Reports, Drill Logs
8	Firefighter Team and Equipment	Maintain a trained firefighting team and backup equipment (CO2, hoses, PPE) for all emergencies.	Quarterly	Contractor	Equipment Checklists, Drill Records
9	Electrical Fire Safety and Lockout/Tagout	Implement LOTO procedures to ensure electrical systems are de-energized during maintenance.	Ongoing	Electrical Supervisor	LOTO Compliance Records

Table 102:Site-Specific Waste Management Plan

Sl. No.	Scope of Work	Management Measures	Frequency	Responsible Party	Monitoring
1	Waste Segregation	Segregate waste into hazardous and non-hazardous categories for proper disposal.	Daily	Waste Management Officer	Waste Logs, Disposal Records
2	Waste Disposal	Ensure that all waste is removed from the site by authorized third-party waste collectors.	Daily	Contractor, Waste Collector	Waste Collection Reports
3	Waste Oil and Lubricants Disposal	Ensure proper disposal of waste oils and lubricants, using closed containers with proper labeling.	Ongoing	Contractor, Safety Officer	Waste Oil Disposal Records
4	Construction Debris Disposal	Dispose of construction debris and packaging materials in a controlled manner.	Weekly	Contractor, Site Supervisor	Debris Disposal Records
5	Hazardous Waste Management	Manage hazardous materials and chemicals by using appropriate containers and ensuring proper storage and handling.	Ongoing	Environmental Officer, Contractor	Waste Management Logs
6	E-Waste Management	Segregate and store e-waste in a designated area, ensuring disposal as per local and international standards.	As required	Contractor	E-Waste Disposal Records
7	Biodegradable Waste Disposal	Organize collection of biodegradable waste (e.g., food waste) separately and ensure proper disposal or composting.	Daily	Camp Manager, Contractor	Waste Collection Logs
8	Solid Waste Management in Camps	Provide adequate dustbins and waste bins at construction sites and camps, ensuring regular collection and disposal.	Weekly	Contractor, Camp Manager	Waste Bin Inventory, Collection Logs
9	Waste Tracking and Documentation	Maintain records for all waste generated, segregated, and disposed of.	Ongoing	Contractor	Waste Tracking Logs

Sl. No.	Scope of Work	Management Measures	Frequency	Responsible Party	Monitoring
10	Medical Waste Disposal	Collect and dispose of medical waste (bandages, cotton, etc.) in a safe manner using labeled bags and certified waste collectors.	As required	Health Officer, Contractor	Medical Waste Disposal Logs

Table 103:Site-Specific Hazardous Materials Handling and Storage Plan

Sl. No.	Scope of Work	Management Measures	Frequency	Responsible Party	Monitoring
1	Hazardous Material Identification	Identify and label hazardous materials (oils, chemicals, etc.) on-site and ensure proper signage.	Ongoing	Environmental Officer, Contractor	Hazardous Materials Logs
2	Storage of Hazardous Materials	Store hazardous materials in designated, secure areas away from ignition sources and spills.	Ongoing	Contractor, Safety Officer	Storage Area Inspections
3	Spill Control Measures	Implement spill containment measures (secondary containment, absorbent materials) around hazardous material storage.	Ongoing	Site Manager, Contractor	Spill Response Logs
4	Hazardous Material Transportation	Ensure safe transportation of hazardous materials using designated vehicles, and follow spill response protocols.	As required	Contractor, Transport Manager	Transport Logs, Safety Reports
5	PPE for Handling Hazardous Materials	Provide appropriate personal protective equipment (PPE) for workers handling hazardous materials.	Ongoing	Safety Officer, Contractor	PPE Distribution Logs
6	Emergency Response for Hazardous Material Incidents	Establish emergency response protocols for hazardous material incidents (e.g., chemical spills).	Ongoing	Safety Officer, Contractor	Incident Response Logs
7	Training for Hazardous Material Handling	Conduct training sessions on proper handling, storage, and disposal of hazardous materials.	Monthly	Safety Trainer, Contractor	Training Records
8	Chemical Waste Disposal	Ensure proper disposal of hazardous chemical waste (e.g., oils, solvents) according to local regulations.	Ongoing	Contractor, Environmental Officer	Disposal Logs
9	Documentation and Reporting	Maintain records of hazardous material usage, storage, and disposal, as well as emergency response incidents.	Ongoing	Contractor, Safety Officer	Hazardous Material Logs
10	Regulatory Compliance	Ensure all hazardous materials management complies with local regulations (e.g., ECR, DOE).	Ongoing	Environmental Officer, Contractor	Compliance Reports

P ANNEX: EFFLUENT MANAGEMENT PLAN

326. During the construction and operational phases of a transmission line project, various forms of effluent may be generated that require appropriate management to mitigate environmental risks. These effluents may include domestic sewage from worker camps, oil-contaminated water from equipment maintenance areas, stormwater runoff from construction sites, and wastewater from concrete batching or material washing activities. If not properly managed, such discharges may lead to contamination of nearby water bodies, soil degradation, or pose health risks to surrounding communities.

327. The effluent management plan for this project focuses on segregation, treatment, and disposal of different types of wastewaters in compliance with national environmental regulations and international best practices (e.g., ADB SPS, IFC EHS Guidelines). Proper monitoring and containment measures will also be instituted to prevent accidental leaks or illegal discharge.

Table 104: Site Specific Effluent Management Plan

Sl. No.	Type of Effluent	Source	Potential Impacts	Management Measures	Responsible Party	Monitoring Frequency
1	**Domestic Sewage**	This effluent is generated from toilets, kitchens, and bathing areas used by workers and staff stationed at the labor camps and site offices.	If not properly treated, domestic sewage can contaminate surface and groundwater sources, leading to health hazards.	Septic tanks or mobile toilets will be installed, with regular desludging and disposal by licensed vendors.	Contractor	Weekly
2	**Oil-Contaminated Water**	This type of effluent is produced from washing and servicing activities of vehicles, machinery, and generators at maintenance areas.	Oil-contaminated water can infiltrate soil and pollute groundwater, causing long-term environmental degradation.	Servicing will be conducted on impermeable surfaces with oil-water separators installed for effective treatment.	Contractor	After every servicing
3	**Concrete Slurry / Wash Water**	Wastewater is generated during washing of concrete mixers, tools, and batching plant equipment used in construction activities.	The high alkalinity and suspended solids in this effluent can adversely impact aquatic ecosystems if discharged untreated.	Collection pits will be installed, and water will be neutralized on-site and reused wherever possible.	Contractor	Daily during concrete work
4	**Stormwater Runoff**	Runoff occurs from exposed land surfaces, stockpiles, and construction yards,	It may carry sediments, oil, and construction debris into nearby water	Silt traps and temporary drainage channels will be constructed to retain	Contractor	Pre/post rainfall events

Sl. No.	Type of Effluent	Source	Potential Impacts	Management Measures	Responsible Party	Monitoring Frequency
		especially during heavy rainfall.	bodies, degrading water quality.	sediments and reduce pollutant load.		
5	**Chemical Contaminated Wastewater**	This may arise from the use of curing agents, solvents, or pesticide applications during site preparation or maintenance activities.	Improper handling can lead to the release of hazardous substances into the environment, affecting soil and water health.	Use of such chemicals will be minimized; if unavoidable, effluents will be stored and handed over to authorized handlers.	Contractor	As per chemical use schedule
6	**Laboratory Wastewater (if applicable)**	Wastewater may be generated from temporary laboratories used for soil or water quality testing during project execution.	Lab effluents may contain chemicals that can be harmful if discharged without treatment, leading to localized pollution.	Segregated drainage will be established and the effluent will be collected in containers for proper disposal.	Contractor	Monthly or as generated

Q ANNEX: IMPLEMENTATION OF SAFETY PROCEDURES FOR MATERIAL HANDLING AND EQUIPMENT

Table 105:Implementation of Safety Procedures for Material Handling and Equipment

S/N	Procedure	Action/Measure	Implementation	Monitoring/Review
1	LIFO (Last In, First Out)	Ensure that materials, particularly hazardous waste and equipment, are used or disposed of in reverse order of receipt.	EHS Officer of Contractor	Monthly review of material handling practices. Ensure proper inventory rotation and waste disposal.
2	FIFO (First In, First Out)	Implement FIFO in handling construction materials and equipment, ensuring older stock is used first.	EHS Officer of Contractor	Weekly audits of material usage. Ensure that outdated materials are not used in critical operations.
3	Lock Out & Tag Out (LOTO)	Apply LOTO procedures to isolate and de-energize machinery and electrical systems before maintenance or repair work.	EHS Officer of Contractor	Regular inspection of LOTO procedures. Ensure that tags and locks are securely placed and documented.
4	Electrical Safety (LOTO)	Workers must use LOTO when working with electrical equipment, securing power sources and preventing unauthorized access.	EHS Officer of Contractor	Daily checks of equipment before maintenance. Confirm compliance with LOTO protocols.
5	PPE & Training for LOTO	Provide necessary PPE and regular training for workers to understand and properly implement LOTO procedures.	EHS Officer of Contractor	Ensure workers have valid PPE certifications. Regular H&S meetings to reinforce LOTO training.

R ANNEX: ESMP FOR PRE-CONSTRUCTION AND CONSTRUCTION PHASE

328. The ESMP for the pre-construction and construction phases is designed to be practical, actionable, and site-responsive. It ensures that mitigation measures are embedded into daily construction activities and contractor obligations. Regular Amonitoring are integral to this framework to ensure compliance, early correction of deviations, and accountability across all project components.

329. The following table provides a consolidated view of the environmental and social aspects identified during the early stages of the project and outlines the corresponding management responses for effective implementation.

Table 106: ESMP For Pre-Construction and Construction Phase

Category	Issue/Aspect	Potential Impact	Key Mitigation Strategies	Lead Actor	Oversight
Land and Site Use	Land acquisition and access	Permanent loss of agricultural land; temporary requisition for camps and access roads	Notify and compensate landowners in line with ADB and DoE policy; develop and implement a Resettlement Plan; prioritize GIS design to reduce footprint	DC, POWER GRID	POWER GRID, DSC
	Site preparation and topsoil	Disruption of fertile soil layers in paddy fields	Strip and store topsoil separately for reuse; avoid unnecessary excavation at Purbachal-2 site	Contractor	DSC
	Vegetation/tree removal	Loss of trees and surface vegetation; impact on microhabitat	Compensate before removal; maintain 1:3 tree plantation ratio; minimize clearing area	Contractor	DSC
Biodiversity & Habitat	Wildlife disturbance	Noise/light from construction; loss of small waterbodies affecting local species	Prohibit wildlife disturbance; restrict night work; compensate waterbody loss with equal restoration on newly acquired land	Contractor, DC	POWER GRID, DSC
Waste and Pollution	Construction waste	Accumulation of scrap, packaging, and non-hazardous materials	Prepare a Waste Management Plan; segregate and reuse materials; dispose residuals through licensed landfill operators	Contractor	DSC
	Hazardous waste and oils	Soil/water contamination from spills and leaks	Store oils on impervious platforms with bunds; prohibit PCBs in transformers; monitor and train staff on handling	Contractor	DSC
	Wastewater and runoff	Discharge of untreated effluents from camps, equipment wash, and surface runoff	Install toilets and septic systems; reuse concrete wash water; build temporary drainage and sedimentation pits	Contractor	DSC
Hydrology	Drainage and flood risk	Obstruction of natural flow causing local flooding	Elevate platforms above HFL; integrate culverts into access road design; avoid	Contractor	POWER GRID, DSC

Category	Issue/Aspect	Potential Impact	Key Mitigation Strategies	Lead Actor	Oversight
			monsoon works; pump stagnant water if necessary		
Air Quality	Dust and emissions	Dust from construction vehicles and machinery; exhaust from DG sets	Water spraying; covered transport; limit idle time; enforce vehicle maintenance; provide masks to workers	Contractor	DSC
Noise and Vibration	Construction and equipment noise	Hearing damage to workers; nuisance to nearby settlements	Prohibit night work; use mufflers; install noise barriers if exceedances occur; provide hearing PPE	Contractor	DSC
Worker & Community H&S	Occupational hazards	Risk of injury due to unsafe working conditions	Appoint qualified H&S manager; deliver safety briefings; ensure PPE use; maintain first aid kits and signage	Contractor	POWER GRID, DSC
	Public safety	Exposure to accidents, noise, or dust near communities	Install fencing and warning signs; restrict access; design and implement emergency response plans	Contractor	DSC
Logistics & Traffic	Road congestion and accidents	Movement of heavy vehicles may obstruct traffic and increase accident risk	Follow BRTA guidelines; schedule off-peak deliveries; deploy traffic marshals; use reflective signals and lighting	Contractor	DSC
Cultural & Social	Physical cultural chance finds	Accidental damage to unrecorded cultural assets	Implement Chance Find Protocol; suspend work upon discovery and notify competent authority	Contractor	DSC
	Livelihood impacts	Displacement or income loss of PAPs; missed employment opportunities	Prioritize local hiring, including PAPs; ensure fair working conditions and transparent recruitment	Contractor	POWER GRID, DSC

S ANNEX: ROLES AND RESPONSIBILITIES OF COMMUNITY LIAISON IN SSEMP IMPLEMENTATION

330. Effective community engagement is essential for the successful implementation of the site-specific environmental management plan. The community liaison officer plays a crucial role in facilitating communication between the project team and local communities, ensuring transparency, addressing concerns, and promoting positive stakeholder relationships. The following table outlines the responsibilities, engagement activities, reporting mechanisms, and frequency of engagement for the community liaison under various SSEMP scopes. The goal is to mitigate potential project impacts, enhance public awareness, and foster community cooperation, ultimately contributing to the project's social and environmental sustainability.

Table 107: Community Liaison Roles and Engagement Framework in SSEMP Implementation

SL. No.	Name of Scopes	Community Liaison Responsibilities	Community Engagement Activities	Reporting and Communication	Frequency of Engagement
A.	Air Quality Management Plan	Facilitate communication with local communities regarding air quality concerns and mitigation measures.	Conduct awareness sessions on dust control, air quality monitoring, and preventive measures such as water spraying and vehicle maintenance.	Record and address concerns related to air quality. Submit periodic reports on mitigation effectiveness and compliance with national air quality standards.	Bi-weekly meetings with affected communities; Monthly reporting to project management.
B.	Noise Level Management Plan	Engage with residents and institutions to address concerns regarding construction-related noise disturbances.	Inform communities about designated working hours, noise reduction measures, and grievance redress mechanisms.	Maintain a log of noise-related complaints and ensure necessary corrective actions are implemented. Provide updates on noise monitoring results.	Monthly community engagement; Weekly monitoring and assessment.
C.	Land Use and Soil Management Plan	Coordinate with local landowners and agricultural stakeholders to minimize impacts on land use and soil conditions.	Organize consultations on land restoration plans, compensation frameworks, and erosion control methods.	Document land-related grievances and resolutions, ensuring compliance with land acquisition guidelines.	Quarterly stakeholder meetings; Continuous engagement during key construction phases.
D.	Water Resources Management Plan	Ensure open dialogue with communities regarding water	Provide information on groundwater protection, sediment	Maintain records of water-related concerns	Bi-monthly engagement;

SL. No.	Name of Scopes	Community Liaison Responsibilities	Community Engagement Activities	Reporting and Communication	Frequency of Engagement
		use, conservation, and pollution prevention strategies.	control, and water resource management.	and mitigation responses. Report compliance with water quality standards.	Regular updates based on water quality monitoring results.
E.	Ecological Resources (Flora and Fauna) Management Plan	Support biodiversity conservation efforts by fostering community awareness and involvement.	Engage local stakeholders in discussions on habitat protection, reforestation efforts, and biodiversity monitoring.	Track and report community feedback on ecological conservation measures and ensure adherence to environmental commitments.	Quarterly engagement with conservation groups and local stakeholders.
F.	Migratory Bird Management Plan	Collaborate with environmental specialists and communities to protect migratory bird populations.	Organize educational sessions on the importance of bird conservation and the use of mitigation measures such as bird diverters.	Document observations of bird interactions with transmission lines and implement necessary adjustments.	Seasonal engagement during peak migration periods; Continuous monitoring and reporting.
G.	Socio-Cultural Environmental Issues	Ensure the project respects local customs, traditions, and cultural heritage sites.	Conduct consultations with community leaders to address social concerns and promote inclusive decision-making.	Maintain a record of cultural and social concerns raised, ensuring their resolution in accordance with social impact guidelines.	Quarterly engagement with community representatives and cultural institutions.
H.	Camp, Work Site Safety, and Immigrant Workers Management	Act as a liaison between project workers and the surrounding community to promote harmony and mutual understanding.	Organize awareness programs on worker rights, safety regulations, and community integration initiatives.	Monitor and report concerns related to worker conduct, labor conditions, and camp safety.	Monthly engagement with workers and local communities; Continuous monitoring.
I.	Waste Management Plan	Promote responsible waste disposal and recycling practices within the community and project site.	Coordinate with local waste management authorities and community representatives to ensure proper waste handling.	Document community concerns related to waste management	Bi-monthly engagement; Continuous

SL. No.	Name of Scopes	Community Liaison Responsibilities	Community Engagement Activities	Reporting and Communication	Frequency of Engagement
				and submit compliance reports.	monitoring and reporting.
J.	Occupational and Public Health and Safety Management Plan	Strengthen community health and safety awareness related to project activities.	Facilitate health and safety awareness campaigns, emergency response drills, and public health education sessions.	Track and document health-related complaints and coordinate with health authorities to implement preventive measures.	Quarterly engagement; Regular safety drills and assessments.
K.	Transportation and Storage Material Management Plan	Address road safety concerns and potential traffic disruptions associated with material transportation.	Inform communities about transport schedules, road safety protocols, and alternative routes.	Maintain records of transport-related concerns and corrective measures undertaken.	Monthly engagement with local authorities and community representatives.
L.	Disaster and Emergency Risk Response Plan	Enhance community preparedness for potential disasters and emergency situations.	Organize emergency drills, provide information on evacuation plans, and establish communication channels for crisis response.	Report on emergency response effectiveness and update mitigation strategies based on community feedback.	Bi-annual community drills and emergency response evaluations.

T ANNEX: SSEMP IMPLEMENTATION SCHEDULE

NOTES	
Continuing Activity	
Activity Implementation Period	

SL. No.	Activities	Aug 2023	Sep 23	Apr 24	Oct 24	Apr 25	Oct 25	Apr 26
1.	**Baseline Environmental Quality Testing**							
1.1	Air Quality Monitoring	1 Nos						
1.2	Noise Level Monitoring	1 Nos						
1.3	Soil Quality Monitoring	1 Nos						
1.4	Water Quality Monitoring (Ground Water and Surface Water)	2 Nos						
2.	Monthly Environmental Monitoring	**Monthly Monitoring and Reporting**						
3.	Environmental Quality Testing							
3.1	Air Quality Monitoring		1 Nos	1 Nos	1 Nos	1 Nos	1 Nos	1 Nos
3.2	Noise Level Monitoring		1 Nos	1 Nos	1 Nos	1 Nos	1 Nos	1 Nos
3.3	Soil Quality Monitoring		1 Nos	1 Nos	1 Nos	1 Nos	1 Nos	1 Nos
3.4	Water Quality Monitoring (Ground Water and Surface Water)		2 Nos	2 Nos	2 Nos	2 Nos	2 Nos	2 Nos
4.	**Environmental Mitigation Measures**[19]							
4.1	Dust suppression in haul roads and material storage location							

[19] The Mitigation Measures have been developed following the Mitigation measures from Package-1 and Package-2 of Component 1.

SL. No.	Activities	Aug 2023	Sep 23	Apr 24	Oct 24	Apr 25	Oct 25	Apr 26
4.2	Providing sewage tank/soak well in construction camps							
4.3	Installation of Tube well and safe drinking water supply							
4.4	Providing solid waste management facility in construction camp medium and small size dustbins							
4.5	Disposal of construction debris and other waste materials and transportation							
4.6	Protection of ponds							
4.7	Traffic management		As per EHS Plan					
4.8	Occupational safety appliances and PPE for workers	As per EHS Plan						
4.9	Informatory Signage for safety near sensitive locations and built-up sections							
5.	**Training for Workers and Institutional Strengthening**							
5.1	Training to workers and Project Personnel on occupational health and safety	Monthly Basis Training (Each 1 Nos/ Month)						
6.	**Uninterrupted Operational Activities**							
6.1	Power Supply	As per Requirement						
6.2	Short Circuit/ Accident	As per Requirement						
6.3	EMF	As per Requirement						

U ANNEX: ENVIRONMENTAL CLEARANCE CERTIFICATE OF THE PROJECT

Hanbaek Co., Ltd. P.O. Box 62241
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Ref.: HBC/PGCB/DWZTGEP/LILO/P1/2025/16
Date: 06th February, 2025

To,
Project Director
DWZTGE Project
Power Grid Bangladesh PLC
9th Floor, PGCB Head Office,
Aftabnagar, Dhaka-1212, Bangladesh

Contract: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)

[Contract No.: PGCB/ADB/3853-BAN/DWZTGEP/400KV&230V LILO/P1, Date: 25.09.2023]
Section C: F/C LILO of Existing Tongi – Ghorashal 230kV D/C T/L to Kaliganj Substation

Subject: **Request to Provide ECC (Environmental Clearance Certificate) of the Project and GRC (Grievance Redress Committee) of PGB PLC**

Dear Sir,

With reference to above we would like to inform you that we have submitted the Site-Specific Environmental Management Plan (SSEMP) and your environment department have given some comments on it. As per their comments we have to submit ECC (Environmental Clearance Certificate) of the Project and GRC (Grievance Redress Committee) of PGB PLC along with the revised SSEMP report.

In view of above, we would request you to provide ECC (Environmental Clearance Certificate) of the Project and GRC (Grievance Redress Committee) of PGB PLC at the earliest convenience so that we can go ahead for our next activities accordingly.

Thanking you and assuring you of our best attention always.

Sincerely yours

HANBAEK CO., LTD. hanbaek KOREA

Jungsu Lee – Director
Hanbaek Company Ltd. - Korea

Encl : As stated above
CC : Superintending Engineer-TLD (Design & QC), PGB PLC, Dhaka

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Government of the People's Republic of Bangladesh
Department of Environment
Head Office, E-16 Agargaon
Dhaka-1207, Bangladesh
www.doe.gov.bd

Memo No: 22.02.0000.018.72.055.20. 160 Date: 28/07/2020

Subject: **Environmental Clearance for Dhaka and Western Zone Transmission Grid Expansion Project of Power Grid Company of Bangladesh Ltd. (PGCB).**

Ref : Your Application dated 10/06/2020 and 19/07/2020.

With reference to the above, the Department of Environment (DOE) is pleased to award the Environmental Clearance in favor of the Dhaka and Western Zone Transmission Grid Expansion Project of Power Grid Company of Bangladesh Ltd. (PGCB) subject to fulfilling the following terms and conditions:

1. The activity under this Project shall not result in the loss of containment of any materials that would affect health or will have damaging impact on the environment or natural resources.
2. Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed Transmission Pipeline construction program.
3. No solid waste can be burnt in the project area. An environment friendly solid waste management should be in place during whole the period of the project in the field.
4. Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be demolished or destructed.
5. All the required mitigation measures suggested in the EMP report along with the emergency response plan are to be strictly implemented and kept operative/ functioning on a continuous basis.
6. To reduce dust, spraying of water over the earthen materials should be carried out from time to time.
7. Resettlement plan should be properly implemented and people should be adequately compensated.
8. After the construction work, top soil should be properly restored. No wetland should be filled up.
9. Construction material should be properly disposed off after the construction work is over.
10. As described in the report environmental monitoring should be strictly followed and monitoring report should be shared with DOE to ensure the environmental management properly.
11. At the time of commissioning of the Transmission Pipeline and other facilities utmost precautionary measures should be taken to reduce the possibility of accident.
12. The Environmental Management Plan (EMP) included in the EMP Report shall strictly be implemented and kept functioning on a continuous basis.

13. In case of any emergency, the following information shall immediately be reported to Headquarter of the Department of Environment (DOE) simultaneously
    a) Nature of incident (fire, accident, collision, etc.)
    b) Personnel affected (injured, missing, fatalities, etc.)
    c) Emergency support available and its location (standby transport, medical facilities, etc.)
    d) Weather conditions
    e) Current operations (abandoning the site, fire fighting, etc.)
14. All pollution incidents shall be reported immediately and simultaneously to the nearby Office of the Department of Environment.
15. Full and adequate utilization of the techniques for mitigation of pollution and environmental damage as well as that for treatment of wastes shall be ensured.
16. Power Grid Company of Bangladesh Ltd (PGCB) shall submit a detail work plan with time schedule of development activities at least 7(seven) days ahead of the work commences in the field to Headquarter of the Department of Environment (DOE) simultaneously.
17. On completion of the Transmission Pipeline and other construction, the project authority shall hand-over and leave the land to the actual land-owner in a replenished condition in terms of fertility and topography.
18. Comprehensive Environmental Performance report shall be submitted on a monthly basis to the DOE Headquarter including actual intervention and the rehabilitation, mitigation and treatment options adopted at the project site.
19. All parameters of effluent, gaseous emission, noise, solid waste, hazardous waste, etc. shall be within the limits in the Environment Conservation Rules (ECR) 1997. In case of non-coverage of ECR 1997 the World Bank Environment, Health and Safety Guideline shall be adhered to.
20. There shall be specific format for Environment Monitoring. Environmental Monitoring Reports shall be made available to DOE Head Quarter on a monthly basis during the whole period of the well development project.
21. Rehabilitation of human settlement or compensation for any sort of activity which will incur damage or loss of public or private property or any natural resources shall be addressed as per Government of Bangladesh rules and regulations;
22. No activity of cutting/razing/dressing of hill or hilly land is endorsed under this clearance without due permission/clearance of the concerned authority of the Government of Bangladesh.
23. Appropriate permission would be required to obtain from the forest department in favor of cutting/felling of any plant/tree/sapling forested by any individual or government before doing such type of activity.
24. Power Grid Company of Bangladesh Ltd (PGCB) shall extend active cooperation to DOE officials to facilitate their visit to the site as and when necessary.
25. This clearance is valid only for the said component of Power Grid Company of Bangladesh Ltd (PGCB)as figured out in the EMP report submitted to this department.

26. This clearance is valid for one year from the date of issuance and the project authority shall apply for renewal to the Head Office of DoE with a copy to the divisional/Regional offices of DoE concerned at least 30 days ahead of expiry.
27. Violation of any of the above mentioned conditions shall render this Environmental Clearance as void and legal action will be taken as per Environmental Conservation Act, 1995 and Environmental Conservation Rules, 1997.
28. This Environmental Clearance Certificate has been issued with the approval of the appropriate authority.

28.07.2020

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 8181673

Project Director (Chief Engineer)
Dhaka and Western Zone Transmission Grid Expansion Project
Power Grid Company of Bangladesh Ltd (PGCB)
NLDC Bhaban (8th floor), Avenue-3, Jahurul Islam City
Aftabnagar, Badda, Dhaka-1212.

Copy Forwarded to :

1) PS to Secretary, Ministry of Environment, Forest and Climate Change, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional/ Rajshahi/ Khulna/ Barishal/ Rangpur Divisional Office, Dhaka/ Rajshahi/ Khulna/ Barishal/ Rangpur.
3) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Primary ECC Certificate

Government of the People's Republic of Bangladesh
Ministry of Environment, Forest and Climate Change
Department of Environment
Environment Clearance Section
www.doe.gov.bd

Record Number: 22.02.0000.018.72.055.20.84 Date: 29/08/2024

Subject: Renewal of Environmental Clearance for Dhaka and Western Zone Transmission Grid Expansion Project of Power Grid Company of Bangladesh Ltd.

Reference: Memo no: 27.21.0000.453.014.000.24.975; dated 04.08.2024

With reference to your above application, the Department of Environment hereby renews the Environmental Clearance of Dhaka and Western Zone Transmission Grid Expansion Project of Power Grid Company of Bangladesh Ltd. The terms and conditions stated in the Environmental Clearance of the above project issued on 28.07.2020 vide memo no. 22.02.0000.018.72.055.20.160 shall remain valid for the renewed period.

2. This renewal is valid up to 27 July, 2025. For further renewal an application along with a) the renewal fees (as per the ECR, 2023) b) VAT on renewal fees (in separate Treasury Chalan) and c) all associated documents shall be submitted to the Head Office of DoE at least 30 days ahead of expiry date.

29-08-2024
Masud Iqbal Md Shameem
Director
222218342
direc@doe.gov.bd

Project Director (Chief Engineer), Dhaka and Western Zone Transmission Grid Expansion Project, Power Grid Company of Bangladesh Ltd. (PGCB) PGCB Bhaban, Avenue-03, Jahurul Islam City Aftabnagar, Badda, Dhaka.

Record Number: 22.02.0000.018.72.055.20.84/1 (2) Date: 29/08/2024

Copy for Kind Information and Necessary Action **(Not in the order of seniority)** :

1. Director, Department of Environment, Dhaka Regional/Rajshahi/Khulna/Barishal/Rangpur Divisional Office, Dhaka/Bogura/Khulna/Barishal/Rangpur and
2. Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka..

29-08-2024
Masud Iqbal Md Shameem
Director

Renewed ECC Copy

V ANNEX: DOCUMENTS TO BE SUBMITTED TO POWER GRID

Tender Document - 01

- The Contractor, immediately after notification of award, shall provide the Employer free of charge with 8 hardcopies of all engineering data, drawings, and descriptive materials submitted with the bid, which will form part of the contract
- SSEMP Report
- 15 hard copies of contract document
- For the shipment of plant, shipping documents need to be distributed as follows
  - i. To the project director, POWER GRID, Aftabnagar, Badda, Dhaka
    - ❖ 1 copy of original plus 10 copies of the invoices endorsed by the contractor
    - ❖ 1 copy of Negotiable plus 10 copies of the bill of lading endorsed by the contractor
    - ❖ 1 copy of original plus 10 copies of the insurance certificate
    - ❖ 10 copies of packing lists
    - ❖ 10 copies of the freight memo
    - ❖ 1 original plus 10 copies of the certificate of origin
    - ❖ 10 copies of the insurance invoice
    - ❖ 10 copies of the application for payment
    - ❖ 10 copies of the pre shipment inspection certificate or waiver thereof
  - ii. To the project manager
    - ❖ 2 copies of the above documentation
  - iii. To the representative of project manager
    - ❖ 2 copies of the above documentation
- Site Specific Health and Safety Management Plan (SSHSMP)
- The contractor shall submit semi-annual reports (environmental) on the carrying out of such measures to the Employer
- Organizational Chart
- Detailed program of performance of the contract

Tender Document – 02

- Quality Assurance Program (Clause 3.2)
- Quality Plan (Clause 3.3)
- Equivalent Standards (Clause 3.4)
- Contract Drawing list (Clause 4.5.3)
- Contract Record list (Clause 4.5.4)
- Route Maps (Clause 4.5.5)
- Supply and Install Material Manual (Clause 4.7)
- Maintenance Manual (Clause 4.8)
- Photographs (Clause 4.10)
- Route Clearance (Clause 5.3)
- Scaffolding (Clause 5.5.3)
- Live Line Scaffolding (Clause 5.5.4)
- Route Map, Mouza map and profile drawings (Clause 6.2.6)
- Slope stability analysis (Clause 6.3.1)
- Dynamic probe (Clause 6.6.1)
- Geotechnical investigation (Clause 6.7)
- Installation Method Statement (Clause 7.1.2)
- Drilled Shaft foundation method statement (Clause 7.1.4.2)
- River Crossing tower foundations method statement (Clause 7.1.2)
- Concrete specification (Clause 7.4)
- Potential Alkali Reactivity – Test Results (Clause 7.4.2)
- Reinforcing Bar couplers (Clause 7.4.4)
- Spacers (details of system) (Clause 7.4.5)
- Working area reinstatement (Programme of work) (Clause 7.5.19)
- Protection of buried steelwork (quality control proposals) (Clause 7.6.6)
- Reinforcement – test certificates (if requested) (Clause 7.7.3)
- Inspection prior to concreting (inspection record) (Clause 7.7.4)
- Trial mixes – test results (Clause 7.7.5)
- Works cubes – test results (Clause 7.7.6.1)
- Foundation incorrect setting (remedial measures) (Clause 7.7.8)
- Foundation setting out records (Clause 7.7.8)
- Imported backfill – detail (Clause 7.7.9)
- Foundation Tests – test proposal (Clause 7.7.10)
- Foundation Tests – test results (Clause 7.7.10)
- Integrity Testing – test records (if requested) (Clause 7.7.10)
- Earth Resistance Tests – test records (Clause 7.7.14)
- Protective coating – Routine tests (Clause 7.7.15)
- Protection coatings – test records (if requested) (Clause 7.7.15)
- Design Calculation (Under Clause 8)
- Fabrication drawings (Under Clause 8)
- Method statement – tower erection (Under Clause 8)
- Material test certificates (Under Clause 8)
- Bolt and nut test certificates (Under Clause 8)
- Welding procedures (Under Clause 8)
- Welder's test certificates (Under Clause 8)
- NDT procedures (Under Clause 8)
- NDT inspection reports (Under Clause 8)

- Galvanizing test records (if requested) (Under Clause 8)
- Ingot zinc certificates (Under Clause 8)
- Pot melt analysis (Under Clause 8)
- Proto type tower test programme (Under Clause 8)
- Proto type test reports (Under Clause 8)
- Certificate of conformity (Under Clause 8)
- Tower erection records (Under Clause 8)
- Insulator & conductor fittings – contract drawings (Clause 10.4.1)
- Installation procedures (Clause 10.4.3)
- Insulator and conductor fittings – type test certificate (if requested) (Clause 10.6.1)
- Type test – Programme and procedures (Clause 10.6.1)
- Galvanizing test results (if requested) (Clause 10.6.2.12)
- Ingot zinc certificates (if requested) (Clause 10.6.5)
- Metallic & bolt/nuts material test certificate (if requested) (Clause 10.6.5)
- Insulator & conductor fittings – type test results (Clause 10.6.5)
- Insulator & conductor fittings – sample test results (Clause 10.6.5)
- Insulator & conductor fittings – routine test results (if requested) (Clause 10.6.5)
- Certificates of conformity (Clause 10.6.6)
- Design of non-standard conductors (Clause 11.2.1)
- Conductor erection-method statement (Clause 11.6.1)
- Conductor joint schedule (Clause 11.6.2)
- Inelastic extension – creep calculation (Clause 11.6.5)
- Sag and tension calculations (Clause 11.6.6)
- Temporary guy – support loading (Clause 11.6.7)
- Temporary scaffolds – calculations and drawings (Clause 11.6.11)
- Live line scaffolds – calculation and drawings (Clause 11.6.12)
- Conductor grease – type test results (Clause 11.7.2)
- Galvanizing test results (if requested) (Clause 11.7.5)
- Ingot zinc certificates (if requested) (Clause 11.7.5)
- Aluminum clad steel certificates (if requested) (Clause 11.7.10)
- Metallic materials – test certificates (Clause 11.7.9)
- Conductor grease – type test results (Clause 11.7.9)
- Conductor – sample test results (Clause 11.7.9)
- Conductor grease – sample test results (Clause 11.7.9)
- Certificate of conformity (Clause 11.7.10)
- Bolt tightness (if requested) (Clause 11.7.15)
- Final records – SIMM (if requested) (Clause 11.7.18)
- Vibration dampers – contract drawings (Clause 12.4.1)
- Installation procedures (Clause 12.4.3)
- Type test programme and procedures (Clause 12.6.1)
- Vibration dampers – type test certificates (Clause 12.6.1)
- Galvanising test results (Clause 12.6.10)
- Ingot zinc certificates (Clause 12.6.10)
- Metallic material test certificates (Clause 12.6.11)
- Bolts and nut material type test certificates (Clause 12.6.11)
- Vibration dampers – type test results (Clause 12.6.11)
- Vibration dampers – sample test results (Clause 12.6.11)
- Certificate of conformity (Clause 12.6.12)
- Spacer, spacer damper – contract drawings (Clause 13.4.1)
- Installation procedures (Clause 13.4.3)
- Type test-programme and procedures (Clause 13.6.1)
- Spacer, spacer damper – type test certificates (Clause 13.6.1)
- Galvanizing test results (Clause 13.6.15)
- Ingot zinc certificates (Clause 13.6.15)
- Metallic, non-metallic material test certificate (Clause 13.6.16)
- Bolts & nuts material test certificates (Clause 13.6.16)
- Spacer, spacer damper – type test results (Clause 13.6.16)
- Spacer, spacer damper – sample test results (Clause 13.6.16)
- Certificate of conformity (Clause 13.6.17)
- Expected overall attenuation and dispersion (Clause 14.2.3)
- Optical Joint Boxes – contract drawings and fixing clamps – contract drawings (Clause 14.4.1)
- Installation instructions (Clause 14.6.1)
- Method statement (Clause 14.6.1)
- OPGW fittings, non-metallic underground fibre optic cable and optical fibres – type test certificates (Clause 14.7.1)
- Type test programme (Clause 14.7.2)
- OPGW – fatigue life (documentary evidence) (Clause 14.7.2)
- OPGW – lighting strike (test proposals) (Clause 14.7.2)

- OPGW – routine tests (test proposals) (Clause 14.7.2)
- Optical joint boxes – visual inspection test records (Clause 14.7.4)
- OPGW fittings and optical fibres – type test records (Clause 14.7.9)
- OPGW fittings and optical fibres – routine test reocrds (Clause 14.7.9)
- Certificate of conformity (Clause 14.7.8)
- Installation test records (Clause 14.7.9)
- Tower painting – painting system (Clause 15.2.10)
- Obstruction aids – contract drawing (Clause 15.4.1)
- Painting – method statement (Clause 15.6.2)
- Test proposals – type, sample, routine (Clause 15.7.1)
- Galvanizing test results (if requested) (Clause 15.7.2)
- Metallic material test certificates (if requested) (Clause 15.7.3)
- Bolt and nuts test certificates (if requested) (Clause 15.7.3)
- Non-metallic material test certificates (if requested) (Clause 15.7.3)
- Type test records (Clause 15.7.3)
- Sample test records (Clause 15.7.3)
- Routine test records (if requested) (Clause 15.7.3)
- Certificate of conformity (Clause 15.7.4)
- Commissioning test proposals (Clause 15.7.5)
- Paining – routine test procedure (Clause 15.7.6)

W ANNEX: DETAILED OFFICE ORDER OF GRC

পাওয়ার গ্রিড কোম্পানি অব বাংলাদেশ লিঃ
POWER GRID COMPANY OF BANGLADESH LTD.
(An Enterprise of Bangladesh Power Development Board)
ISO 9001 : 2015 CERTIFIED

Ref. No.:27.21.0000.453.06.001.21.122 Date: 04/03/2021

Office Order

As per approval of PGCB management a Grievance Redress Committee for "Dhaka & Western Zone Transmission Grid Expansion Project" has been formed by following members:

Sl. No.	Name & Designation	Name of the Office	Status in Committee
1.	Deputy Project Director of concerned package	DWZTGEP, PGCB	Convener
2.	Executive Engineer of concerned package	DWZTGEP, PGCB	Member
3.	Manager Accounts & Admin	DWZTGEP, PGCB	Member
4.	Sub -Divisional Engineer / Assistant Engineer/ Sub Asst. Engineer of concerned package	DWZTGEP, PGCB	Member
5.	Project Manager or representative of concerned Turnkey Contractor	Concern Turnkey Contractor	Member
6.	Representative of RAP implementation consultant.	RAP implementation consultant	Member
7.	Local Union Parishad Member	Union Parishad	Member

Committee will manage construction related complaints & payment for compensation and make report time to time to undersigned.

4/3/2021

(Md. Sharfuddin Hossain)
Project Director (CE)
Dhaka & Western Zone Transmission
Grid Expansion Project
Mobile No: 01713850419

Copy to:

1. *Managing Director, PGCB*
2. *Executive Director (P&D/O&M/Finance), PGCB.*
3. *Chief Engineer, (P&D), PGCB*
4. *Mr.*.....Convener/ Member of the Committee.
5. *BRM, ADB, Dhaka.*
6. *Office Copy.*

PGCB Bhaban, Avenue-3, Jahurul Islam City, Aftabnagar, Badda. Dhaka-1212.
Web : www.pgcb.gov.bd, PABX : +88-02 55046731-35, Fax : +88-02 55046722, E-mail : info@pgcb.gov.bd

X ANNEX: COPY OF REVISED PUBLIC NOTICE

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার
জেলা প্রশাসকের কার্যালয়, গাজীপুর
সাধারণ শাখা
www.gazipur.gov.bd

নম্বর: ০৫.৪১.৩৩০০.০০৫.১৩.০০১.২৪-

তারিখ: ফাল্গুন ১৪৩১ / ফেব্রুয়ারি ২০২৫

"সংশোধিত **গণবিজ্ঞপ্তি**"

বিষয় : গণপ্রজাতন্ত্রী বাংলাদেশ সরকার (GoB), Asian Development Bank (ADB) ও Asian Infrastructure Investment Bank (AIIB) এর যৌথ অর্থায়নে বাস্তবায়িত "Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP)" এর আওতায় টঙ্গী-ঘোড়াশাল ২৩০ কেভি সঞ্চালন লাইনের ৩.৫ কি. মি. ও ৪০০ কেভি ঘোড়াশাল-কালীগঞ্জ-পূর্বাচল সঞ্চালন লাইনের ২ কি. মি. দীর্ঘ লাইন-ইন-লাইন -আউট (LILO) লাইন নির্মাণ কাজের Right of Way (RoW) সংক্রান্ত।

বিদ্যুৎ আইন, ২০১৮ এর ধারা ৬ এর উপ-ধারা (২) ও বিদ্যুৎ বিধিমালা, ২০২০ এর বিধি-৩ এর উপ-বিধি (৭) অনুযায়ী পাওয়ার গ্রিড বাংলাদেশ পিএলসি এর অধীনে Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP) প্রকল্পের আওতায় নির্মাণাধীন টঙ্গী-ঘোড়াশাল ২৩০ কেভি এবং ঘোড়াশাল-কালীগঞ্জ-পূর্বাচল ৪০০ কেভি সঞ্চালন/বিতরণ লাইন গাজীপুর জেলার কালীগঞ্জ উপজেলাধীন বক্তারপুর ইউনিয়ন পরিষদ ও কালীগঞ্জ পৌরসভা এর উপর দিয়ে অতিক্রম করিবে। এই সময় সংশ্লিষ্ট এলাকার ফসলাদি, বৃক্ষরাজীর কিছু ক্ষতি হইতে পারে বিধায় সংশ্লিষ্ট সংস্থা সরকার কর্তৃক অনুমোদিত হারে ক্ষতিগ্রস্থ সকল মালিককে ফসলাদি, বৃক্ষরাজীর ক্ষতিপূরণ দিতে বাধ্য থাকিবে। **সংশ্লিষ্ট কর্তৃপক্ষ কর্তৃক ক্ষতিগ্রস্ত জমির মালিকগণকে সঞ্চালন লাইনের টাওয়ার নির্মাণকল্পে ব্যবহৃত জমির বাজার মূল্যের সমপরিমান ক্ষতিপূরণ প্রদানের জন্য "ঢাকা এবং পশ্চিমাঞ্চলীয় গ্রিড সঞ্চালন ব্যবস্থা সম্প্রসারণ" শীর্ষক প্রকল্পের স্টিয়ারিং কমিটির ৯ম সভার কার্যবিবরণীর ৩.১ নং সিদ্ধান্ত অনুযায়ী সঞ্চালন লাইনের টাওয়ার নির্মাণের জন্য ক্ষতিগ্রস্থ জমির ক্ষতিপূরণের ব্যয় বিধি মোতাবেক নির্বাহ করা হবে।**

এই সব প্রকল্প দেশের সার্বিক উন্নয়নের স্বার্থে অতীব জনগুরুত্বপূর্ণ। এই ধরণের প্রকল্পের কাজ যাহাতে সুষ্ঠুভাবে সম্পন্ন হইতে পারে সেইজন্য সংশ্লিষ্ট এলাকার সকল জনসাধারণকে উক্ত উন্নয়ন কাজে সহযোগিতা করিবার জন্য বিশেষভাবে অনুরোধ করা যাইতেছে।

বর্ণিত যে সমস্ত এলাকার উপর দিয়ে উক্ত বিদ্যুৎ সঞ্চালন/বিতরণ লাইনসমূহ নির্মাণ করা হইবে সেই সমস্ত এলাকার উপজেলা নির্বাহী অফিসার, থানার ভারপ্রাপ্ত কর্মকর্তা ও অন্য সকল কর্মকর্তা এবং সংশ্লিষ্ট পৌরসভার প্রশাসক, ইউনিয়ন পরিষদের চেয়ারম্যান ও সদস্যগণকে বিশেষভাবে অনুরোধ করা যাইতেছে যে, তাহারা যেন এই বিষয়ে পাওয়ার গ্রিড বাংলাদেশ পিএলসি এর কর্মকতা/কর্মচারীদেরকে সার্বিক সাহায্য ও সহযোগিতা প্রদান করেন।

এই প্রসঙ্গে সকলকে সতর্ক করা যাইতেছে যে, গণপ্রজাতন্ত্রী বাংলাদেশ সরকারের জাতীয় গুরুত্বপূর্ণ প্রকল্পের কাজে যাহারা প্রতিবন্ধকতা সৃষ্টি করিবে তাহাদের বিরুদ্ধে আইন মোতাবেক যথাযথ ব্যবস্থা গ্রহণ করা হইবে।

গুরুত্বপূর্ণ এই প্রকল্পের কাজটি সুষ্ঠুভাবে সম্পন্ন করিবার নিমিত্ত সকলকে সার্বিক সহযোগিতা প্রদানের জন্য বিশেষভাবে অনুরোধ করা যাইতেছে।

স্বাঃ
নাফিসা আরেফীন
জেলা প্রশাসক ও জেলা ম্যাজিস্ট্রেট
গাজীপুর
ফোন : ০২-৪৯২৭৩০৭০
ই-মেইল : dcgazipur@mopa.gov.bd

নম্বর: ০৫.৪১.৩৩০০.০০৫.১৩.০০১.২৪- ২৭৬/১৬

তারিখ: ১৪ ফাল্গুন ১৪৩১ / ২৭ ফেব্রুয়ারি ২০২৫

বিতরণ জ্ঞাতার্থে ও কার্যার্থে (জ্যৈষ্ঠতার ক্রমানুসারে নয়):

০১। মন্ত্রিপরিষদ সচিব, মন্ত্রিপরিষদ বিভাগ, বাংলাদেশ সচিবালয়, ঢাকা
০২। সিনিয়র সচিব, জনপ্রশাসন মন্ত্রণালয়, বাংলাদেশ সচিবালয়, ঢাকা
০৩। সচিব, বিদ্যুৎ বিভাগ, বিদ্যুৎ, জ্বালানী ও খনিজ সম্পদ মন্ত্রণালয়, বাংলাদেশ সচিবালয়, ঢাকা
০৪। বিভাগীয় কমিশনার, ঢাকা বিভাগ, ঢাকা
০৫। নির্বাহী পরিচালক, প্লানিং ও ডেভেলপমেন্ট বিভাগ, পাওয়ার গ্রিড, ঢাকা
০৬। পুলিশ সুপার, গাজীপুর
০৭। প্রকল্প পরিচালক, ডিডব্লিউজেডটিজিই প্রকল্প, পাওয়ার গ্রিড, ঢাকা
০৮। অতিরিক্ত জেলা প্রশাসক (রাজস্ব ও এলএ), গাজীপুর
০৯। উপজেলা নির্বাহী অফিসার, কালীগঞ্জ, গাজীপুর
১০। প্রশাসক, কালীগঞ্জ পৌরসভা, গাজীপুর
১১। উপপরিচালক, কৃষি সম্প্রসারণ অধিদপ্তর, গাজীপুর
১২। অফিসার ইন চার্জ, কালীগঞ্জ থানা, গাজীপুর
১৩। অফিস কপি।

২৬.০২.২৫
জেলা প্রশাসক ও জেলা ম্যাজিস্ট্রেট
গাজীপুর

Y ANNEX: TRAINING IMPLEMENTATION PLAN

Introduction

331. This Training Implementation Plan outlines a structured and field-ready approach for delivering all relevant Environmental, Health, and Safety (EHS) training sessions across the project lifecycle of the 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1). Given the complexity and sensitivity of the activities involving transmission tower erection, line stringing, vegetation clearance, and work near socio-culturally significant areas and sensitive ecological receptors, the plan ensures that all project workers, including contractors, laborers, and associated personnel, are well-trained in project-specific environmental management procedures, occupational safety, community engagement, and grievance redress.

Objectives

332. The primary objective of the training plan is to enhance the capacity of the workforce to prevent, manage, and mitigate environmental and social risks that are specific to the project area. It aims to ensure all personnel are informed and equipped to manage ecological sensitivities such as migratory bird flyways, cultural heritage zones, and residential proximity. The plan will also foster knowledge on managing hazardous materials, personal safety, and emergency response at transmission line construction sites.

Audience / Participants

333. The target participants of this training program include field engineers and supervisory staff, contractor site managers, foremen, skilled and unskilled laborers, drivers, equipment operators, environmental monitoring officers, safety officers, and community liaison personnel. Each group will receive tailored training based on their job responsibilities and exposure to project-related environmental and social risks.

Location of Training

- Project site base camps at key construction clusters
- Temporary shelters or schools available in non-sensitive zones
- Mobile training setups near tower erection sites

Training Delivery Approach

334. Training content will be delivered through:

  - Visual tools and posters at site
  - Demonstration-based toolbox talks
  - Mock drills and simulation exercises
  - Leaflets and pictorial manuals in Bengali
  - BCC (Behavior Change Communication) tools for community-based awareness

Table 108: Detailed Training Schedule and Frequency

Training Topic	Frequency	Target Group	Mode of Delivery	Responsibility	Site-specific Implementation Details
EHS Induction for New Workers	At Mobilization	All new staff and workers	Training will be delivered face-to-face using induction sessions and posters.	The Contractor's EHS Supervisor will be responsible for delivering this training.	Training will be conducted at labor camps before workers are deployed to the field.
Toolbox Talks and Daily Pre-start Briefings	Daily	All site workers	Daily verbal briefings will be conducted, accompanied by safety card distribution.	Site Supervisors and EHS Officers will lead these daily briefings.	Briefings will take place near tower sites before each work shift begins.
Environmental Management Training	Quarterly	Site engineers, Contractor's staff	Training will be conducted through group sessions and field demonstrations.	The Environmental Specialist from contractor will facilitate these training sessions.	Training will include specific topics such as dust control, waste handling, and ensuring compliance with air and water regulations.
Hazardous Waste and Spill Control	Quarterly	Storekeepers, equipment operators	Training will follow a practical and scenario-based approach.	The contratctor will organize and conduct this training.	This training will take place at material storage areas and focus on practical handling procedures.
Occupational Health & Safety	Monthly	Workers, crane operators, riggers	Posters, toolbox discussions, and practical demonstrations will be used for training.	The Safety Officer will oversee and execute this training.	Training will demonstrate the proper use of PPE, safety in trenches, and basic first aid at the site.
Grievance Redress Mechanism (GRM) Awareness	Bi-monthly	All workers + Community Liaison Staff	Training will involve distribution of leaflets and interactive sessions.	The project team will be responsible.	Training will cover procedures for accessing hotlines, recording grievances, and managing verbal complaints on-site.
Training on Ecological & Bird Protection	Bi-annual	Tower erection team + foremen	Training will be conducted using videos and live demonstrations.	Environmental Monitoring Officer and an Ornithologist will conduct this training.	Topics will include migratory routes, the installation of bird diverters, and marking buffer zones.
Sanitation and Camp Hygiene	Monthly	All laborers and canteen staff	Training will include on-site demonstrations and poster presentations.	The Camp Management Team and the EHS Officer will handle this training.	Training will focus on hygiene in kitchen areas and the use of waste bins in labor camps.
Cultural Heritage Awareness	Prior to construction near religious sites	Civil works team near Fuldi Bugpara Jame Mosque, Jannatul Baky Masjid, etc.	Workshops and site visit protocols will be used as training methods.	The Contractor's Social Officer will organize and deliver this training.	Training will be provided to ensure respect for prayer times and to avoid public announcements near religious sites.
Training on COVID-19 and Communicable Disease	As per Govt. Guidelines	Entire site team	Training will include expert lectures and distribution of informational leaflets.	This training will be managed by the Health Officer or an external trainer.	Training will include location-specific protocols for emergency isolation zones and distribution points for masks.

Training Materials and Documentation

335. A variety of materials will be used to enhance understanding among the diverse workforce. These include illustrated manuals in Bengali, audiovisual content on relevant EHS topics, safety posters, PPE demonstration kits, and feedback forms. All materials will be developed in alignment with local literacy levels and will be available onsite for reference.

Monitoring and Reporting of Training Activities

336. Contractor's EHS officer will maintain attendance records and prepare training session logs after each session. These records, along with evaluation summaries, will be submitted monthly to POWER GRID for review. POWER GRID's Environmental and Social Monitoring Unit will conduct audits randomly to assess training effectiveness through behavioral observations, feedback from field staff, and comparison of performance indicators.

Continuous Improvement

337. To ensure the training remains responsive to field realities, the contractor will review the implementation every six months. The committee will evaluate the gaps in content, identify refresher needs in high-risk locations, and update the schedule and delivery format accordingly.

338. This training plan will serve as the operational guideline for all capacity building efforts at the field level under the project, ensuring safety, compliance, and environmental protection through participatory learning and responsive knowledge delivery.

Z ANNEX: SITE EMERGENCY PLAN SOP FOR DWZTGEP

- ***Introduction***

339. The Site Emergency Plan (SEP) for the Dhaka and Western Zone Transmission Grid Expansion Project (DWZTGEP) provides a comprehensive approach to managing emergency situations at the construction site. It ensures the safety of workers, contractors, and the local community by providing clear guidelines and procedures for responding to a wide range of potential incidents. These incidents include fire outbreaks, hazardous material spills, medical emergencies, electrocution, and other construction-related accidents. The SEP aims to minimize risks, safeguard workers, protect the environment, and ensure compliance with national regulations and international safety standards.

- ***Objectives***

a) Ensure the safety and well-being of workers, contractors, and the surrounding community.

b) Prevent and minimize damage to property and the environment during emergencies.

c) Provide a clear, structured approach to handling various emergency situations.

d) Comply with all applicable safety regulations and standards.

e) Ensure efficient emergency response and recovery, minimizing downtime and disruptions.

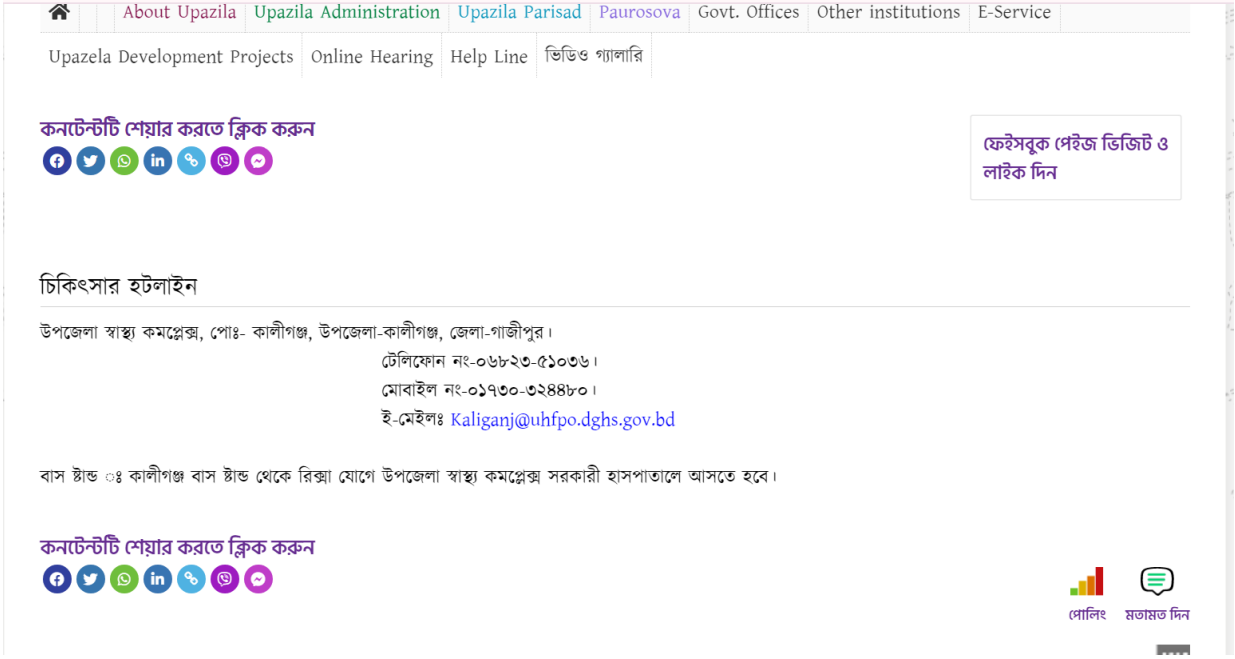
- ***Emergency Scopes***

Table 109: Site Emergency Plan SOP for DWZTGEP

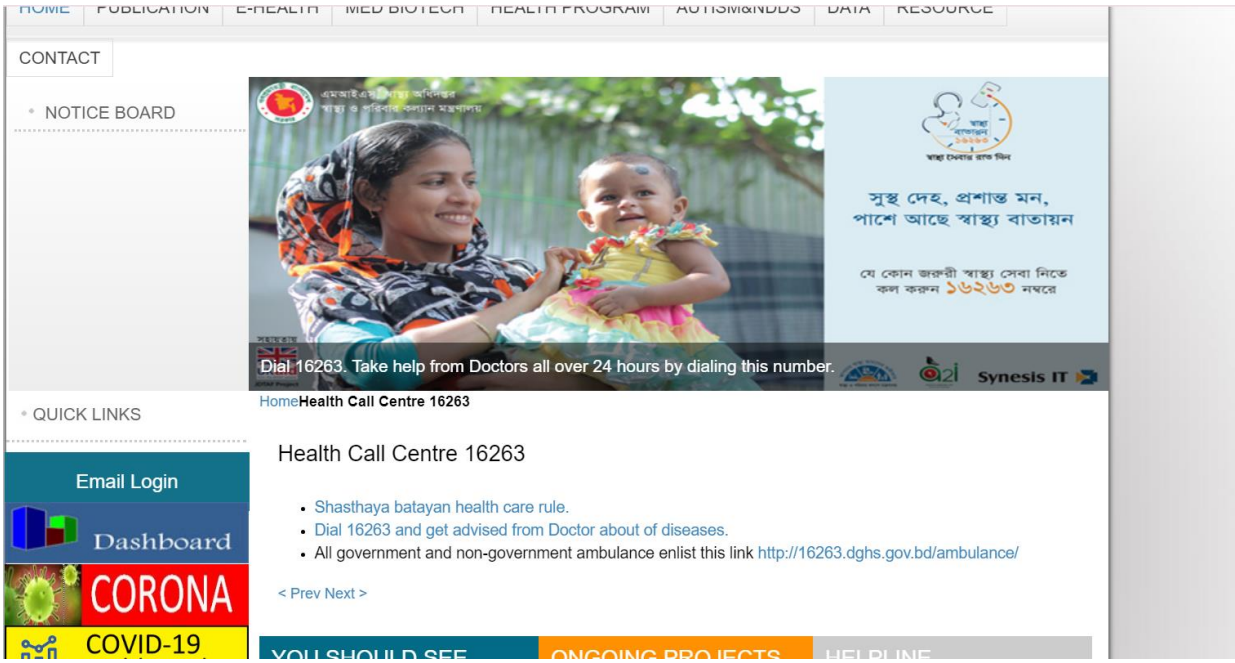
S/N	Scope of Work	Action/Measure	Responsible Party	Frequency	Monitoring and Review
1.	Fire Hazard Management	Conduct daily inspections of fire safety equipment and potential fire hazards. Ensure functional firefighting equipment.	Fire Officer and Contractor	Daily	Daily inspections and equipment check
2.	Fire Drills and Evacuation	Conduct weekly fire drills and train all workers in evacuation procedures.	Contractor, Local Fire Department	Weekly	Drill records, attendance
3.	Fire Awareness and Training	Provide fire awareness training for all staff, including new employees.	Contractor	Monthly	Training records and effectiveness evaluation
4.	Hazardous Material Spill Response	Establish containment measures for hazardous material spills. Ensure secondary containment and emergency response readiness.	Environmental Officer, Contractor	As required	Incident logs and cleanup records
5.	Health and Safety Protocols	Conduct regular health and safety inductions for all workers. Provide PPE and ensure its use. Conduct daily safety briefings.	Contractor, Safety Officer	Daily	Attendance logs, safety equipment checks
6.	Medical Emergency Response	Ensure on-site medical facilities and trained personnel for first aid and emergency treatment. Ensure ambulance service for major incidents.	Contractor	Ongoing	Medical records and incident reports
7.	Traffic Control and Safety	Control traffic movement around construction zones. Use flagmen and maintain	Contractor, Security Officer	Ongoing	Traffic logs and incident reports

S/N	Scope of Work	Action/Measure	Responsible Party	Frequency	Monitoring and Review
		speed limits. Conduct regular inspections to ensure traffic safety.			
8.	Electrical Safety Protocols	Enforce strict electrical safety measures. Ensure workers wear appropriate PPE and are trained on electrical hazards.	Contractor	Ongoing	PPE checklists, training records
9.	Emergency Response Drills	Regularly conduct emergency drills (fire, medical, and electrical accidents) to ensure effective response in case of an emergency.	Contractor, Safety Officer	Quarterly	Drill reports, worker feedback
10.	Community Health and Safety	Implement measures to control dust, noise, and traffic to protect community health. Engage local community in awareness and safety measures.	Contractor	Ongoing	Community feedback, dust and noise levels

AA ANNEX: EMERGENCY SERVICE CONTACT LIST



Upazila Health Complex



Health Center Contact List

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Personnel

Form PER – 1: Proposed Personnel

Bidders should provide the details of proposed personnel and their experience record in the relevant Information Forms below for each of the candidate.

1.	Title of position	Project Director / Project Manager
	Name	Mr. Lee Jung Su
2.	Title of position	Transmission Line Design Engineer
	Name	Mohammad Jewel Mia
3.	Title of position	Site Manager
	Name	Mr. Lee Meen Ho
4.	Title of position	Site Manager
	Name	Md. Islam Mahin
5	Title of position	Transmission Line Electrical Engineer
	Name	Dhiman Mistry
6	Title of position	Transmission Line Civil Engineer
	Name	Md. Abu Bakar Siddik
7	Title of position	Health & Safety(Accident Prevention) Officer
	Name	Mr. You Sang Chun
8	Title of position	Environmental Specialist
	Name	Sim Dongsup
9	Title of position	Social / Land Acquisition / Compensation Specialist
	Name	Md. Bablu Hossain

-Note-

All titles of positions will be as listed in section 6 (Employer's Requirements).

HANBAEK CO., LTD. KOREA

HANBAEK CO., LTD. KOREA

Project Personnel Contact List

=কালীগঞ্জ থানা:=

ক্রমিক নং	বিট নং ও বিটের নাম	বিটের আওতাধীন এলাকা	বিট অফিসারের নাম ও পদবী	মোবাইল নম্বর	বিট অফিসারের ছবি
১.	০১ নং বিট (পৌরসভা-১,২ ও ৩ নং ওয়ার্ড)	পৌরসভা-১,২ ও ৩ নং ওয়ার্ড	এসআই/ আলমগীর হোসেন	01320092481	
২.	০২ নং বিট (পৌরসভা-৪,৫ ও ৬ নং ওয়ার্ড)	পৌরসভা-৪,৫ ও ৬ নং ওয়ার্ড	এসআই/ শুকুর আলী	01320092482	
৩.	০৩ নং বিট (পৌরসভা-৭,৮ ও ৯ নং ওয়ার্ড)	পৌরসভা-৭,৮ ও ৯ নং ওয়ার্ড	এসআই/ মনিরুজ্জামান	01850-571999	
৪.	০৪ নং বিট (বাহাদুরসাদী ইউপি)	বাহাদুরসাদী ইউনিয়ন সমগ্র এলাকা	এসআই/ শহিদুল ইসলাম	01738-540347	
৫.	০৫ নং বিট (জামালপুর ইউপি)	জামালপুর ইউনিয়ন সমগ্র এলাকা	এসআই/ সুকান্ত বিশ্বাস		
৬.	০৬ নং বিট (মোক্তারপুর ইউপি)	মোক্তারপুর ইউনিয়ন সমগ্র এলাকা	এসআই/ শামীম	01671-419857	
৭.	০৭ নং বিট (বক্তারপুর ইউপি)	বক্তারপুর ইউনিয়ন সমগ্র এলাকা	এসআই/ সাইফুল ইসলাম	01320-092490	
৮.	০৮ নং বিট (জাঙ্গালিয়া ইউপি)	জাঙ্গালিয়া ইউনিয়ন সমগ্র এলাকা	এসআই/ কামাল হোসেন	01320-092489	
৯.	০৯ নং বিট (তুমুলিয়া ইউপি)	তুমুলিয়া ইউনিয়ন সমগ্র এলাকা	এসআই/ সাদিকুর রহমান	01320-092489	
১০.	১০ নং বিট (নাগরী ইউপি)	নাগরী ইউনিয়ন সমগ্র এলাকা	এসআই/ জাকির হোসেন	01320-092481	

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হ্যানবেক কোম্পানি লিমিটেড

আচরণবিধি

প্রযোজ্যতা

এই কোডটি কোম্পানির সকল পরিচালক এবং কর্মচারীদের জন্য প্রযোজ্য। এটি BSEC (অভ্যন্তরীণ ট্রেডিং নিষিদ্ধকরণ), 1995 এর অধীনে প্রণীত কোড এবং অন্যান্য সকল প্রযোজ্য নীতি, পদ্ধতি এবং কোম্পানির জন্য প্রযোজ্য বিদ্যমান নিয়ম ও বিধি ছাড়া। এই কোডটি কোম্পানির ব্যবসা পরিচালিত সমস্ত স্থান/স্থানের ক্ষেত্রে প্রযোজ্য।

আচরণের মানদন্ড

কোম্পানি আশা করে যে সকল পরিচালক, কর্মচারী, এজেন্ট এবং ঠিকাদার নাগরিকদের নিরাপত্তা ও কল্যাণ বৃদ্ধির জন্য এবং একটি সহযোগিতামূলক, দক্ষ, ইতিবাচক, সুরেলা এবং উৎপাদনশীল কর্ম পরিবেশ নিশ্চিত করার জন্য পদক্ষেপ নেবেন। যারা এই কোড অবহেলা করবেন বা ইচ্ছাকৃতভাবে লঙ্ঘন করবেন তাদের সংশোধনমূলক ব্যবস্থা নেওয়া হতে পারে, যার মধ্যে চাকরিচ্যুতিও অন্তর্ভুক্ত থাকতে পারে।

শেয়ারহোল্ডারের মূল্য

কোম্পানির পরিচালক এবং কর্মচারীরা শেয়ারহোল্ডারদের মূল্য এবং নিট সম্পদ বৃদ্ধির জন্য সম্পূর্ণরূপে প্রতিশ্রুতিবদ্ধ থাকবেন। বোর্ডের প্রতিটি সদস্য এবং সমস্ত কর্মচারী এই লক্ষ্য অর্জনের জন্য পর্যাপ্ত পদক্ষেপ এবং ব্যবস্থা গ্রহণ করবেন যা একজন সাধারণ বিচক্ষণ ব্যক্তির দ্বারা নেওয়া হত।

স্বার্থের দ্বন্দ্ব

কোম্পানির স্বার্থ এবং এই ধরনের ব্যক্তিদের ব্যক্তিগত স্বার্থের মধ্যে স্বার্থের দ্বন্দ্ব থাকলে, পরিচালক এবং কর্মচারীরা সিদ্ধান্ত গ্রহণ প্রক্রিয়ায় অংশগ্রহণ করতে পারবেন না। পরিচালক এবং কর্মচারীরা কোনও সংস্থা, ফার্ম বা কোনও ব্যক্তির সাথে জড়িত কোনও বিষয় বা লেনদেনের ক্ষেত্রে সিদ্ধান্ত গ্রহণে অংশগ্রহণ করবেন না, যেখানে এই ধরনের পরিচালক বা কর্মচারীরা আগ্রহী বলে বিবেচিত হতে পারেন।

উপহার

পরিচালক এবং কর্মচারীরা কোনও এজেন্ট/ঠিকাদার/বিক্রেতা বা কোম্পানির ব্যবসায়িক সম্পর্কযুক্ত অন্য কোনও পক্ষের কাছ থেকে কোনও উপহার, আতিথেয়তা বা বস্তুগত সুবিধা গ্রহণ করবেন না। উপহারগুলি সাধারণত নতুন বছর, ঈদ, ক্রিসমাস ইত্যাদির মতো বিশেষ উপলক্ষে দেওয়া হয় না।

কর্মচারী আইডি	কর্মচারীর নাম	তারিখ সহ স্বাক্ষর

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২০০০/- টাকার বেশি মূল্যের নয় অথবা সাধারণভাবে এবং প্রকাশ্যে বিতরণ করা হবে না এবং একটি ব্যবসায়িক মধ্যাহ্নভোজ অনুষ্ঠান যা প্রকৃতিগতভাবে অত্যন্ত গুরুত্বপূর্ণ, এই ধারার আওতায় আসবে না। সাধারণ গ্রাহক সভা, সেমিনার, সম্মেলন, ব্যবসায়িক অংশীদারদের দ্বারা আয়োজিত, উন্মুক্ত আমন্ত্রণপত্রেও কর্মচারীদের অংশগ্রহণ এই ধারার আওতায় আসবে না।

ব্যবসার সুযোগ

পরিচালক এবং কর্মচারীরা কোম্পানির অন্তর্গত এবং তাদের কাছে স্বত্বাধিকারী বলে পরিচিত কোনও ব্যবসায়িক সুযোগের সুবিধা গ্রহণ করবেন না।

সময় এবং মনোযোগ

সার্বক্ষণিক পরিচালক এবং কর্মচারীদের কোম্পানির বিষয় গুলিতে পূর্ণ সময় এবং মনোযোগ দিতে হবে এবং অন্য কোনও পেশা বা কলিংয়ে জড়িত হবে না যা তাদের তা করার ক্ষমতাকে ব্যাহত করে।

গুণমান

পরিচালক এবং কর্মচারীরা এমনভাবে কাজ করবেন যাতে কোম্পানি বাজারে তার সুনাম বজায় রাখে, অভ্যন্তরীণ এবং বহিরাগত উভয় গ্রাহকদের মানসম্পন্ন পণ্য এবং মূল্যবান পরিষেবা সরবরাহ করে এবং কোম্পানির সুনাম বৃদ্ধির জন্য ক্রমাগত কাজ করে।

তথ্য প্রচার

পরিচালক এবং কর্মচারীরা নিশ্চিত করবেন যে কোম্পানি কর্তৃক জনসাধারণের জন্য উপলব্ধ সমস্ত তথ্য সঠিক এবং অস্পষ্টতামুক্ত। কোম্পানির সাথে সম্পর্কিত এবং জনসাধারণের কাছে নয় এমন তথ্য সাধারণত গোপনীয় বলে বিবেচিত হবে। গোপনীয় তথ্য একটি মূল্যবান সম্পদ হিসাবে বিবেচিত হবে এবং সমস্ত কর্মচারী এবং পরিচালকরা তা সেই ভাবেই বিবেচনা করবেন। তথ্যের অনুমোদিত প্রকাশ রোধ করার জন্য কোম্পানি প্রয়োজনীয় সকল পদক্ষেপ গ্রহণের অধিকারী থাকবে।

তহবিল

প্রতিটি কর্মচারী ব্যক্তিগতভাবে কোম্পানির তহবিলের জন্য দায়ী থাকবেন যার উপর তিনি নিয়ন্ত্রন করেন। কোম্পানির তহবিল শুধুমাত্র কোম্পানির উদ্দেশ্যে ব্যবহার করতে হবে। প্রতিটি কর্মচারী নিশ্চিত করবেন যে তিনি এবং কোম্পানির এজেন্ট এবং ঠিকাদাররা সমস্ত যুক্তিসঙ্গত পদক্ষেপ গ্রহণ করবেন যাতে কোম্পানি কোম্পানির তহবিলের মূল্য পায় এবং প্রতিটি ব্যয়ের সঠিক এবং সময়োপযোগী রেকর্ড রাখা হয়।

কর্মচারী আইডি	কর্মচারীর নাম	তারিখ সহ স্বাক্ষর

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রেকর্ডস

প্রতিটি কর্মচারীকে আইন এবং কোম্পানির ব্যবসার দ্বারা প্রয়োজনীয় সুবিধাজনকভাবে রেকর্ড সংরক্ষণের জন্য প্রয়োজনীয় পদক্ষেপ নিতে হবে। রেকর্ডের মধ্যে রয়েছে লিখিত নথি, সিডি, কম্পিউটার হার্ড ডিস্ক, ইউএসবি ড্রাইভ, মাইক্রোফিল্ম, মাইক্রোফাইচ এবং অন্যান্য সকল মাধ্যম।

আইন মেনে চলা

কোম্পানি যাতে প্রযোজ্য আইন, বিধান, নিয়ম এবং নিয়ন্ত্রক আদেশ মেনে চলে তা নিশ্চিত করার জন্য পরিচালক এবং কর্মচারীরা পদক্ষেপ নেবেন। তারা কোম্পানির ঠিকাদার এবং এজেন্টদের কাছ থেকেও এই ধরনের সম্মতি চাইবেন। সকল কর্মচারী বাংলাদেশে প্রযোজ্য আইন মেনে চলবেন এবং অমান্য করলে তাদের বিরুদ্ধে কোম্পানির ব্যবস্থা নেওয়া হবে।

সম্পদের ব্যবহার

পরিচালক এবং কর্মচারীরা নিশ্চিত করবেন যে কোম্পানির সম্পদ কোম্পানির সর্বোত্তম স্বার্থে ব্যবহার করা হচ্ছে এবং তাদের ব্যক্তিগত সুবিধার জন্য নয়, যদি না বিশেষভাবে এই উদ্দেশ্যে বরাদ্দ করা হয়।

বৈষম্যহীনতা

অন্যান্য সকল বিষয় সমান হওয়ায়, পরিচালক এবং কর্মচারীরা জাতি, ধর্ম, বর্ণ, লিঙ্গ, প্রতিবন্ধিতা বা বৈবাহিক অবস্থার ভিত্তিতে বৈষম্য করবেন না। যেকোনো ধরণের যৌন হয়রানি নিষিদ্ধ। যৌন হয়রানির অভিযোগ তদন্ত করা হবে এবং অপরাধী ব্যক্তিদের বিরুদ্ধে ব্যবস্থা নেওয়া হবে।

সুবিধা

কোনও পরিচালক বা কর্মচারী কোম্পানি থেকে এমন কোনও অযাচিত সুবিধা গ্রহণ করবেন না যা অন্যথায় কোম্পানির ব্যবসা চলাকালীন তার জন্য উপলব্ধ হবে না

কর্মচারী আইডি	কর্মচারীর নাম	তারিখ সহ স্বাক্ষর

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প্রয়োগ

১) ১লা জানুয়ারি থেকে এই কোডটি গ্রহণ করতে হবে বলে মনে করা হবে। অন্য সকল ব্যক্তি যারা পরিচালক এবং কর্মচারী হতে পারেন তারা কোম্পানির পরিচালক বা কর্মচারী হওয়ার তারিখ থেকে কোডটি গ্রহণ করেছেন বলে মনে করা হবে।

২) কোডের উদ্দেশ্যে কোম্পানি সচিব হবেন কমপ্লায়েন্স অফিসার।

৩) সকল পরিচালক এবং ব্যবস্থাপককে কোডের বার্ষিক স্বীকৃতি দিতে হবে। কোড লঙ্ঘনের বিষয়ে অবগত যে কোনও ব্যক্তি কমপ্লায়েন্স অফিসারের সাথে সম্মতিপূর্ণ লিখিতভাবে থাকতে পারে।

৪) কোড লঙ্ঘনের সন্দেহ হলে কোম্পানি স্বতঃপ্রণোদিতভাবে অভ্যন্তরীণ তদন্ত বা তদন্ত করতে পারে।

৫) এই কোডটি কোম্পানির পরিচালনা পর্ষদ কর্তৃক বাতিল করা হতে পারে।

কর্মচারী আইডি	কর্মচারীর নাম	তারিখ সহ স্বাক্ষর

Subir Singha
General Manager
Hanbaek Co.Ltd., Korea

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

CC ANNEX: LIST OF RESPONSIBLE PERSONNEL FOR IMPLEMENTATION OF SSEMP

Hanbaek Co., Ltd. P.O. Box 62241
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)

Contract No.: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Contract Details

Hanbaek Company Limited

Sl. No.	Name with Designation	Mobile Number	E-mail Address
1	**Lee Minho** (Country Director)	+8801785678888	meen1ho@daum.net
2	**Lee Jungsu** (Director)	+8801301794280	jungsu.lee@hanbaek.co
3	**Subir Singha** (General Manager)	+8801711836720	laishram_subir@yahoo.com
4	**Md Miadul Islam Mahin** (Manager Construction)	+8801718115363	mahinhadi04@gmail.com
5	**Md Rahad Hossain** (Manager Engineering)	+8801716334118	rahad.hanbaek@gmail.com
6	**Md Abu Bakar Siddik** (Deputy Manager)	+8801711112272	anik.hanbaek@gmail.com
7	**Md Monir Hossain** (Deputy Manager)	+8801775400673	monir15889@gmail.com
8	**Mosharof Hossain** (Environmental Specialish)	+8801864983256	mosharof.greenbud@gmail.com

Subir Singha
General Manager
Hanbaek Co.Ltd., Korea

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

DD ANNEX: ISO CERTIFICATIONS OF THE CONTRACTOR

International Certification Registrar International Certification Registrar International Certification Registrar

Certificate of Registration

This is to certify that :

HAN BAEK CO., LTD.

23, Bia-ro, Gwangsan-gu, Gwangju, Korea

Has been assessed by International Certification Registrar Ltd., in respect of their Quality Management Systems and found to comply with

ISO 9001:2015

Approval is hereby granted for registration providing the rules and conditions relating to certification are observed at all times.

Certification Scope

Construction of Electric Works(Electrical Transmission, Transformation & Distribution Facilities), Fire Fighting Facilities and Telecommunication Works

Certification Date :	**19th October 2023**	**Initial Issued Date :**	**05th December 2008**
Certificate Issue Date :	**19th October 2023**	**Expiration Date :**	**19th November 2026**
Certificate No. :	**QI000923**	**IAF CODE :**	**28**

※ **This certificate is valid by completion of surveillance audit which is conducted within 12 months from the certification date.**

※ **Refer to appendix for detailed activities and location of each sites.**

The Seal of ICR Limited was here to affixed in the presence of :

President

- This certificate is intellectual property of ICR.
- This certificate is only valid by completion of surveillance audit which is conducted at least once a year.
- You can verify the authenticity of this certificate on "Certification Confirm" at www.icrqa.com
- If you can not maintain the certification, this certificate shall be returned to ICR.

ICR Co., Ltd. 1501, Daerung Post Tower 6th, 288, Beotkkot-ro, Geumcheon-gu, Seoul, Korea http://www.icrqa.com

International Certification Registrar International Certification Registrar International Certification Registrar

Certificate of Registration

This is to certify that :

HAN BAEK CO., LTD.

23, Bia-ro, Gwangsan-gu, Gwangju, Korea

Has been assessed by International Certification Registrar Ltd., in respect of their Environmental Management Systems and found to comply with

ISO 14001:2015

Approval is hereby granted for registration providing the rules and conditions relating to certification are observed at all times.

Certification Scope

Construction of Electric Works(Electrical Transmission, Transformation & Distribution Facilities), Fire Fighting Facilities and Telecommunication Works

Certification Date :	**19th October 2023**	**Initial Issued Date :**	**22nd December 2009**
Certificate Issue Date :	**19th October 2023**	**Expiration Date :**	**19th November 2026**
Certificate No. :	**EI000523**	**IAF CODE :**	**28**

※ **This certificate is valid by completion of surveillance audit which is conducted within 12 months from the certification date.**

※ **Refer to appendix for detailed activities and location of each sites.**

The Seal of ICR Limited was here to affixed in the presence of :

President

- This certificate is intellectual property of ICR.
- This certificate is only valid by completion of surveillance audit which is conducted at least once a year.
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- If you can not maintain the certification, this certificate shall be returned to ICR.

ICR Co., Ltd. 1501, Daerung Post Tower 6th, 298, Beotkkot-ro, Geumcheon-gu, Seoul, Korea http://www.icrqa.com

International Certification Registrar International Certification Registrar International Certification Registrar

Certificate of Registration

This is to certify that :

HAN BAEK CO., LTD.

23, Bia-ro, Gwangsan-gu, Gwangju, Korea

Has been assessed by International Certification Registrar Ltd., in respect of their Occupational Health and Safety Management Systems and found to comply with

ISO 45001:2018

Approval is hereby granted for registration providing the rules and conditions relating to certification are observed at all times.

Certification Scope

Construction of Electric Works(Electrical Transmission,Transformation & Distribution Facilities), Fire Fighting Facilities and Telecommunication Works

Certification Date :	**26th July 2022**	**Initial Issued Date :**	**26th July 2022**
Certificate Issue Date :	**17th February 2025**	**Expiration Date :**	**25th July 2025**
Certificate No. :	**OHI238724**	**IAF CODE :**	**28**

※ **This certificate is valid by completion of surveillance audit which is conducted within 12 months from the certification date.**

※ **Refer to appendix for detailed activities and location of each sites.**

The Seal of ICR Limited was here to affixed in the presence of :

President

- This certificate is intellectual property of ICR.
- This certificate is only valid by completion of surveillance audit which is conducted at least once a year.
- You can verify the authenticity of this certificate on "Certification Confirm" at www.icrqa.com
- If you can not maintain the certification, this certificate shall be returned to ICR.

ICR Co., Ltd, 1501, Daerung Post Tower 6th, 298, Beotkkot-ro, Geumcheon-gu, Seoul, Korea http://www.icrqa.com

EE ANNEX: ISO-17020 CERTIFICATE OF GREENBUD

GLOBAL ACCEPTANCE
BAB
BANGLADESH ACCREDITATION BOARD

ACCREDITATION CERTIFICATE

Issued under the authority of Bangladesh Accreditation Act, 2006
by Bangladesh Accreditation Board (BAB), Ministry of Industries to

GREENBUD Testing & Inspection Services

14A, Level-14, Building 2, Confidence center

Kha-09, Sahajadpur, Gulshan, Dhaka-1212, Bangladesh

This is to certify that this

Inspection Body(Type-A)
is accredited in accordance with the international standard

ISO/IEC 17020:2012
in respect of the associated scope, subject to the terms and conditions governing the relevant conformity assessment body (CAB) accreditation.

Certificate Number	:	05.003.18
Accreditation Date	:	28 June 2018
Date of Issuance	:	18 Aug 2024 (2nd Renewal)
Date of Expiration	:	27 June 2027

CERT. NO. 05.003.18
BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17020:2012

GLOBAL
BAB ACCREDITED
ACCEPTANCE

18. 08. 2024
Md. Anwarul Alam
Director General

This certificate must be returned on request; reproduction must follow BAB guidelines. For the specific scopes to which this accreditation applies, please refer to the Directory of CABs at BAB website.

BANGLADESH ACCREDITATION BOARD (BAB)

91, Motijheel C/A, Dhaka-1000
Tel: +880-2-9513221
Fax: +880-2-9513222
Email: info@bab.gov.bd
Web: www.bab.gov.bd

SCOPE OF ACCREDITATION

(For Inspection Bodies)

CAB Name & Address:	**GREENBUD Testing and Inspection Service Private Limited**		
Accreditation Standard:	ISO/IEC 17020:2012	**Accreditation Date:**	28-06-2024
Certificate Number:	05.003.18	**Issued on:**	18-08-2024
Last Amended on:	18-08-2024	**Valid until:**	27-06-2027
Amendment no:	01		
Types :	A		

Head Office or primary location			**Additional Locations (If different from Head Office)**		
Flat: 14A, Level:14, Lift No.: 06; Building 2; Confidence Center, Kha-9, Shahjadpur, Gulshan Dhaka-1212			**1**	N/A	
			2	N/A	
			3	N/A	
Type (A, B, C)	**Inspection Category (Product, Process, Services or Installation)**	**Inspection Field (and sub-fields)**	**Range of inspections**	**Stage of inspection**	**Inspection requirements or criteria**
A	**Service**	Stack Air Emission Assessment	CO: 0 - 100000ppm CO_2: 0 - 99.9% NO: 0 - 5000ppm NO_2: 0 - 500 ppm NOx: 0 - 5000ppm SO_2: 0 - 5000ppm O_2: 0 - 25% SPM: 0-1000 mg/m^3 PM 2.5: 0-1000 mg/m^3 PM 10: 0-1000 mg/m^3 Excess Air: 0 - 2885.0% Flue Temperature: 0-650 ℃	N/A	In-house (TP-GB-01)
		Ambient Air Quality Assessment	CO: 0 - 1000ppm CO_2: 0 - 9999ppm NO_2: 0-20ppm SO_2: 0-20ppm VOC: 0.0-9.9 mg/m^3 CH_2O: 0 - 4.00 ppm O_3: 0-9.99mg/m^3 SPM: 0-1000 mg/m^3 $PM_{1.0}$, $PM_{2.5}$, PM_{10} (0.3µm and 2.5µm fine particulate matters quantity; $PM_{2.5}$ and PM_{10} fine particulate matters weight)		In-house (TP-GB-04)

Quality Manager

BANGLADESH ACCREDITATION BOARD (BAB)

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Fax: +880-2-9513222
Email: info@bab.gov.bd
Web: www.bab.gov.bd

			NH_3: 0-50ppm Pb: less than 50 µg/m3		
		Indoor Air Quality Assessment and Industrial Hygiene Assessment	CO: 0 - 1000ppm CO_2: 0 - 9999ppm NO_2: 0-20ppm SO_2: 0-20ppm VOC: 0.0-9.9 mg/m^3 CH_2O: 0 - 4.00 ppm O_3: 0-9.99mg/m^3 $PM_{1.0}$, $PM_{2.5}$, PM_{10} (0.3µm and 2.5µm fine particulate matters quantity; $PM_{2.5}$ and PM_{10} fine particulate matters weight) Air Flow Rate: 0-47.19 m^3/s Breathability: 60-800 L/m NH_3: 0-50ppm		In-house (TP-GB-04) (TP-GB-07)
		Noise Level Assessment	Noise (30-130dB)		In-house (TP-GB-02)
		Light Level Assessment	Light (0.1-200000 lux)		In-house (TP-GB-03)
		Temperature Level Inspection	Temperature (0-40°C)		In-house (TP-GB-05)
		Humidity Level Inspection of Work Environment	Humidity (5% - 98%)		In-house (TP-GB-05)
		Leak Detection	High frequency sound waves (35 kHz - 45 kHz)		In-house (TP-GB-06)
		Vehicle Air Emission Assessment	CO (0-10%), CO2 (0-10%), O2 (0-10%), NO_x (150 micro gram/cubic meter) SPM (100-150 micro gram/cubic meter)		In-house (TP-GB-08)

END

Quality Manager

FF ANNEX: REQUEST FOR APPROVAL AND BASELINE MONITORING REPORTS

Hanbaek Co., Ltd. P.O. Box 62241
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Ref.: HBC/PGCB/DWZTGEP/LILO/P1/2025/15
Date: 06th February, 2025

To,
Project Director
DWZTGE Project
Power Grid Bangladesh PLC
9th Floor, PGCB Head Office,
Aftabnagar, Dhaka-1212, Bangladesh

Contract: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
[Contract No.: PGCB/ADB/3853-BAN/DWZTGEP/400KV&230V LILO/P1, Date: 25.09.2023]
Section C: F/C LILO of Existing Tongi – Ghorashal 230kV D/C T/L to Kaliganj Substation

Subject: Request for Approval of Baseline Assessment Schedule for SSEMP under Dhaka Western Zone Transmission Grid Expansion Project (DWZTGEP)

Dear Sir,

We extend our sincere gratitude to Power Grid Bangladesh PLC for its continuous guidance and collaboration in implementing the Dhaka Western Zone Transmission Grid Expansion Project (DWZTGEP). As part of our contractual obligations under Package-1, we are submitting the proposed schedule for conducting the required baseline environmental assessment as per the Site-Specific Environmental Management Plan (SSEMP).

The baseline assessment will cover monitoring of Ambient Air Quality and Ambient Noise Level and sample collection of Surface Water, Ground Water, and Soil, with five (5) samples being collected for each parameter in line with the requirements outlined in the project's Initial Environmental Examination (IEE) and Environmental Management Plan (EMP).

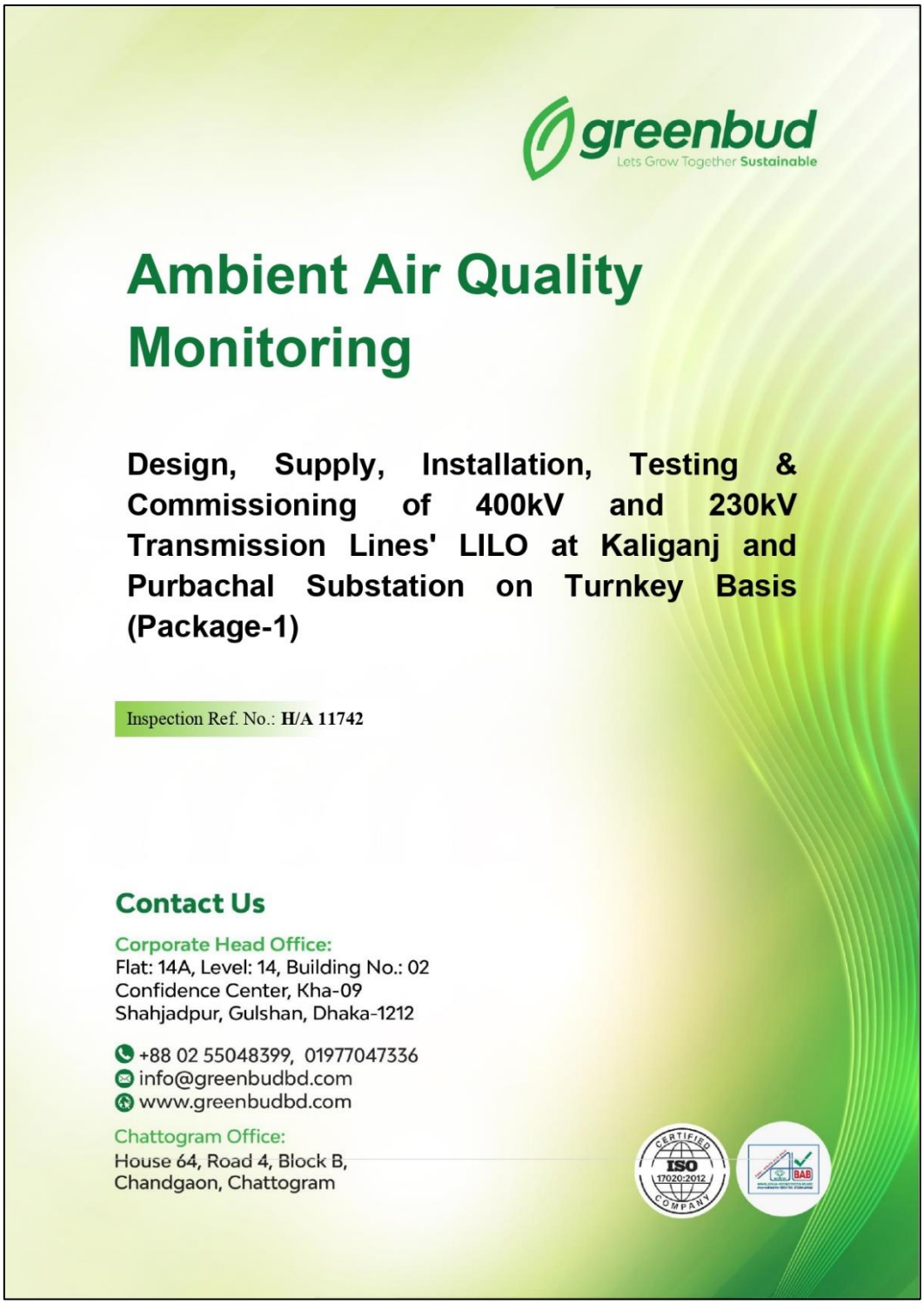
The detailed schedule for the assessment is as follows:

Sl. No.	Day	Sampling Date	Sampling Type	No. of Sample	Tower ID
1	Day-01	08.02.2025 (Saturday)	AAQ-1	1	TT-1/0
2			ANL-1	1	TT-1/0
3			SQ-1	1	TT-1/0
4	Day-02	09.02.2025 (Sunday)	AAQ-2	1	T-4/0
5			ANL-2	1	T-4/0
6			SQ-2	1	T-4/0
7	Day-03	10.02.2025 (Monday)	AAQ-3	1	T-3/0
8			ANL-3	1	T-3/0
9			SQ-3	1	T-3/0
10	Day-04	11.02.2025 (Tuesday)	AAQ-4	1	T-2/3
11			ANL-4	1	T-2/3
12			SQ-4	1	T-2/3
13	Day-05	12.02.2025 (Wednesday)	AAQ-5	1	T-2/1
14			ANL-5	1	T-2/1
15			SW-1	1	T-2/1
16			SW-2	1	T-2/1
17			SW-3	1	T-2/3

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Request for Approval of Baseline Assessment for SSEMP

Ambient Air Quality Test Report



Inspection Reference No: **H/A 11742**

General Information		
Inspection Reference No: **H/A 11742**		Inspection Date: 08.02.2025– 12.02.2025
		Inspection Duration: 9 am-9 am
Report Generation Date:	19.02.2025	Inspection Description: Ambient Air Quality Monitoring
Report Submission Date:	21.02.2025	Inspection location: 5 Locations of the Package.
Inspection Standards: 2004/108/EEC		
Contractor Name: Hanbaek Company Limited, Korea		

On Site Inspection Team	
Tanzir Hosen *Chemist (Operation)* *B.Sc. in Chemistry*	**Tanveer Faisal** *Intern (Operation)* *B.Sc. in ESDM*
Report Prepared by	**Quality Checked**
Toriqul Islam *Executive (Operation)* *B.Sc. in Civil and Environmental Engineering*	**Mosharof Hossain** *Assistant Manager (Operation)* *M.Sc. & B.Sc. in Environmental Science*

Report Approved by:

Engr. Syed Tasnem Mahmood
Chief Environmental Engineer & CEO
B.Sc. & M.Sc. (Civil and Environmental Engineering)
MIEB No.: M/35960

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Method of Sampling:

The air sample has been collected by using High Volume Sampler (Model No: GTI-FPS-375) with Impinger attachment for 8-hours of sampling period.

Method of Analysis:

The following methods were used to analyze the air quality parameters:

No.	Parameter	Methodology	Device/Equipment	Sampling Period
1	SPM	Gravimetric	GTI-FPS-375	8hours
2	PM_{10}	Gravimetric	GTI-FPS-375	8hours
3	$PM_{2.5}$	Gravimetric	GTI-FPS-375	8hours
4	NO_2	Modified West and Gaeke Method	GTI-FPS-375 with Impinger attachment	8hours
5	SO_2	Modified Jacob & Hochhseiser Method	GTI-FPS-375 with Impinger attachment	8hours
6	CO	Iodine Pentoxide Method	GTI-FPS-375 with Impinger attachment	8hours
7	O_3	KI Chemical Method	GTI-FPS-375 with Impinger attachment	8hours

As per the national standard (Air Pollution Control Rules-2022), O_3 and CO need to be monitored for 8 hours to compare with the national standard whereas standard for PM_{10}, $PM_{2.5}$, NOx and SO_2, is 24-hour. So, standard duration is varying from parameter to parameter. Considering all these issues, conversion factors have been used for the calculation of the parameters in the standard timelines from 8-hour monitoring period. Using the simple power law principle, Schroeder and Jugloff (2012) described the steps for converting eight-hour readings to 24- hour/annual values. In order to provide 24-hour averages for the five parameters, the following power-law equation as defined in Schroeder and Jugloff 2012 was applied:

$C_{long} = Cshort\ (t_{shor}t/t_{long})\ p$

Where,

C_{long} = Expected output in specific time period

C_{short} = Outcome during Monitoring Period

t_{short} = Specific time period during monitoring (in minutes)

t_{long} = Expected time period (in minutes)

p = Exponential factor where the value is 0.39 (for project area).

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Inspection Reference No: **H/A 11742**

Reference Standard:

Parameter	SPM	$PM_{2.5}$	PM_{10}	NOx	SOx	CO	O_3
Air Pollution Control Rules 2022[1]	NYS	65 ($\mu g/m^3$)	150 ($\mu g/m^3$)	80$\mu g/m^3$	80 $\mu g/m^3$	5000 $\mu g/m^3$	100 $\mu g/m^3$
Time period	NYS	24hours	24hours	24hours	24hours	8hours	8hours

Ambient Air Quality Monitoring Sampling Point:

Tower	Date	Co-ordinates
TT-1/0	08.02.25	23°58'0.906"N 90°33'3.408"E
T-4/0	09.02.25	23°57'28.528"N 90°33'23.954"E
T-3/0	10.02.25	23°57'10.977"N 90°33'18.231"E
T-2/3	11.02.25	23°56'50.084"N 90°33'25.961"E
T-2/1	12.02.25	23°56'20.567"N 90°33'34.481"E

[1] Air Pollution Control Rules'2022 Schedule-01, Department of Environment, Govt. of Bangladesh

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Inspection Reference No: H/A 11742

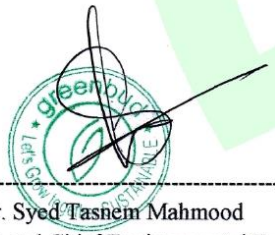
Ambient Air Quality Monitoring Result:

Sl. No.	Date	Coordinates	Period	Parameters (µg/m³)						
				$PM_{2.5}$	PM_{10}	SOx	NOx	CO	O_3	SPM
AAQ-01	08.02.25	23°58'0.906"N 90°33'3.408"E	8-hour	55	67	62	72	372	30	87
			As per Standard	36	44	40.4	46.9			
AAQ-02	09.02.25	23°57'28.528"N 90°33'23.954"E	8-hour	59	71	66	73	380	33	77
			As per Standard	38	46	43.0	47.6			
AAQ-03	10.02.25	23°57'10.977"N 90°33'18.231"E	8-hour	57	81	70	68	376	37	82
			As per Standard	37	53	45.6	44.3			
AAQ-04	11.02.25	23°56'50.084"N 90°33'25.961"E	8-hour	62	70	71	70	367	30	74
			As per Standard	36	44	46.3	45.6			
AAQ-05	12.02.25	23°56'20.567"N 90°33'34.481"E	8-hour	59	69	63	69	362	32	75
			As per Standard	38	45	41.0	45.0			
Air Pollution Control Rules-2022				**65**	**150**	**80**	**80**	**5000**	**100**	**NYS**
Standard Time Period as per APCR-2022				**24hr.**	**24hr.**	**24hr.**	**24hr.**	**8hr.**	**8hr.**	**NYS**

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Comments on Results:

According to the air quality test results, it can be summarized that all the parameters of the air quality has been found within the standard limit according to the APCR-2022.



Engr. Syed Tasnem Mahmood
CEO and Chief Environmental Engineer
GREENBUD
MIEB No.: M/35960
ISO 14001 certification Number.: EA/15/IN/16050
ISO 50001 certification Number.: ENMS/16/IN/533

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ANNEXURE



TT-1/0



T-4/0



T-3/0



T-2/3



T-2/1

Figure: Pictorial Evidence of Ambient Air Quality Monitoring

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Monitoring Instrument:



GTI-FPS-375



Attached Impinger



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STANDARD CALIBRATION SERVICE PRIVATE LIMITED

ISO/IEC :17025
Accredited Laboratory

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02411064318
Issue Date 13/07/2024

Customer Details:

Name	**Greenbud**
Address	Level:14, Building No:02, Confidence Center, Kha-09, Shahjadpur, Gulshan, Dhaka-1212, Bangladesh.

Details of Unit Under Verification (UUV):

Description	Respirable Dust Sampler
Manufacturer	Greintech Instruments
Model/Type	GTT-FPS-375
Serial Number	20011908005788
ID No.	**GB-150-070-003**
Range/working Range	Ref. On Obs.
Least Count	Ref. On Obs.
Accuracy	As Per Instrument
Location of Verification	Laboratory
Visual Inspection	OK
Date of Calibration	10/07/2024
Suggested Due Date	09/07/2025
Procedure	The calibration had been performed in accordance with the procedure COP/SCS/186
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	35 to 65

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

02411064318

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Inspection Reference No: **H/A 11742**

STANDARD CALIBRATION SERVICE PRIVATE LIMITED

ISO/IEC :17025 Accredited Laboratory

www.scsbd-ltd.com

Corporate Office
Rabeya Commercial Complex, 33/Kha (5th Floor)
Section-6, Mirpur Circle-10, Dhaka-1216, Bangladesh
Cell: +8801712 789 321

Laboratory Location
House # 427, Road # 6/2
Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Thermal Anemometer	testo	SCS/TAM/01	EMC/243651M	01/02/2025	EMC-CHINA
02	Thermo Hygrometer (Data Logger)	CEM	SCS/DL/05	QSI/1982/23/10	08/10/2024	QSI-INDIA

OBSERVATION:

Air Flow : (verified against calibrated anemometer)

Sl. No.	Meter Flow (m^3)	Actual Flow (m^3)	Error (m^3)	Tolerance (m^3)	Status	Uncertainty (m^3)
01	0.0	0.000	0.000	N/S	D	±0.05% of rdg
02	0.5	0.503	-0.003	N/S	D	
03	1.0	1.005	-0.005	N/S	D	
04	2.0	2.008	-0.008	N/S	D	
05	5.0	5.013	-0.013	N/S	D	

Air Flow : (verified against calibrated anemometer)

Sl. No.	Meter Flow (L/min)	Actual Flow (L/min)	Error (L/min)	Tolerance	Status	Uncertainty (L/min)
01	2.5	2.502	-0.002	N/S	D	±0.05% of rdg
02	5.0	5.005	-0.005	N/S	D	
03	10.0	10.012	-0.012	N/S	D	
04	15.0	15.020	-0.020	N/S	D	
05	20.0	20.028	-0.028	N/S	D	

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:
Md. Mobinul Islam
(Sr. Calibration Engineer)

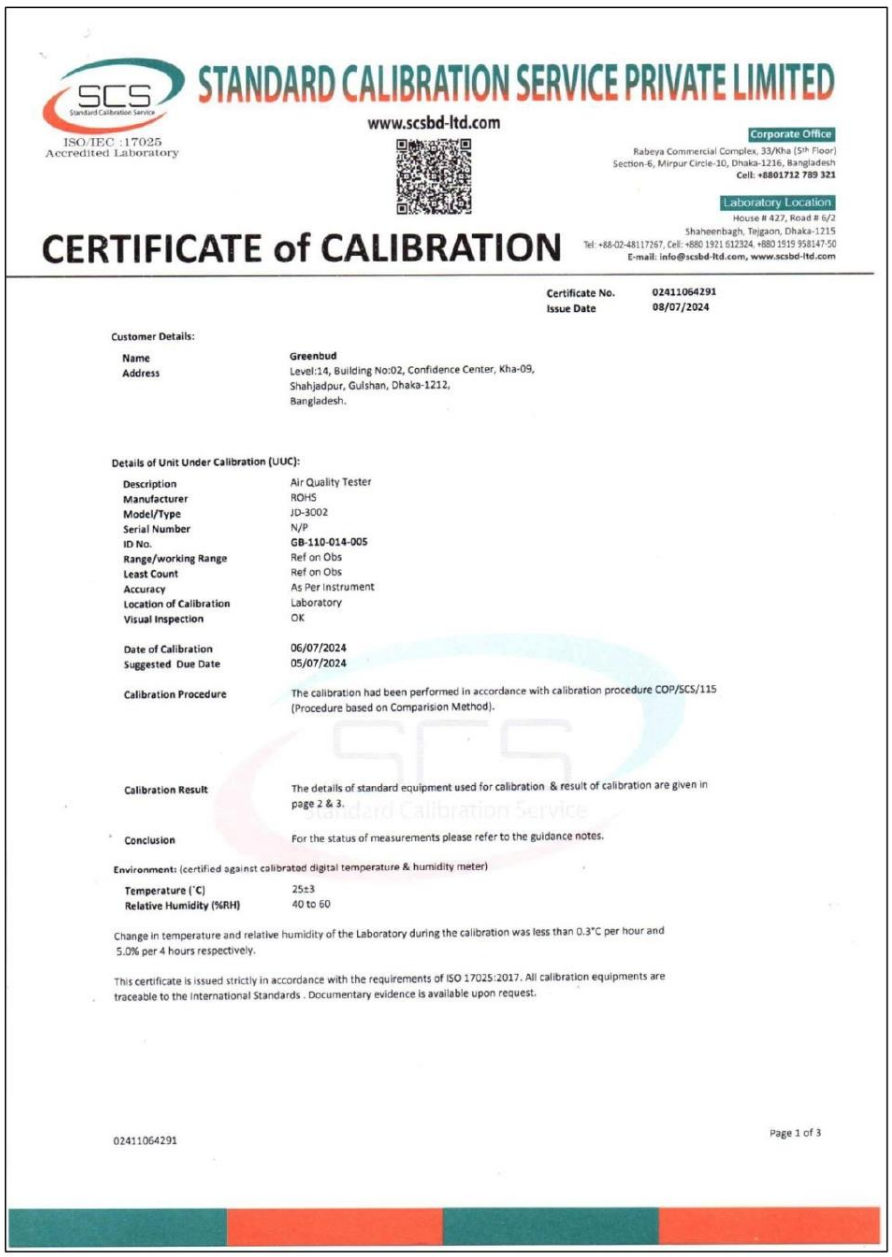
Issued By:
Md. Arman Ahmed Rasu
(Technical Manager)

End of Calibration Certificate

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Laboratory Location
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Shaheenbagh, Tejgaon, Dhaka-1215
Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02411064291
Issue Date 08/07/2024

Customer Details:

Name Greenbud
Address Level:14, Building No:02, Confidence Center, Kha-09, Shahjadpur, Gulshan, Dhaka-1212, Bangladesh.

Details of Unit Under Calibration (UUC):

Description	Air Quality Tester
Manufacturer	ROHS
Model/Type	JD-3002
Serial Number	N/P
ID No.	GB-110-014-005
Range/working Range	Ref on Obs
Least Count	Ref on Obs
Accuracy	As Per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	06/07/2024
Suggested Due Date	05/07/2024
Calibration Procedure	The calibration had been performed in accordance with calibration procedure COP/SCS/115 (Procedure based on Comparision Method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2 & 3.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	25±3
Relative Humidity (%RH)	40 to 60

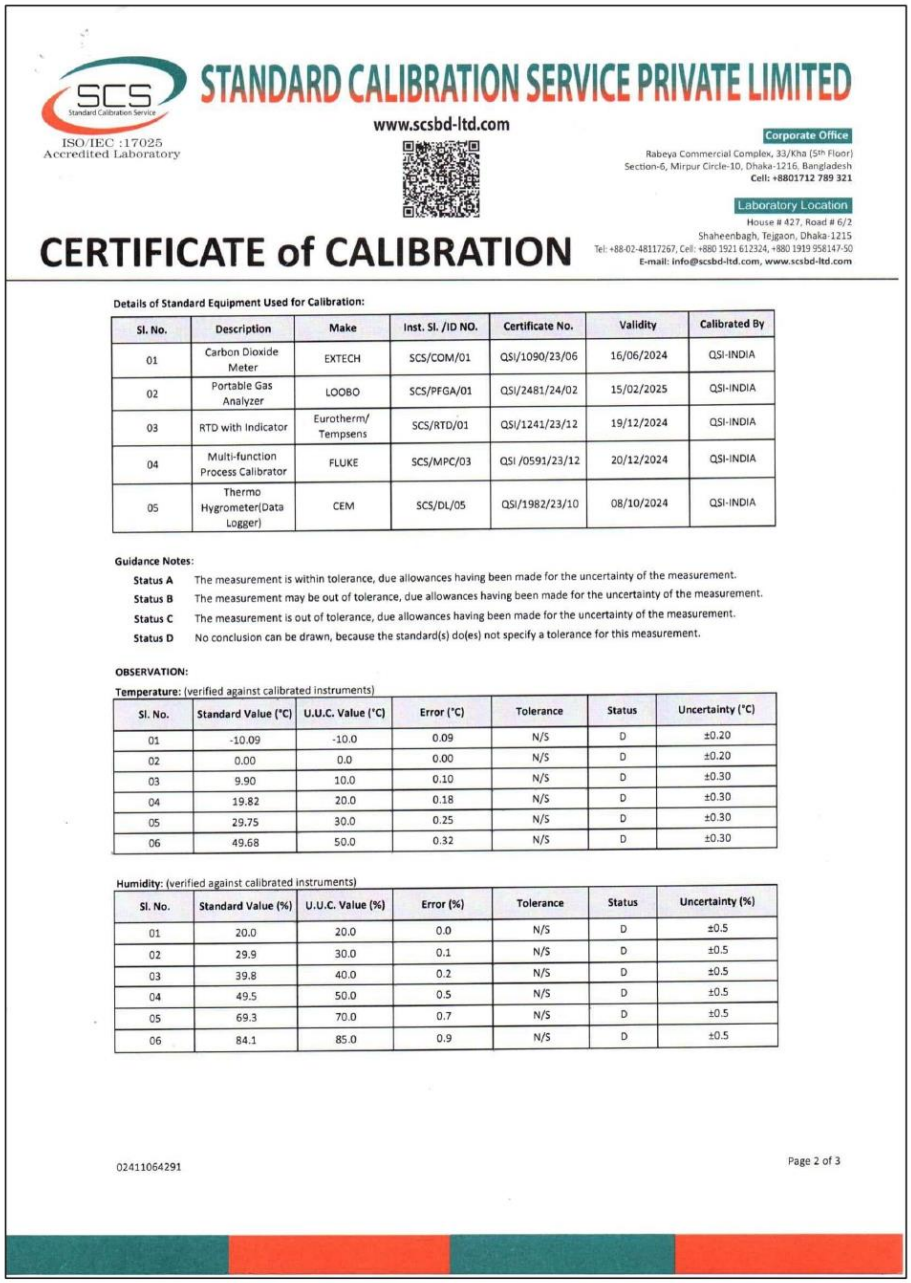
Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Carbon Dioxide Meter	EXTECH	SCS/COM/01	QSI/1090/23/06	16/06/2024	QSI-INDIA
02	Portable Gas Analyzer	LOOBO	SCS/PFGA/01	QSI/2481/24/02	15/02/2025	QSI-INDIA
03	RTD with Indicator	Eurotherm/ Tempsens	SCS/RTD/01	QSI/1241/23/12	19/12/2024	QSI-INDIA
04	Multi-function Process Calibrator	FLUKE	SCS/MPC/03	QSI /0591/23/12	20/12/2024	QSI-INDIA
05	Thermo Hygrometer(Data Logger)	CEM	SCS/DL/05	QSI/1982/23/10	08/10/2024	QSI-INDIA

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.
Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.
Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.
Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Temperature: (verified against calibrated instruments)

Sl. No.	Standard Value (°C)	U.U.C. Value (°C)	Error (°C)	Tolerance	Status	Uncertainty (°C)
01	-10.09	-10.0	0.09	N/S	D	±0.20
02	0.00	0.0	0.00	N/S	D	±0.20
03	9.90	10.0	0.10	N/S	D	±0.30
04	19.82	20.0	0.18	N/S	D	±0.30
05	29.75	30.0	0.25	N/S	D	±0.30
06	49.68	50.0	0.32	N/S	D	±0.30

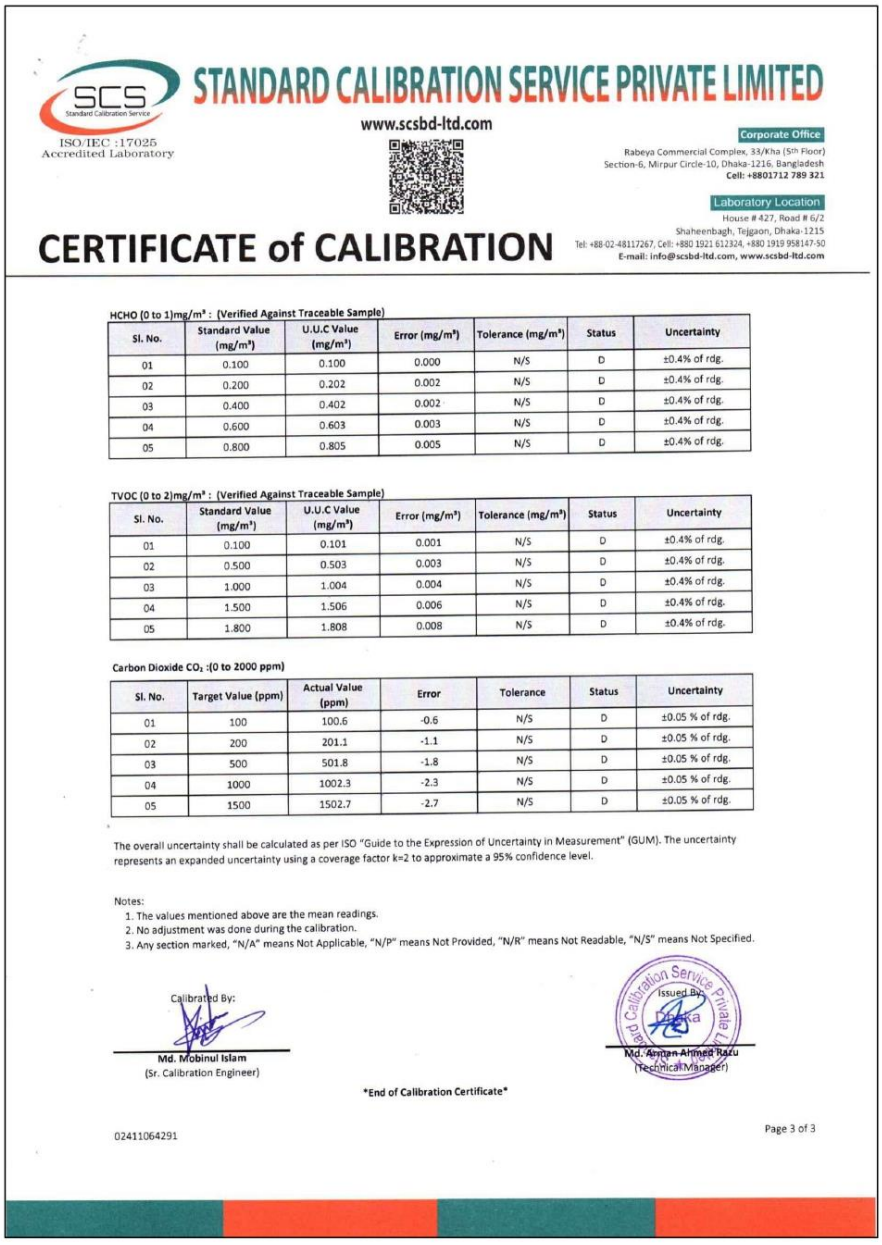
Humidity: (verified against calibrated instruments)

Sl. No.	Standard Value (%)	U.U.C. Value (%)	Error (%)	Tolerance	Status	Uncertainty (%)
01	20.0	20.0	0.0	N/S	D	±0.5
02	29.9	30.0	0.1	N/S	D	±0.5
03	39.8	40.0	0.2	N/S	D	±0.5
04	49.5	50.0	0.5	N/S	D	±0.5
05	69.3	70.0	0.7	N/S	D	±0.5
06	84.1	85.0	0.9	N/S	D	±0.5

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STANDARD CALIBRATION SERVICE PRIVATE LIMITED

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Laboratory Location
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Tel: +88-02-48117267, Cell: +880 1921 612324, +880 1919 958147-50
E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

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HCHO (0 to 1)mg/m³ : (Verified Against Traceable Sample)

Sl. No.	Standard Value (mg/m³)	U.U.C Value (mg/m³)	Error (mg/m³)	Tolerance (mg/m³)	Status	Uncertainty
01	0.100	0.100	0.000	N/S	D	±0.4% of rdg.
02	0.200	0.202	0.002	N/S	D	±0.4% of rdg.
03	0.400	0.402	0.002	N/S	D	±0.4% of rdg.
04	0.600	0.603	0.003	N/S	D	±0.4% of rdg.
05	0.800	0.805	0.005	N/S	D	±0.4% of rdg.

TVOC (0 to 2)mg/m³ : (Verified Against Traceable Sample)

Sl. No.	Standard Value (mg/m³)	U.U.C Value (mg/m³)	Error (mg/m³)	Tolerance (mg/m³)	Status	Uncertainty
01	0.100	0.101	0.001	N/S	D	±0.4% of rdg.
02	0.500	0.503	0.003	N/S	D	±0.4% of rdg.
03	1.000	1.004	0.004	N/S	D	±0.4% of rdg.
04	1.500	1.506	0.006	N/S	D	±0.4% of rdg.
05	1.800	1.808	0.008	N/S	D	±0.4% of rdg.

Carbon Dioxide CO_2 :(0 to 2000 ppm)

Sl. No.	Target Value (ppm)	Actual Value (ppm)	Error	Tolerance	Status	Uncertainty
01	100	100.6	-0.6	N/S	D	±0.05 % of rdg.
02	200	201.1	-1.1	N/S	D	±0.05 % of rdg.
03	500	501.8	-1.8	N/S	D	±0.05 % of rdg.
04	1000	1002.3	-2.3	N/S	D	±0.05 % of rdg.
05	1500	1502.7	-2.7	N/S	D	±0.05 % of rdg.

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:
Md. Mobinul Islam
(Sr. Calibration Engineer)

Issued By:
Md. Aman Ahmed Ratu
(Technical Manager)

End of Calibration Certificate

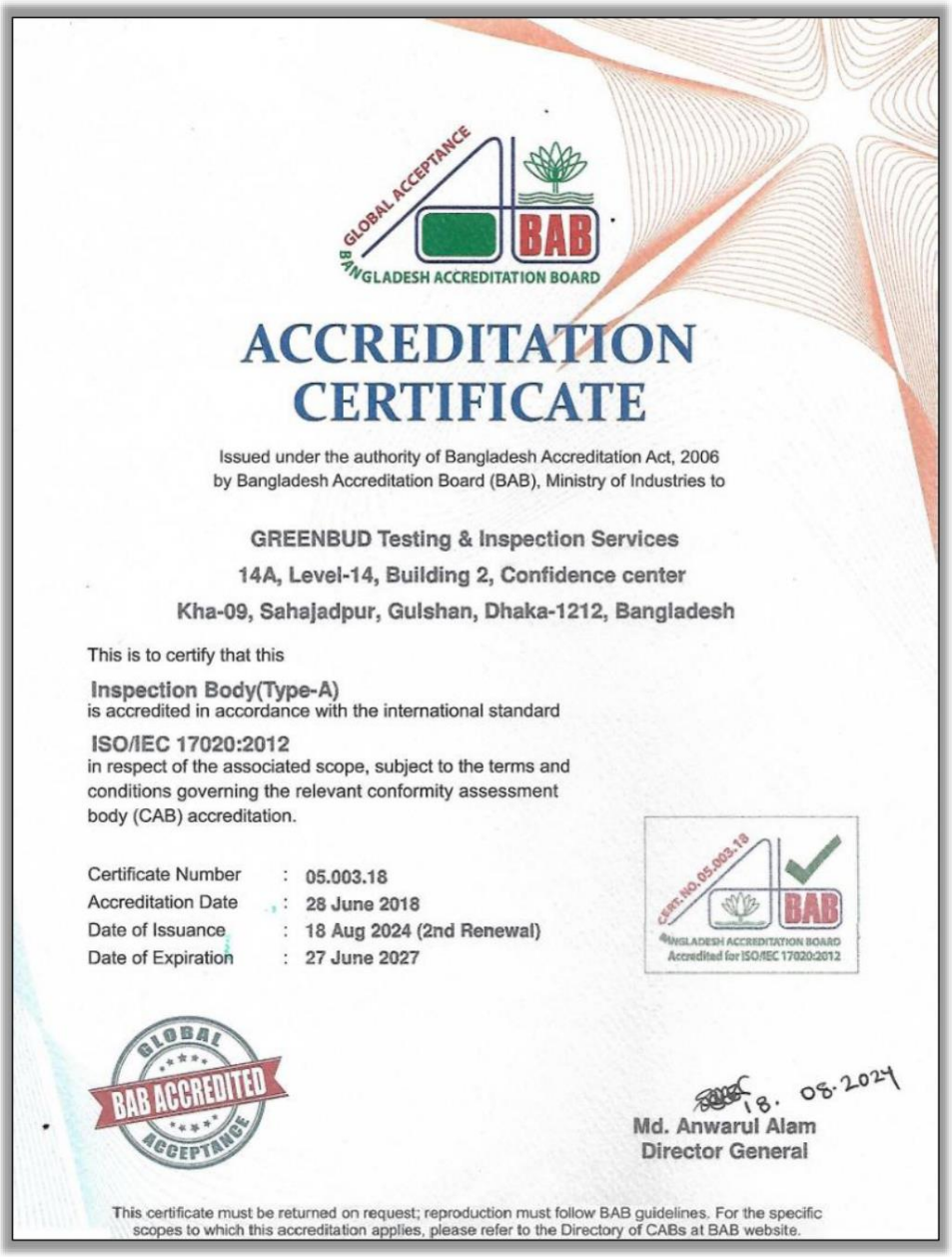
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Inspection Reference No: **H/A 11534**



GLOBAL ACCEPTANCE
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BANGLADESH ACCREDITATION BOARD

ACCREDITATION CERTIFICATE

Issued under the authority of Bangladesh Accreditation Act, 2006
by Bangladesh Accreditation Board (BAB), Ministry of Industries to

GREENBUD Testing & Inspection Services
14A, Level-14, Building 2, Confidence center
Kha-09, Sahajadpur, Gulshan, Dhaka-1212, Bangladesh

This is to certify that this

Inspection Body(Type-A)
is accredited in accordance with the international standard

ISO/IEC 17020:2012
in respect of the associated scope, subject to the terms and conditions governing the relevant conformity assessment body (CAB) accreditation.

Certificate Number	:	05.003.18
Accreditation Date	:	28 June 2018
Date of Issuance	:	18 Aug 2024 (2nd Renewal)
Date of Expiration	:	27 June 2027

CERT. NO. 05.003.18
BAB
BANGLADESH ACCREDITATION BOARD
Accredited for ISO/IEC 17020:2012

GLOBAL BAB ACCREDITED ACCEPTANCE

18. 08. 2024
Md. Anwarul Alam
Director General

This certificate must be returned on request; reproduction must follow BAB guidelines. For the specific scopes to which this accreditation applies, please refer to the Directory of CABs at BAB website.

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Ambient Noise Level Test Report

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Ambient Noise Level Monitoring

Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)

Inspection Ref. No.: **I/N 11379**

Contact Us

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Confidence Center, Kha-09
Shahjadpur, Gulshan, Dhaka-1212

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info@greenbudbd.com
www.greenbudbd.com

Chattogram Office:
House 64, Road 4, Block B,
Chandgaon, Chattogram

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Reference No: **I/N 11379**

General Information		
Reference No: **I/N 11379**		Inspection Date: 08.02.2025– 12.02.2025
		Monitoring Duration: 09.00AM-09.00AM
Report Generation Date:	19.02.2025	Monitoring Description: Ambient Noise Level
Report Submission Date:	21.02.2025	Monitoring location: Throughout the Project Corridor (5 Locations)
Monitoring Standards: 2004/108/EEC		

Contractor Name:

Hanbaek Company Limited, Korea

On Site Monitoring Team	
Tanzir Hosen *Chemist (Operation)* *B.Sc. in Chemistry*	**Tanveer Faisal** *Intern (Operation)* *B.Sc. in ESDM*
Report Prepared by:	**Quality Checked:**
Toriqul Islam *Executive (Operation)* *B.Sc. in Civil and Environmental Engineering*	**Mosharof Hossain** *Assistant Manager (Operation)* *M.Sc. & B.Sc. in Environmental Science*

Report Approved by:

Engr. Syed Tasnem Mahmood
Chief Environmental Engineer & CEO
B.Sc. & M.Sc. (Civil and Environmental Engineering)
MIEB No.: M/35960

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Method of Analysis:

A calibrated noise meter (Model SLM-25) has been used for noise level monitoring with a data recording system. Noise Sample data has been collected for 24hours in both daytime and nighttime. The time schedule of noise monitoring as per Noise Pollution Control Rules-2006.

Sl./No.	Parameter	Methodology	Device/Equipment	Sampling Period
1.	Leq	Portable Noise Meter with Data Recording System	SLM-25	24hours

Ambient Noise Level Monitoring Sampling Point:

Tower	Date	Co-ordinates
TT-1/0	08.02.25	23°58'1.116"N 90°33'1.59"E
T-4/0	09.02.25	23°57'30.075"N 90°33'23.303"E
T-3/0	10.02.25	23°57'9.805"N 90°33'19.510"E
T-2/3	11.02.25	23°56'49.083"N 90°33'25.387"E
T-2/1	12.02.25	23°56'18.556"N 90°33'33.555"E

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Ambient Noise level Standard:

Sl. No.	Area Class[1]	Day (dBA)	Night (dBA)
a.	Silent Zone	50	40
b.	Residential area	55	45
c.	Mix area	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Source: Sound Pollution Control Rules, 2006

Ambient Noise Level Monitoring Result:

S/N	Tower	Category	Monitoring result		Standard Limit	
			Leq (Day)	Leq (Night)	Day	Night
ANL-01	TT-1/0	Silent Zone	48.59	37.80	50	40
ANL-02	T-4/0	Silent Zone	46.30	37.84	50	40
ANL-03	T-3/0	Silent Zone	45.71	36.23	50	40
ANL-04	T-2/3	Silent Zone	41.86	37.77	50	40
ANL-05	T-2/1	Silent Zone	42.95	37.86	50	40

[1] Noise Pollution Control Rules 2006 Schedule 05, Department of Environment, Govt. of Bangladesh

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Comments on Results:

The summary results show that the Leq (day) values have been found within the standard limit for all five monitored locations. And, the Leq (night) values have also been found within the standard limit for all five monitored locations.

Engr. Syed Tasnem Mahmood
CEO and Chief Environmental Engineer
GREENBUD
MIEB No.: M/35960
ISO 14001 certification Number.: EA/15/IN/16050
ISO 50001 certification Number.: ENMS/16/IN/533

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ANNEXURE



TT-1/0



T-4/0



T-3/0



T-2/3



T-2/1

Figure: Pictorial Evidence of Ambient Noise Level Monitoring (Day Time)

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TT-1/0



T-4/0



T-3/0



T-2/3



T-2/1

Figure: Pictorial Evidence of Ambient Noise Level Monitoring (Night Time)

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Monitoring Instrument:

GREENBUD Testing & Monitoring Services Private Ltd. high quality equipment is available to assess your NOISE Level. We have used "SLM-25 sound meter", GREENBUD is also committed to assess your NOISE inside the project corridor with transparency & Quality. To assess this NOISE level, we have to follow some standards, such as SPCR-2006, WHO etc.



Technical Specification

Microphone	½ inch Electret Condenser Microphone
Measuring Range	30~130dB
Measurement Unit	dBA/dBC
Accuracy	+1.5dB (reference sound pressure standard,94dB@1KHz)
Record Interval	1~60 sec / 1~60 min / 1~24 hrs.
Frequency Range	31.5Hz ~ 8.5kHz
Frequency Weighting	A&C
Digit & Resolution	5 Digits & 0.1dB

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Reference No: **I/N 11379**



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E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Certificate No. 02411064302
Issue Date 13/07/2024

Customer Details:

Name	**Greenbud**
Address	Level:14, Building No:02, Confidence Center, Kha-09, Shahjadpur, Gulshan, Dhaka-1212, Bangladesh.

Details of Unit Under Calibration (UUC):

Description	Digital Sound Level Meter
Manufacturer	N/P
Model/Type	SLM-25
Serial Number	89022L
ID No.	**GB-120-019-002**
Range/working Range (dB)	30 to 130
Least Count (dB)	0.1
Accuracy	As per Instrument
Location of Calibration	Laboratory
Visual Inspection	OK
Date of Calibration	10/07/2024
Suggested Due Date	09/07/2025
Calibration Procedure	The calibration had been performed in accordance with calibration procedure SCS.WI-09M (Procedure based on comparision method).
Calibration Result	The details of standard equipment used for calibration & result of calibration are given in page 2.
Conclusion	For the status of measurements please refer to the guidance notes.

Environment: (certified against calibrated digital temperature & humidity meter)

Temperature (°C)	20±2
Relative Humidity (%RH)	40 to 60

Change in temperature and relative humidity of the Laboratory during the calibration was less than 0.3°C per hour and 5.0% per 4 hours respectively.

This certificate is issued strictly in accordance with the requirements of ISO 17025:2017. All calibration equipments are traceable to the International Standards . Documentary evidence is available upon request.

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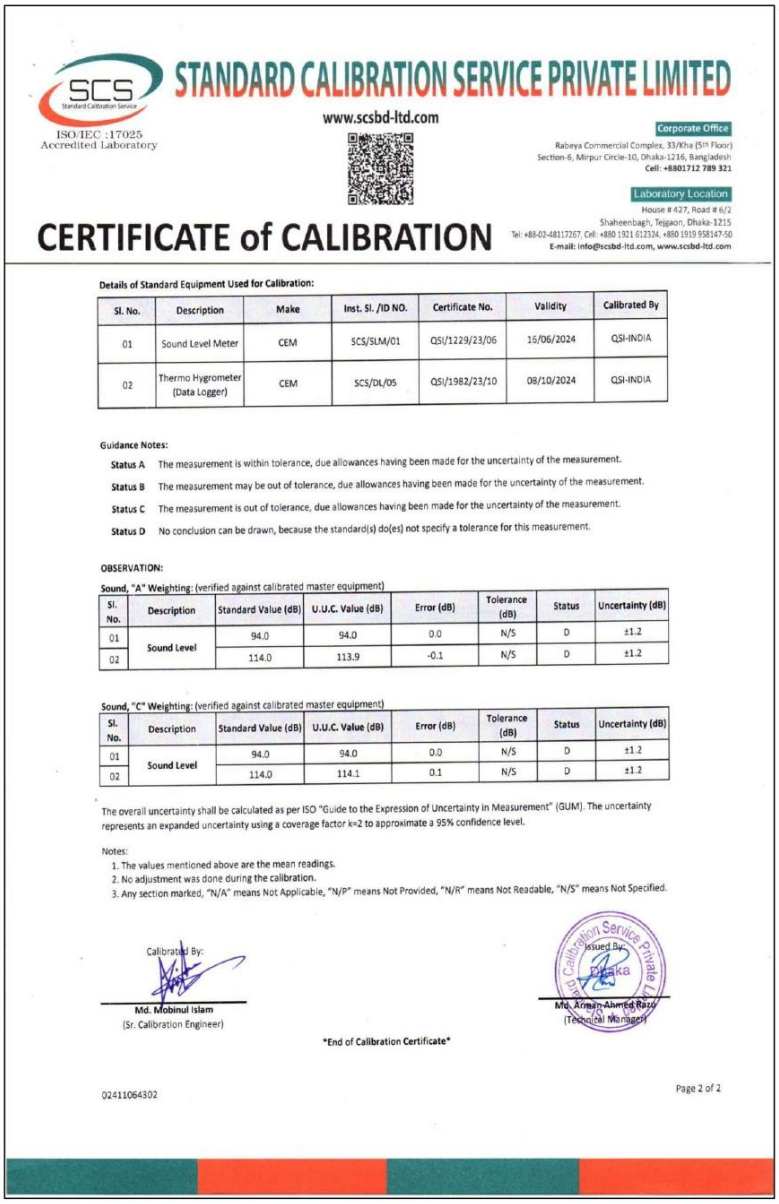
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CERTIFIED ISO COMPANY



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E-mail: info@scsbd-ltd.com, www.scsbd-ltd.com

CERTIFICATE of CALIBRATION

Details of Standard Equipment Used for Calibration:

Sl. No.	Description	Make	Inst. Sl. /ID NO.	Certificate No.	Validity	Calibrated By
01	Sound Level Meter	CEM	SCS/SLM/01	QSI/1229/23/06	16/06/2024	QSI-INDIA
02	Thermo Hygrometer (Data Logger)	CEM	SCS/DL/05	QSI/1982/23/10	08/10/2024	QSI-INDIA

Guidance Notes:

Status A The measurement is within tolerance, due allowances having been made for the uncertainty of the measurement.

Status B The measurement may be out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status C The measurement is out of tolerance, due allowances having been made for the uncertainty of the measurement.

Status D No conclusion can be drawn, because the standard(s) do(es) not specify a tolerance for this measurement.

OBSERVATION:

Sound, "A" Weighting: (verified against calibrated master equipment)

Sl. No.	Description	Standard Value (dB)	U.U.C. Value (dB)	Error (dB)	Tolerance (dB)	Status	Uncertainty (dB)
01	Sound Level	94.0	94.0	0.0	N/S	D	±1.2
02		114.0	113.9	-0.1	N/S	D	±1.2

Sound, "C" Weighting: (verified against calibrated master equipment)

Sl. No.	Description	Standard Value (dB)	U.U.C. Value (dB)	Error (dB)	Tolerance (dB)	Status	Uncertainty (dB)
01	Sound Level	94.0	94.0	0.0	N/S	D	±1.2
02		114.0	114.1	0.1	N/S	D	±1.2

The overall uncertainty shall be calculated as per ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor k=2 to approximate a 95% confidence level.

Notes:
1. The values mentioned above are the mean readings.
2. No adjustment was done during the calibration.
3. Any section marked, "N/A" means Not Applicable, "N/P" means Not Provided, "N/R" means Not Readable, "N/S" means Not Specified.

Calibrated By:
Md. Mobinul Islam
(Sr. Calibration Engineer)

Issued By:
Dhaka
Md. Arman Ahmed Razu
(Technical Manager)

End of Calibration Certificate

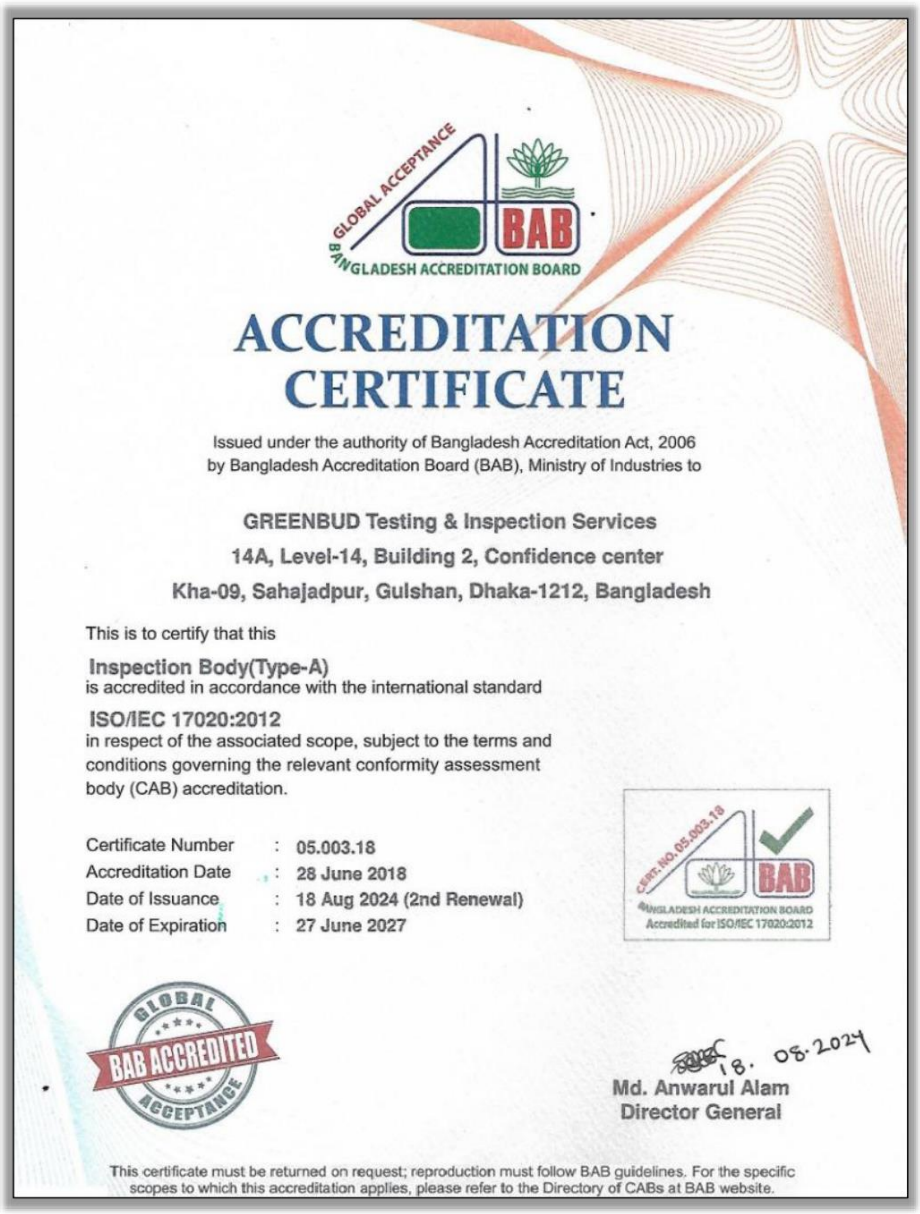
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Reference No: I/N 11188



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ACCREDITATION CERTIFICATE

Issued under the authority of Bangladesh Accreditation Act, 2006
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14A, Level-14, Building 2, Confidence center
Kha-09, Sahajadpur, Gulshan, Dhaka-1212, Bangladesh

This is to certify that this

Inspection Body(Type-A)
is accredited in accordance with the international standard

ISO/IEC 17020:2012
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Certificate Number	:	05.003.18
Accreditation Date	:	28 June 2018
Date of Issuance	:	18 Aug 2024 (2nd Renewal)
Date of Expiration	:	27 June 2027

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18. 08. 2024
Md. Anwarul Alam
Director General

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Surface Water Quality Test Report

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Test Report

Reference No	SW 10411	**Test Name**	Surface Water Test
Sample Receiving Date	12/02/2025	**Sample ID**	SW-(1-2-3-4-5)
Date of Analysis	12/02/2025 to 05/03/2025	**Date of Submission**	12/03/2025
Client Name	**Handbaek Co. Ltd.** Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis	**Sample Type**	Surface Water from water bodies

Methodology

S/I	Water Quality Parameters	Unit	Bangladesh Standard for Surface Water (ECR'2023)	Method of Analysis
1	Arsenic (As)	mg/L	0.05	AAS
2	Iron (Fe)	mg/L	0.3-1	AAS
3	Manganese (Mn)	mg/L	0.1	AAS
4	pH	-	6.5-8.5	pH Meter
5	Total Coliform (TC)	CFU/100mL	-	Membrane Filtration
6	Faecal Coliform (FC)	CFU/100mL	-	Membrane Filtration

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Test Result

Sample No.	As (mg/L)	Fe (mg/L)	Mn (mg/L)	pH	TC (N/100 ml)	FC (N/100 ml)
SW-1	0.003	3.10	0.03	7.0	200	56
SW-2	0.001	8.59	0.03	6.9	308000	232000
SW-3	0.006	4.53	0.03	6.7	5200	3300
SW-4	0.001	0.99	0.06	6.7	1600	600
SW-5	0.001	4.41	0.30	7.0	500	315
ECR'2023 Standards	**0.5**	**0.3-1**	**0.1**	**6.5-8.5**	**-**	**-**

Comments:

1. **Most of the parameters are within the acceptable limit set for the Inland Surface Water in ECR 2023 except Iron in (SW-1, SW-2, SW-3 & SW-5).**
2. Sample was collected by Site Inspector.
3. Sample was sent to authorize laboratory in sealed condition.
4. Lab Test Report has been added to the annexure.

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Annexure A

Government of the People's Republic of Bangladesh
Office of the Chief Chemist
Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka

Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030022	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Surface Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : SW-1, TT-1/0)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.003	mg/L	AAS	0.001
2	Iron (Fe)	0.3-1	3.10	mg/L	AAS	0.05
3	Manganese (Mn)	0.1	0.03	mg/L	AAS	0.03
4	pH	6.5-8.5	7.0	-	pH Meter	-

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parves 06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	B Hosen 06/03/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka

Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030023	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Surface Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : SW-2, T-4/0)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
2	Iron (Fe)	0.3-1	8.59	mg/L	AAS	0.05
3	Manganese (Mn)	0.1	0.03	mg/L	AAS	0.03
4	pH	6.5-8.5	6.9	-	pH Meter	-

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	06/03/2025 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka — Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030024	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Surface Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : SW-3. T-3/0)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.006	mg/L	AAS	0.001
2	Iron (Fe)	0.3-1	4.53	mg/L	AAS	0.05
3	Manganese (Mn)	0.1	0.03	mg/L	AAS	0.03
4	pH	6.5-8.5	6.7	-	pH Meter	-

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	06/03/2025 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka

Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030025	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Surface Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : SW-4, T-2/3)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
2	Iron (Fe)	0.3-1	0.99	mg/L	AAS	0.05
3	Manganese (Mn)	0.1	0.06	mg/L	AAS	0.03
4	pH	6.5-8.5	6.7	-	pH Meter	-

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parves 06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	06/03/2025 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka — Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030026	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Surface Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : SW-5, T-2/1)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Arsenic (As)	0.05	0.001	mg/L	AAS	0.001
2	Iron (Fe)	0.3-1	4.41	mg/L	AAS	0.05
3	Manganese (Mn)	0.1	0.30	mg/L	AAS	0.03
4	pH	6.5-8.5	7.0	-	pH Meter	-

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, LOQ - Limit of Quantitation.

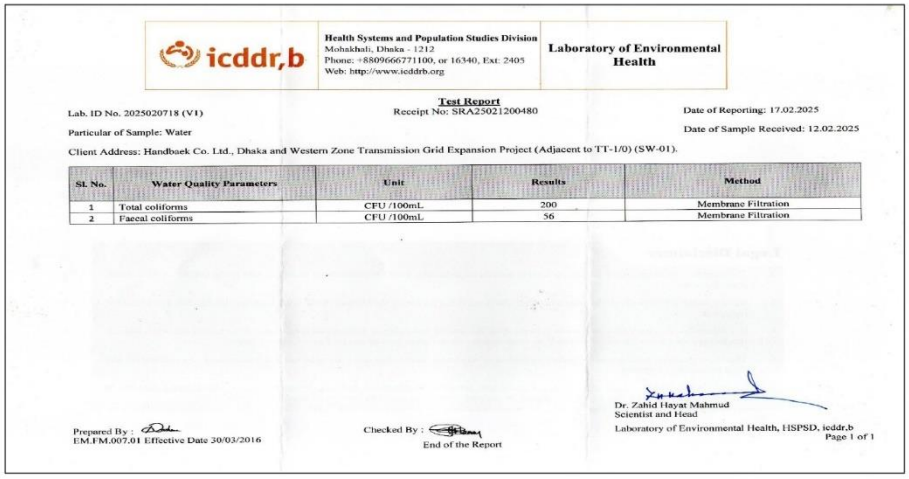
Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parves 06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	06/03/2025 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Annexure B



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Health Systems and Population Studies Division
Mohakhali, Dhaka - 1212
Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org
Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020718 (V1) Receipt No: SRA25021200480 Date of Reporting: 17.02.2025

Particular of Sample: Water Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to TT-1/0) (SW-01).

Sl. No.	Water Quality Parameters	Unit	Results	Method
1	Total coliforms	CFU /100mL	200	Membrane Filtration
2	Faecal coliforms	CFU /100mL	56	Membrane Filtration

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

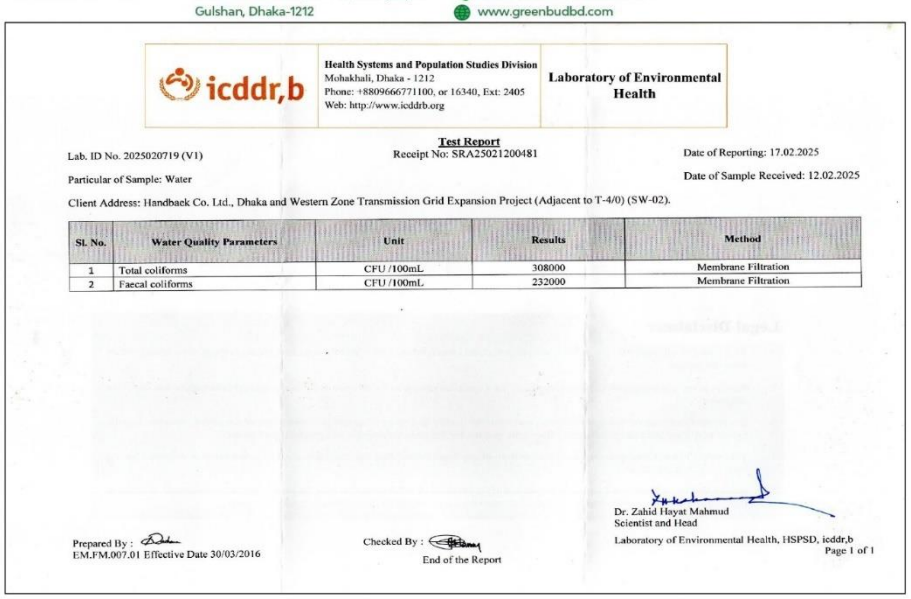
Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

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Health Systems and Population Studies Division
Mohakhali, Dhaka - 1212
Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org
Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020719 (V1) Receipt No: SRA25021200481 Date of Reporting: 17.02.2025

Particular of Sample: Water Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-4/0) (SW-02).

Sl. No.	Water Quality Parameters	Unit	Results	Method
1	Total coliforms	CFU /100mL	308000	Membrane Filtration
2	Faecal coliforms	CFU /100mL	232000	Membrane Filtration

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

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Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org

Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020715 (V1) | Receipt No: SRA25021200483 | Date of Reporting: 17.02.2025

Particular of Sample: Water | Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-3/0) (SW-03).

Sl. No.	Water Quality Parameters	Unit	Results	Method
1	Total coliforms	CFU /100mL	5200	Membrane Filtration
2	Faecal coliforms	CFU /100mL	3300	Membrane Filtration

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

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Web: http://www.icddrb.org

Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020716 (V1) | Receipt No: SRA25021200485 | Date of Reporting: 17.02.2025

Particular of Sample: Water | Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-2/3) (SW-04).

Sl. No.	Water Quality Parameters	Unit	Results	Method
1	Total coliforms	CFU /100mL	1600	Membrane Filtration
2	Faecal coliforms	CFU /100mL	600	Membrane Filtration

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

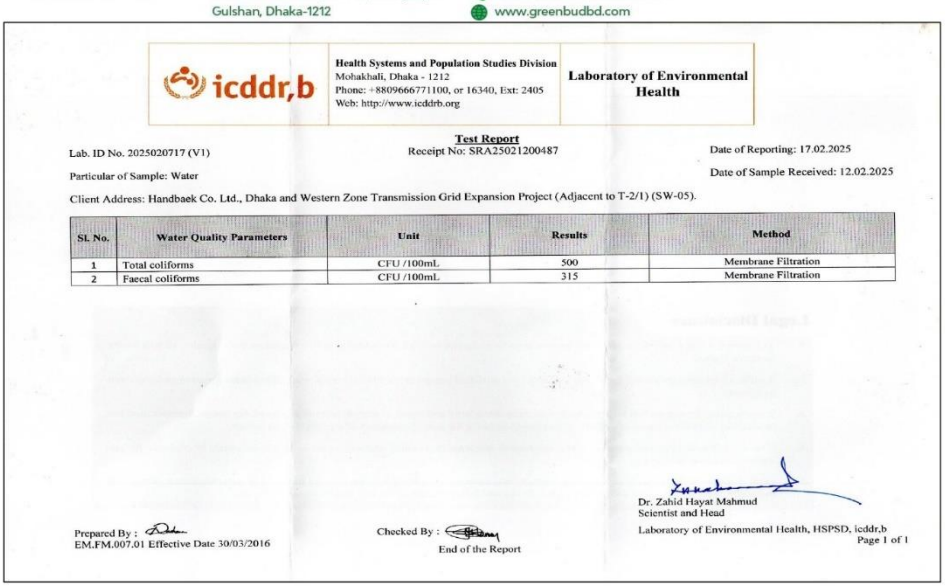
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Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020717 (V1)
Receipt No: SRA25021200487
Date of Reporting: 17.02.2025
Particular of Sample: Water
Date of Sample Received: 12.02.2025
Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-2/1) (SW-05).

Sl. No.	Water Quality Parameters	Unit	Results	Method
1	Total coliforms	CFU /100mL	500	Membrane Filtration
2	Faecal coliforms	CFU /100mL	315	Membrane Filtration

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

Prepared By :
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Surface Water Test Report of Handbaek from icddr, b

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Appendix



Surface Water Sampe Collection

Figure: Surface Water Sample Collection

Groundwater Quality Test Report

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Test Report

Reference No	GW 10410	**Test Name**	Ground Water Test
Sample Receiving Date	12/02/2025	**Sample ID**	GW-(1-2-3-4-5)
Date of Analysis	12/02/2025 to 05/03/2025	**Date of Submission**	17/03/2025
Client Name	**Handbaek Co. Ltd.** Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis	**Sample Type**	Ground Water from Adjacent Point

Methodology

S/I	Water Quality Parameters	Unit	Bangladesh Standard for Ground Water (ECR'2023)	Method of Analysis
1	Ammonia	mg/L	0.5	UVS
2	Chemical Oxygen Demand (COD)	mg/L	4	CRM
3	pH	-	6.5-8.5	pH Meter
4	Phosphate	mg/L	6.0	UVS
5	Total Coliform	CFU/100 ml	0	Membrane Filtration
6	Fecal Coliform	CFU/100 ml	0	Membrane Filtration
7	Biochemical Oxygen Demand (BOD)	mg/L	-	5-Day BOD Test

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Test Results

Sample No.	Ammonia (mg/L)	COD (mg/L)	TC (CFU/100 ml)	FC (CFU/100 ml)	pH	Phosphate (mg/L)	BOD (mg/L)
GW-1	0.40	56	0	0	7.1	2.0	2.0
GW-2	0.32	312	0	0	6.7	1.0	2.0
GW-3	0.23	36	17	13	7.0	0.66	2.0
GW-4	0.30	48	0	0	6.4	0.70	2.0
GW-5	0.35	56	48	21	6.8	1.2	1410
ECR'2023 Standards	**0.5**	**4**	**0**	**0**	**6.5-8.5**	**6**	**-**

Comments:

1. **All the parameters are within the acceptable limits set for the Drinking Water in ECR 2023 except TC & FC in (GW-3 & GW-5) & COD in all water.**
2. Sample was collected by Site Inspector.
3. Sample was sent to authorize laboratory in sealed condition.
4. Lab Test Report has been attached to Annexure.

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Annexure A

Government of the People's Republic of Bangladesh
Office of the Chief Chemist
Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka — Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030017	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Ground Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : GW-1, TT-1/0)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Ammonia	0.5	0.40	mg/L	UVS	0.10
2	Chemical Oxygen Demand (COD)	4.0	56	mg/L	CRM	4.0
3	pH	6.5-8.5	7.1	-	pH Meter	-
4	Phosphate	6.0	2.0	mg/L	UVS	0.10

Comments:
Sample was collected & supplied by client.
N.B. AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	06/03/2025 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Department of Public Health Engineering
Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka

Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030018	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Ground Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : GW-2, T-4/0)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Ammonia	0.5	0.32	mg/L	UVS	0.10
2	Chemical Oxygen Demand (COD)	4.0	312	mg/L	CRM	4.0
3	pH	6.5-8.5	6.7	-	pH Meter	-
4	Phosphate	6.0	1.0	mg/L	UVS	0.10

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	06/03/2025 Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Central Lab, 38-39, Mohakhali C/A, Dhaka-1212
Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka — Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030019	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Ground Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : GW-3, T-3//0)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Ammonia	0.5	0.25	mg/L	UVS	0.10
2	Chemical Oxygen Demand (COD)	4.0	36	mg/L	CRM	4.0
3	pH	6.5-8.5	7.0	-	pH Meter	-
4	Phosphate	6.0	0.66	mg/L	UVS	0.10

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	06/03/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Phone: 88-02-9881927, Fax: 88-02-9882003 , Email: wqmsc_central_lab@yahoo.com

Lab Memo: 873/ CC, DPHE, CL, Dhaka — Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030020	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Ground Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : GW-4, T-2/3)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Ammonia	0.5	0.30	mg/L	UVS	0.10
2	Chemical Oxygen Demand (COD)	4.0	48	mg/L	CRM	4.0
3	pH	6.5-8.5	6.4	-	pH Meter	-
4	Phosphate	6.0	0.70	mg/L	UVS	0.10

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrane Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	Parves 06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	06/03/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	Alam 06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Lab Memo: 873/ CC, DPHE, CL, Dhaka

Date: 06-03-2025

Physical /Chemical/ Bacteriological Analysis of Water Sample

Sample ID: CEN2025030021	Sample Receiving date: 12-02-2025
Ref. Memo No: HCL/2025/Nill & Dated: 12-02-2025	Sample Source: Ground Water
Sent by:Md. Rahad Hossain ,Manager (Engineering) , Hanbaek Co. Ltd.	Dist:Gazipur, Upa:
Care Taker: Hanbaek Co. Ltd.(Sample : GW-5, T-2/1)	Union:, Vill.:
Sample Collection date: 12-02-2025	Date of Testing: 12/02/2025-05/03/2025

LABORATORY TEST RESULTS:

Sl.#	Water quality parameters	Bangladesh Standard	Concentration present	Unit	Analysis Method	LOQ
1	Ammonia	0.5	0.35	mg/L	UVS	0.10
2	Chemical Oxygen Demand (COD)	4.0	56	mg/L	CRM	4.0
3	pH	6.5-8.5	6.8	-	pH Meter	-
4	Phosphate	6.0	1.2	mg/L	UVS	0.10

Comments:
Sample was collected & supplied by client.
N.B: AAS - Atomic Absorption Spectrophotometer, UVS - UV-Visible Spectrophotometer, MFM-Membrare Filtration Method, CRM-Closed Reflex Methods, LOQ - Limit of Quantitation.

Test Performed by:	Signature	Countersigned/Approved by:	Signature
1.) Name: S.M. Parves Talukder Designation: Sample Analyzer	06/03/2025	1.) Name: Mita Sarker Designation: Senior Chemist	06/03/2025
2.) Name: Md. Saiful Alam Khosru Designation: Sample Analyzer	06.03.2025	2.) Name: Md. Biplab Hossain Designation: Chief Chemist	Md. Biplab Hossain Chief Chemist Department of Public Health Engineering Central Laboratory Mohakhali, Dhaka

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Ground Water Test Report of the project corridor from DPHE

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Annexure B

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Health Systems and Population Studies Division
Mohakhali, Dhaka - 1212
Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org
Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020712 (V1) Receipt No: SRA25021200458 Date of Reporting: 24.02.2025

Particular of Sample: Drinking Water (Ground Water) Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to TT-1/0) (Ground Water).

Sl. No.	Water Quality Parameters	Unit	Results	Bangladesh Standard for Drinking Water (ECR'23)	WHO Guideline for Drinking Water, 2008	Method
1	Total coliforms	CFU /100mL	0	0	0	Membrane Filtration
2	Faecal coliforms	CFU /100mL	0	0	0	Membrane Filtration
3	Biochemical Oxygen Demand (BOD_5 ; 20^0C)	mg/L	<2.0	-	-	5-Day BOD Test

Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

Checked By :

End of the Report

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

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Health Systems and Population Studies Division
Mohakhali, Dhaka - 1212
Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org
Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020713 (V1) Receipt No: SRA25021200460 Date of Reporting: 24.02.2025

Particular of Sample: Drinking Water (Ground Water) Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-4/0) (Ground Water).

Sl. No.	Water Quality Parameters	Unit	Results	Bangladesh Standard for Drinking Water (ECR'23)	WHO Guideline for Drinking Water, 2008	Method
1	Total coliforms	CFU /100mL	0	0	0	Membrane Filtration
2	Faecal coliforms	CFU /100mL	0	0	0	Membrane Filtration
3	Biochemical Oxygen Demand (BOD_5 ; 20^0C)	mg/L	<2.0	-	-	5-Day BOD Test

Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

Checked By :

End of the Report

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

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Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org

Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020714 (V1) Receipt No: SRA25021200467 Date of Reporting: 24.02.2025

Particular of Sample: Drinking Water (Ground Water) Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-3/0) (Ground Water).

Sl. No.	Water Quality Parameters	Unit	Results	Bangladesh Standard for Drinking Water (ECR'23)	WHO Guideline for Drinking Water, 2008	Method
1	Total coliforms	CFU /100mL	17	0	0	Membrane Filtration
2	Faecal coliforms	CFU /100mL	13	0	0	Membrane Filtration
3	Biochemical Oxygen Demand (BOD_5 ; 20^0C)	mg/L	<2.0	-	-	5-Day BOD Test

Comment: The supplied water sample is contaminated with total coliforms and faecal coliforms.

Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

Checked By :

End of the Report

Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

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Phone: +8809666771100, or 16340, Ext: 2405
Web: http://www.icddrb.org

Laboratory of Environmental Health

Test Report

Lab. ID No. 2025020720 (V1) Receipt No: SRA25021200474 Date of Reporting: 24.02.2025

Particular of Sample: Drinking Water (GW) Date of Sample Received: 12.02.2025

Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-2/3) (GW).

Sl. No.	Water Quality Parameters	Unit	Results	Bangladesh Standard for Drinking Water (ECR'23)	WHO Guideline for Drinking Water, 2008	Method
1	Total coliforms	CFU /100mL	0	0	0	Membrane Filtration
2	Faecal coliforms	CFU /100mL	0	0	0	Membrane Filtration
3	Biochemical Oxygen Demand (BOD_5 ; 20^0C)	mg/L	<2.0	-	-	5-Day BOD Test

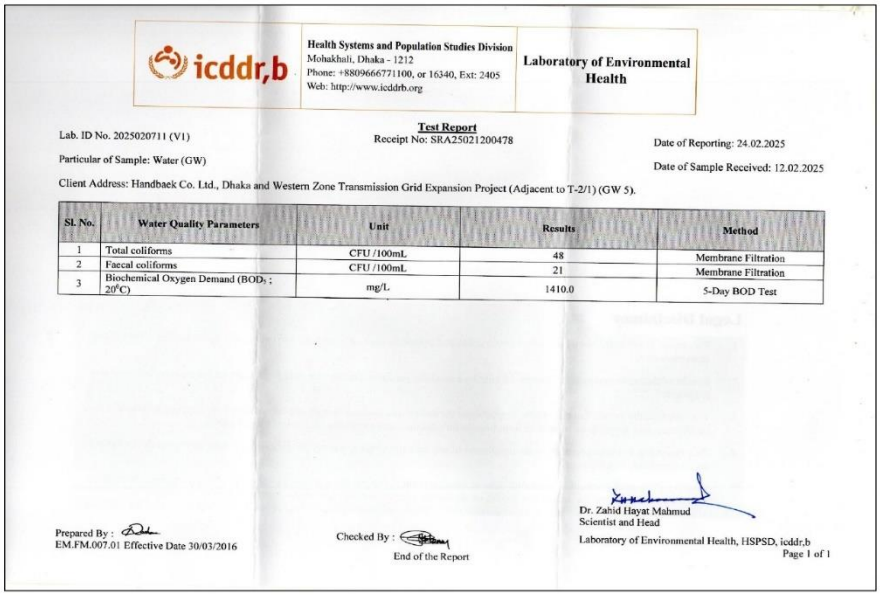
Prepared By :
EM.FM.007.01 Effective Date 30/03/2016

Checked By :

End of the Report

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Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b

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Laboratory of Environmental Health

Test Report
Receipt No: SRA25021200478

Lab. ID No. 2025020711 (V1)
Date of Reporting: 24.02.2025
Particular of Sample: Water (GW)
Date of Sample Received: 12.02.2025
Client Address: Handbaek Co. Ltd., Dhaka and Western Zone Transmission Grid Expansion Project (Adjacent to T-2/1) (GW 5).

Sl. No.	Water Quality Parameters	Unit	Results	Method
1	Total coliforms	CFU /100mL	48	Membrane Filtration
2	Faecal coliforms	CFU /100mL	21	Membrane Filtration
3	Biochemical Oxygen Demand (BOD_5 ; 20^0C)	mg/L	1410.0	5-Day BOD Test

Prepared By :
EM.FM.007.01 Effective Date 30/03/2016
Checked By :
End of the Report
Dr. Zahid Hayat Mahmud
Scientist and Head
Laboratory of Environmental Health, HSPSD, icddr,b
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Ground Water Test Report of Handbaek from icddr, b

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Appendix



Groundwater Sample Collection

Figure: Ground Water Sample Collection

Soil and Reverbed Sediment Quality Test Report

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Test Report

Reference No	ST 10113	**Test Name**	Soil Quality Test (Chemical Properties)
Sample Receiving Date	17/03/2025	**Sample ID**	SQ-(1-2-3-4-5)
Date of Analysis	06/04/2025 to 27/04/2025	**Date of Submission**	30/04/2025
Client Name	**Handbaek Co. Ltd.** Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis	**Sample Type**	Soil Sample from site

Methodology

S/I	Soil Quality Parameters	Unit	Bangladesh Standard (ECR'23)	Method of Analysis
1	pH	-	-	1:2:5 Glass Electrode Method
2	Total Nitrogen (TN)	%	-	Micro-Kjeldahl Method
3	EC	ppm	-	FAO-UNESCO, 1973
4	Zinc (Zn)	ppm	-	DTPA Extraction Method
5	Phosphourus (P)	ppm	-	Olsen Method and Bray & Kurtz Method
6	Potassium (K)	ppm		NH_4OAc Extraction Method
7	Iron (Fe)	%	-	DTPA Extraction Method
8	Lead (Pb)	ppm	-	Nitric Acid Digestion Method
9	Copper (Cu)	ppm	-	DTPA Extraction Method
10	Calcium (Ca)	ppm	-	NH_4OAc Extraction Method

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Soil Quality Monitoring Result:

Sample Code	pH	Total Nitrogen	EC	Zinc	Phosphourus	Potassium	Iron	Lead	Copper	Calcium
	-	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
Code:1	5.4	0.26	4.43	184.40	3.15	0.26	1.74	34.08	56.90	15.36
Code:2	4.8	0.28	2.55	90.82	2.10	0.31	1.57	35.65	45.11	14.24
Code:3	4.7	0.21	1.36	54.18	1.53	0.26	1.70	36.01	30.68	8.56
Code:4	7.8	0.09	10.69	36.01	2.53	0.68	1.57	0.05	22.17	18.75
Code:5	4.5	0.50	4.70	90.94	2.18	0.30	1.68	33.59	45.11	11.70

Comments:

1. **No Standard has been set yet for Soil Quality Tests.**
2. Sample was collected by Site Inspector.
3. Sample was received in sealed condition

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Annexure

TEST REPORT

Government of the People's Republic of Bangladesh
Soil Resource Development Institute (SRDI)
Central Laboratory
Mrittika Bhabon, Krishi Khamar Sarak, Dhaka-1215

Report ID	:	**12.03.0000.034.57.005.25-68** Ref. F01(7.8/01)
Name of Client	:	Md. Rahad Hossain
Address	:	Manager (Egineering) Hanbaek Co., Ltd. 23, Bia-ro, Gwangsan-gu- Gwangju -si, KOREA PH:82-62-954-1122,
Mobile/ Email	:	global@hanbaek.com
Description with Ref.	:	Personal Application.
Sampling Method	:	Not Applicable
Sample Received Date	:	17th March, 2025
Test Starting Date	:	06th April, 2025
Result Delivery date	:	27th April, 2025
Testing Method	:	pH (1:2:5 Glass Electrode Method), EC [(FAO-UNESCO, 1973), TN (Micro-Kjeldahl Method), P (Olsen Method and Bray & Kurtz Method), K, Ca (NH_4OAc Extraction Method), Zn, Cu, Fe (DTPA Extraction Method), Pb (Nitric Acid Digestion Method).
Test Temperature	:	Average 23.3^0 C

Analytical Result

Lab No.	Sample Name & Code	Tested Items			Govt. Specification/ Maximum Allowable Limit	Remarks
		Element	Result	Unit		
S2025-209	Name: Soil Sample Code: 01	pH	5.4	-	Not applicable (N/A)	
		Total Nitrogen (TN)	0.26	%	N/A	
		EC	4.43	ppm	N/A	
		Zinc (Zn)	184.40	ppm	N/A	
		Phosphorus (P)	3.15	ppm	N/A	
		Potassium (K)	0.26	ppm	N/A	
		Iron (Fe)	1.74	%	N/A	
		Lead (Pb)	34.08	ppm	N/A	
		Copper (Cu)	56.90	ppm	N/A	
		Calcium (Ca)	15.36	ppm	N/A	
S2025-210	Name: Soil Sample Code: 02	pH	4.8	-	N/A	
		Total Nitrogen (TN)	0.28	%	N/A	
		EC	2.55	ppm	N/A	
		Zinc (Zn)	90.82	ppm	N/A	
		Phosphorus (P)	2.10	ppm	N/A	
		Potassium (K)	0.31	ppm	N/A	
		Iron (Fe)	1.57	%	N/A	
		Lead (Pb)	35.65	ppm	N/A	
		Copper (Cu)	45.11	ppm	N/A	
		Calcium (Ca)	14.24	ppm	N/A	

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Lab No.	Sample Name & Code	Tested Items			Govt. Specification/ Maximum Allowable Limit	Remarks
		Element	Result	Unit		
S2025-211	Name: Soil Sample Code: 03	pH	4.7	-	Not applicable (N/A)	
		Total Nitrogen (TN)	0.21	%	N/A	
		EC	1.36	ppm	N/A	
		Zinc (Zn)	54.18	ppm	N/A	
		Phosphorus (P)	1.53	ppm	N/A	
		Potassium (K)	0.26	ppm	N/A	
		Iron (Fe)	1.70	%	N/A	
		Lead (Pb)	36.01	ppm	N/A	
		Copper (Cu)	30.68	ppm	N/A	
		Calcium (Ca)	8.56	ppm	N/A	
S2025-212	Name: Soil Sample Code: 04	pH	7.8	-	N/A	
		Total Nitrogen (TN)	0.09	%	N/A	
		EC	10.69	ppm	N/A	
		Zinc (Zn)	36.01	ppm	N/A	
		Phosphorus (P)	2.53	ppm	N/A	
		Potassium (K)	0.68	ppm	N/A	
		Iron (Fe)	1.57	%	N/A	
		Lead (Pb)	0.05	ppm	N/A	
		Copper (Cu)	22.17	ppm	N/A	
		Calcium (Ca)	18.75	ppm	N/A	
S2025-213	Name: Soil Sample Code: 05	pH	4.5	-	N/A	
		Total Nitrogen (TN)	0.50	%	N/A	
		EC	4.70	ppm	N/A	
		Zinc (Zn)	90.94	ppm	N/A	
		Phosphorus (P)	2.18	ppm	N/A	
		Potassium (K)	0.30	ppm	N/A	
		Iron (Fe)	1.68	%	N/A	
		Lead (Pb)	33.59	ppm	N/A	
		Copper (Cu)	45.11	ppm	N/A	
		Calcium (Ca)	11.70	ppm	N/A	

Shammi 27.4.25
(Asst. Technical Manager)
শাম্মী আখতার তিনা
বৈজ্ঞানিক কর্মকর্তা
কেন্দ্রীয় গবেষণাগার
মৃত্তিকা সম্পদ উন্নয়ন ইনস্টিটিউট
খামারবাড়ি সড়ক, ঢাকা-১২১৫

27.4.25
(Technical Manager)
(ড. মোঃ হুমায়ুন কবীর সিরাজী)
মৃত্তিকা সম্পদ উন্নয়ন ইনস্টিটিউট
কেন্দ্রীয় গবেষণাগার
কৃষি খামার সড়ক, ঢাকা

29/04/25
(Quality Manager)
মোঃ জয়নাল আবেদিন
প্রধান বৈজ্ঞানিক কর্মকর্তা
কেন্দ্রীয় গবেষণাগার
মৃত্তিকা সম্পদ উন্নয়ন ইনস্টিটিউট
কৃষি খামার সড়ক, ঢাকা।

Soil Test Report for Handbaek from srdi

greenbud

Head Office
14A, Level: 14, Building No: 02
Confidence Center, Kha-09, Shahjadpur
Gulshan, Dhaka-1212

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Appendix



Soil Sample Collection

Figure: Soil Sample Collection

GG ANNEX: RAW DATA SHEET FOR NOISE LEVEL MONITORING

Data_Record

Record	Time	Noise (dB)	Record	Time	Noise (dB)	Record	Time	Noise (dB)
1	08/02/25 09:47:39	48.3	481	08/02/25 17:47:39	47.1	961	09/02/25 01:47:39	36.9
2	08/02/25 09:48:39	46.5	482	08/02/25 17:48:39	49.5	962	09/02/25 01:48:39	38.5
3	08/02/25 09:49:39	50.3	483	08/02/25 17:49:39	48.5	963	09/02/25 01:49:39	38.3
4	08/02/25 09:50:39	42.0	484	08/02/25 17:50:39	40.2	964	09/02/25 01:50:39	38.4
5	08/02/25 09:51:39	55.3	485	08/02/25 17:51:39	29.4	965	09/02/25 01:51:39	35.8
6	08/02/25 09:52:39	55.9	486	08/02/25 17:52:39	53.9	966	09/02/25 01:52:39	36.2
7	08/02/25 09:53:39	54.5	487	08/02/25 17:53:39	28.3	967	09/02/25 01:53:39	38.3
8	08/02/25 09:54:39	50.9	488	08/02/25 17:54:39	48.0	968	09/02/25 01:54:39	35.7
9	08/02/25 09:55:39	44.3	489	08/02/25 17:55:39	50.3	969	09/02/25 01:55:39	36.6
10	08/02/25 09:56:39	50.7	490	08/02/25 17:56:39	55.9	970	09/02/25 01:56:39	37.1
11	08/02/25 09:57:39	52.4	491	08/02/25 17:57:39	48.5	971	09/02/25 01:57:39	37.4
12	08/02/25 09:58:39	46.6	492	08/02/25 17:58:39	54.0	972	09/02/25 01:58:39	39.6
13	08/02/25 09:59:39	53.9	493	08/02/25 17:59:39	53.5	973	09/02/25 01:59:39	39.0
14	08/02/25 10:00:39	43.0	494	08/02/25 18:00:39	52.5	974	09/02/25 02:00:39	37.5
15	08/02/25 10:01:39	44.9	495	08/02/25 18:01:39	48.8	975	09/02/25 02:01:39	35.6
16	08/02/25 10:02:39	47.0	496	08/02/25 18:02:39	53.0	976	09/02/25 02:02:39	35.6
17	08/02/25 10:03:39	48.3	497	08/02/25 18:03:39	49.4	977	09/02/25 02:03:39	36.4
18	08/02/25 10:04:39	47.2	498	08/02/25 18:04:39	32.3	978	09/02/25 02:04:39	39.3
19	08/02/25 10:05:39	49.4	499	08/02/25 18:05:39	59.7	979	09/02/25 02:05:39	36.2
20	08/02/25 10:06:39	41.9	500	08/02/25 18:06:39	29.4	980	09/02/25 02:06:39	38.0
21	08/02/25 10:07:39	42.4	501	08/02/25 18:07:39	51.3	981	09/02/25 02:07:39	35.6
22	08/02/25 10:08:39	45.9	502	08/02/25 18:08:39	32.3	982	09/02/25 02:08:39	38.4
23	08/02/25 10:09:39	39.3	503	08/02/25 18:09:39	36.7	983	09/02/25 02:09:39	38.9
24	08/02/25 10:10:39	44.9	504	08/02/25 18:10:39	38.9	984	09/02/25 02:10:39	37.4
25	08/02/25 10:11:39	54.5	505	08/02/25 18:11:39	37.7	985	09/02/25 02:11:39	35.4
26	08/02/25 10:12:39	36.6	506	08/02/25 18:12:39	44.1	986	09/02/25 02:12:39	35.1
27	08/02/25 10:13:39	36.5	507	08/02/25 18:13:39	35.5	987	09/02/25 02:13:39	35.8
28	08/02/25 10:14:39	38.3	508	08/02/25 18:14:39	40.3	988	09/02/25 02:14:39	39.3
29	08/02/25 10:15:39	35.7	509	08/02/25 18:15:39	36.1	989	09/02/25 02:15:39	35.4
30	08/02/25 10:16:39	37.6	510	08/02/25 18:16:39	40.3	990	09/02/25 02:16:39	36.8
31	08/02/25 10:17:39	45.7	511	08/02/25 18:17:39	44.6	991	09/02/25 02:17:39	39.6
32	08/02/25 10:18:39	55.5	512	08/02/25 18:18:39	43.7	992	09/02/25 02:18:39	36.1
33	08/02/25 10:19:39	56.0	513	08/02/25 18:19:39	43.9	993	09/02/25 02:19:39	38.2
34	08/02/25 10:20:39	54.9	514	08/02/25 18:20:39	38.3	994	09/02/25 02:20:39	35.0
35	08/02/25 10:21:39	46.6	515	08/02/25 18:21:39	38.5	995	09/02/25 02:21:39	35.4
36	08/02/25 10:22:39	54.9	516	08/02/25 18:22:39	42.6	996	09/02/25 02:22:39	36.8
37	08/02/25 10:23:39	44.9	517	08/02/25 18:23:39	38.9	997	09/02/25 02:23:39	39.4
38	08/02/25 10:24:39	38.8	518	08/02/25 18:24:39	42.5	998	09/02/25 02:24:39	38.1
39	08/02/25 10:25:39	40.8	519	08/02/25 18:25:39	42.8	999	09/02/25 02:25:39	35.4
40	08/02/25 10:26:39	51.4	520	08/02/25 18:26:39	44.8	1000	09/02/25 02:26:39	36.8
41	08/02/25 10:27:39	39.5	521	08/02/25 18:27:39	37.5	1001	09/02/25 02:27:39	39.4
42	08/02/25 10:28:39	38.4	522	08/02/25 18:28:39	35.4	1002	09/02/25 02:28:39	37.6
43	08/02/25 10:29:39	39.7	523	08/02/25 18:29:39	36.9	1003	09/02/25 02:29:39	36.6
44	08/02/25 10:30:39	53.0	524	08/02/25 18:30:39	35.5	1004	09/02/25 02:30:39	35.2
45	08/02/25 10:31:39	53.0	525	08/02/25 18:31:39	39.4	1005	09/02/25 02:31:39	35.8
46	08/02/25 10:32:39	44.2	526	08/02/25 18:32:39	35.8	1006	09/02/25 02:32:39	38.5
47	08/02/25 10:33:39	52.7	527	08/02/25 18:33:39	39.1	1007	09/02/25 02:33:39	35.5
48	08/02/25 10:34:39	45.2	528	08/02/25 18:34:39	39.4	1008	09/02/25 02:34:39	37.0
49	08/02/25 10:35:39	47.7	529	08/02/25 18:35:39	38.2	1009	09/02/25 02:35:39	38.9

Data_Record

50	08/02/25 10:36:39	38.7	530	08/02/25 18:36:39	36.1	1010	09/02/25 02:36:39	37.7
51	08/02/25 10:37:39	40.2	531	08/02/25 18:37:39	37.7	1011	09/02/25 02:37:39	38.1
52	08/02/25 10:38:39	55.8	532	08/02/25 18:38:39	38.5	1012	09/02/25 02:38:39	39.5
53	08/02/25 10:39:39	47.7	533	08/02/25 18:39:39	29.2	1013	09/02/25 02:39:39	39.3
54	08/02/25 10:40:39	56.9	534	08/02/25 18:40:39	41.9	1014	09/02/25 02:40:39	37.1
55	08/02/25 10:41:39	50.9	535	08/02/25 18:41:39	40.5	1015	09/02/25 02:41:39	35.6
56	08/02/25 10:42:39	54.8	536	08/02/25 18:42:39	38.4	1016	09/02/25 02:42:39	39.1
57	08/02/25 10:43:39	52.2	537	08/02/25 18:43:39	42.1	1017	09/02/25 02:43:39	37.6
58	08/02/25 10:44:39	42.5	538	08/02/25 18:44:39	35.1	1018	09/02/25 02:44:39	37.8
59	08/02/25 10:45:39	50.5	539	08/02/25 18:45:39	39.3	1019	09/02/25 02:45:39	35.7
60	08/02/25 10:46:39	43.7	540	08/02/25 18:46:39	41.0	1020	09/02/25 02:46:39	39.7
61	08/02/25 10:47:39	47.9	541	08/02/25 18:47:39	39.5	1021	09/02/25 02:47:39	35.4
62	08/02/25 10:48:39	50.2	542	08/02/25 18:48:39	36.4	1022	09/02/25 02:48:39	37.3
63	08/02/25 10:49:39	40.4	543	08/02/25 18:49:39	38.3	1023	09/02/25 02:49:39	39.2
64	08/02/25 10:50:39	45.5	544	08/02/25 18:50:39	39.9	1024	09/02/25 02:50:39	36.8
65	08/02/25 10:51:39	53.2	545	08/02/25 18:51:39	38.8	1025	09/02/25 02:51:39	38.0
66	08/02/25 10:52:39	39.3	546	08/02/25 18:52:39	44.8	1026	09/02/25 02:52:39	36.6
67	08/02/25 10:53:39	44.9	547	08/02/25 18:53:39	41.5	1027	09/02/25 02:53:39	35.2
68	08/02/25 10:54:39	52.5	548	08/02/25 18:54:39	35.5	1028	09/02/25 02:54:39	35.7
69	08/02/25 10:55:39	42.1	549	08/02/25 18:55:39	35.6	1029	09/02/25 02:55:39	36.6
70	08/02/25 10:56:39	43.2	550	08/02/25 18:56:39	35.1	1030	09/02/25 02:56:39	39.5
71	08/02/25 10:57:39	46.0	551	08/02/25 18:57:39	44.7	1031	09/02/25 02:57:39	39.5
72	08/02/25 10:58:39	38.5	552	08/02/25 18:58:39	42.4	1032	09/02/25 02:58:39	39.8
73	08/02/25 10:59:39	46.2	553	08/02/25 18:59:39	30.3	1033	09/02/25 02:59:39	39.0
74	08/02/25 11:00:39	54.7	554	08/02/25 19:00:39	39.0	1034	09/02/25 03:00:39	39.2
75	08/02/25 11:01:39	44.9	555	08/02/25 19:01:39	36.1	1035	09/02/25 03:01:39	36.9
76	08/02/25 11:02:39	55.2	556	08/02/25 19:02:39	37.2	1036	09/02/25 03:02:39	36.6
77	08/02/25 11:03:39	41.0	557	08/02/25 19:03:39	37.9	1037	09/02/25 03:03:39	35.3
78	08/02/25 11:04:39	45.9	558	08/02/25 19:04:39	36.0	1038	09/02/25 03:04:39	37.6
79	08/02/25 11:05:39	56.4	559	08/02/25 19:05:39	41.9	1039	09/02/25 03:05:39	37.0
80	08/02/25 11:06:39	51.2	560	08/02/25 19:06:39	37.3	1040	09/02/25 03:06:39	39.0
81	08/02/25 11:07:39	48.8	561	08/02/25 19:07:39	41.2	1041	09/02/25 03:07:39	38.8
82	08/02/25 11:08:39	52.2	562	08/02/25 19:08:39	36.9	1042	09/02/25 03:08:39	37.7
83	08/02/25 11:09:39	53.2	563	08/02/25 19:09:39	37.0	1043	09/02/25 03:09:39	36.7
84	08/02/25 11:10:39	47.2	564	08/02/25 19:10:39	38.1	1044	09/02/25 03:10:39	35.7
85	08/02/25 11:11:39	52.8	565	08/02/25 19:11:39	37.1	1045	09/02/25 03:11:39	39.6
86	08/02/25 11:12:39	47.4	566	08/02/25 19:12:39	37.8	1046	09/02/25 03:12:39	38.9
87	08/02/25 11:13:39	45.4	567	08/02/25 19:13:39	36.9	1047	09/02/25 03:13:39	38.5
88	08/02/25 11:14:39	56.3	568	08/02/25 19:14:39	42.7	1048	09/02/25 03:14:39	35.4
89	08/02/25 11:15:39	44.3	569	08/02/25 19:15:39	36.1	1049	09/02/25 03:15:39	37.9
90	08/02/25 11:16:39	55.7	570	08/02/25 19:16:39	41.6	1050	09/02/25 03:16:39	36.9
91	08/02/25 11:17:39	51.7	571	08/02/25 19:17:39	29.2	1051	09/02/25 03:17:39	38.2
92	08/02/25 11:18:39	49.6	572	08/02/25 19:18:39	37.8	1052	09/02/25 03:18:39	39.8
93	08/02/25 11:19:39	50.0	573	08/02/25 19:19:39	40.9	1053	09/02/25 03:19:39	38.4
94	08/02/25 11:20:39	41.2	574	08/02/25 19:20:39	35.5	1054	09/02/25 03:20:39	35.3
95	08/02/25 11:21:39	57.6	575	08/02/25 19:21:39	41.4	1055	09/02/25 03:21:39	38.0
96	08/02/25 11:22:39	52.3	576	08/02/25 19:22:39	37.5	1056	09/02/25 03:22:39	37.3
97	08/02/25 11:23:39	40.3	577	08/02/25 19:23:39	33.3	1057	09/02/25 03:23:39	38.1
98	08/02/25 11:24:39	40.2	578	08/02/25 19:24:39	39.9	1058	09/02/25 03:24:39	35.9
99	08/02/25 11:25:39	52.5	579	08/02/25 19:25:39	41.5	1059	09/02/25 03:25:39	36.9
100	08/02/25 11:26:39	59.8	580	08/02/25 19:26:39	41.7	1060	09/02/25 03:26:39	39.0

Data_Record

101	08/02/25 11:27:39	51.9	581	08/02/25 19:27:39	38.4	1061	09/02/25 03:27:39	36.6
102	08/02/25 11:28:39	52.2	582	08/02/25 19:28:39	35.3	1062	09/02/25 03:28:39	36.5
103	08/02/25 11:29:39	47.2	583	08/02/25 19:29:39	37.2	1063	09/02/25 03:29:39	38.3
104	08/02/25 11:30:39	42.2	584	08/02/25 19:30:39	35.4	1064	09/02/25 03:30:39	35.7
105	08/02/25 11:31:39	52.8	585	08/02/25 19:31:39	37.9	1065	09/02/25 03:31:39	37.6
106	08/02/25 11:32:39	53.6	586	08/02/25 19:32:39	37.8	1066	09/02/25 03:32:39	36.7
107	08/02/25 11:33:39	47.0	587	08/02/25 19:33:39	37.7	1067	09/02/25 03:33:39	38.1
108	08/02/25 11:34:39	35.4	588	08/02/25 19:34:39	36.8	1068	09/02/25 03:34:39	39.7
109	08/02/25 11:35:39	37.4	589	08/02/25 19:35:39	37.9	1069	09/02/25 03:35:39	38.9
110	08/02/25 11:36:39	38.7	590	08/02/25 19:36:39	39.1	1070	09/02/25 03:36:39	36.7
111	08/02/25 11:37:39	35.8	591	08/02/25 19:37:39	36.6	1071	09/02/25 03:37:39	39.5
112	08/02/25 11:38:39	38.1	592	08/02/25 19:38:39	35.9	1072	09/02/25 03:38:39	38.7
113	08/02/25 11:39:39	38.9	593	08/02/25 19:39:39	39.4	1073	09/02/25 03:39:39	38.3
114	08/02/25 11:40:39	36.0	594	08/02/25 19:40:39	37.5	1074	09/02/25 03:40:39	37.8
115	08/02/25 11:41:39	39.0	595	08/02/25 19:41:39	36.3	1075	09/02/25 03:41:39	39.1
116	08/02/25 11:42:39	36.6	596	08/02/25 19:42:39	38.8	1076	09/02/25 03:42:39	38.3
117	08/02/25 11:43:39	35.2	597	08/02/25 19:43:39	39.9	1077	09/02/25 03:43:39	38.3
118	08/02/25 11:44:39	39.1	598	08/02/25 19:44:39	39.7	1078	09/02/25 03:44:39	39.7
119	08/02/25 11:45:39	39.1	599	08/02/25 19:45:39	39.7	1079	09/02/25 03:45:39	39.9
120	08/02/25 11:46:39	37.8	600	08/02/25 19:46:39	38.0	1080	09/02/25 03:46:39	37.8
121	08/02/25 11:47:39	35.1	601	08/02/25 19:47:39	35.3	1081	09/02/25 03:47:39	39.8
122	08/02/25 11:48:39	38.1	602	08/02/25 19:48:39	38.4	1082	09/02/25 03:48:39	35.9
123	08/02/25 11:49:39	40.0	603	08/02/25 19:49:39	40.6	1083	09/02/25 03:49:39	35.6
124	08/02/25 11:50:39	35.8	604	08/02/25 19:50:39	39.9	1084	09/02/25 03:50:39	38.8
125	08/02/25 11:51:39	36.2	605	08/02/25 19:51:39	38.7	1085	09/02/25 03:51:39	35.7
126	08/02/25 11:52:39	39.0	606	08/02/25 19:52:39	35.2	1086	09/02/25 03:52:39	39.0
127	08/02/25 11:53:39	38.0	607	08/02/25 19:53:39	37.9	1087	09/02/25 03:53:39	35.1
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129	08/02/25 11:55:39	36.7	609	08/02/25 19:55:39	37.5	1089	09/02/25 03:55:39	37.1
130	08/02/25 11:56:39	37.7	610	08/02/25 19:56:39	40.0	1090	09/02/25 03:56:39	39.9
131	08/02/25 11:57:39	35.8	611	08/02/25 19:57:39	39.9	1091	09/02/25 03:57:39	39.4
132	08/02/25 11:58:39	39.1	612	08/02/25 19:58:39	37.0	1092	09/02/25 03:58:39	39.4
133	08/02/25 11:59:39	35.9	613	08/02/25 19:59:39	39.1	1093	09/02/25 03:59:39	39.8
134	08/02/25 12:00:39	36.5	614	08/02/25 20:00:39	35.4	1094	09/02/25 04:00:39	38.0
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136	08/02/25 12:02:39	36.5	616	08/02/25 20:02:39	35.9	1096	09/02/25 04:02:39	35.1
137	08/02/25 12:03:39	35.2	617	08/02/25 20:03:39	38.8	1097	09/02/25 04:03:39	36.5
138	08/02/25 12:04:39	37.1	618	08/02/25 20:04:39	38.7	1098	09/02/25 04:04:39	38.6
139	08/02/25 12:05:39	37.7	619	08/02/25 20:05:39	35.1	1099	09/02/25 04:05:39	36.3
140	08/02/25 12:06:39	35.9	620	08/02/25 20:06:39	36.4	1100	09/02/25 04:06:39	36.9
141	08/02/25 12:07:39	37.8	621	08/02/25 20:07:39	37.4	1101	09/02/25 04:07:39	35.7
142	08/02/25 12:08:39	36.7	622	08/02/25 20:08:39	39.4	1102	09/02/25 04:08:39	38.0
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144	08/02/25 12:10:39	39.9	624	08/02/25 20:10:39	38.5	1104	09/02/25 04:10:39	38.4
145	08/02/25 12:11:39	38.6	625	08/02/25 20:11:39	37.7	1105	09/02/25 04:11:39	35.9
146	08/02/25 12:12:39	37.2	626	08/02/25 20:12:39	36.2	1106	09/02/25 04:12:39	36.4
147	08/02/25 12:13:39	38.1	627	08/02/25 20:13:39	39.8	1107	09/02/25 04:13:39	36.9
148	08/02/25 12:14:39	36.3	628	08/02/25 20:14:39	37.7	1108	09/02/25 04:14:39	38.1
149	08/02/25 12:15:39	37.7	629	08/02/25 20:15:39	37.0	1109	09/02/25 04:15:39	37.1
150	08/02/25 12:16:39	36.1	630	08/02/25 20:16:39	38.6	1110	09/02/25 04:16:39	39.6
151	08/02/25 12:17:39	36.8	631	08/02/25 20:17:39	37.3	1111	09/02/25 04:17:39	35.8

Data_Record

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156	08/02/25 12:22:39	41.2	636	08/02/25 20:22:39	37.1	1116	09/02/25 04:22:39	37.6
157	08/02/25 12:23:39	35.7	637	08/02/25 20:23:39	36.6	1117	09/02/25 04:23:39	35.4
158	08/02/25 12:24:39	38.0	638	08/02/25 20:24:39	36.8	1118	09/02/25 04:24:39	37.6
159	08/02/25 12:25:39	39.1	639	08/02/25 20:25:39	35.5	1119	09/02/25 04:25:39	35.7
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161	08/02/25 12:27:39	39.1	641	08/02/25 20:27:39	35.8	1121	09/02/25 04:27:39	37.2
162	08/02/25 12:28:39	38.5	642	08/02/25 20:28:39	35.5	1122	09/02/25 04:28:39	38.6
163	08/02/25 12:29:39	39.6	643	08/02/25 20:29:39	36.3	1123	09/02/25 04:29:39	36.0
164	08/02/25 12:30:39	39.0	644	08/02/25 20:30:39	37.1	1124	09/02/25 04:30:39	35.5
165	08/02/25 12:31:39	35.8	645	08/02/25 20:31:39	38.1	1125	09/02/25 04:31:39	36.4
166	08/02/25 12:32:39	36.0	646	08/02/25 20:32:39	39.2	1126	09/02/25 04:32:39	38.3
167	08/02/25 12:33:39	35.6	647	08/02/25 20:33:39	35.8	1127	09/02/25 04:33:39	38.5
168	08/02/25 12:34:39	38.7	648	08/02/25 20:34:39	40.0	1128	09/02/25 04:34:39	38.6
169	08/02/25 12:35:39	38.8	649	08/02/25 20:35:39	36.1	1129	09/02/25 04:35:39	36.7
170	08/02/25 12:36:39	35.3	650	08/02/25 20:36:39	36.5	1130	09/02/25 04:36:39	36.0
171	08/02/25 12:37:39	35.1	651	08/02/25 20:37:39	36.2	1131	09/02/25 04:37:39	38.2
172	08/02/25 12:38:39	38.0	652	08/02/25 20:38:39	35.5	1132	09/02/25 04:38:39	36.1
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174	08/02/25 12:40:39	38.8	654	08/02/25 20:40:39	35.4	1134	09/02/25 04:40:39	35.2
175	08/02/25 12:41:39	52.7	655	08/02/25 20:41:39	37.3	1135	09/02/25 04:41:39	35.5
176	08/02/25 12:42:39	38.2	656	08/02/25 20:42:39	37.4	1136	09/02/25 04:42:39	36.9
177	08/02/25 12:43:39	36.3	657	08/02/25 20:43:39	39.9	1137	09/02/25 04:43:39	36.8
178	08/02/25 12:44:39	36.4	658	08/02/25 20:44:39	39.7	1138	09/02/25 04:44:39	39.9
179	08/02/25 12:45:39	35.1	659	08/02/25 20:45:39	39.3	1139	09/02/25 04:45:39	36.8
180	08/02/25 12:46:39	36.2	660	08/02/25 20:46:39	35.2	1140	09/02/25 04:46:39	38.4
181	08/02/25 12:47:39	37.1	661	08/02/25 20:47:39	39.3	1141	09/02/25 04:47:39	36.2
182	08/02/25 12:48:39	39.3	662	08/02/25 20:48:39	39.7	1142	09/02/25 04:48:39	39.9
183	08/02/25 12:49:39	38.7	663	08/02/25 20:49:39	39.7	1143	09/02/25 04:49:39	37.0
184	08/02/25 12:50:39	37.6	664	08/02/25 20:50:39	36.0	1144	09/02/25 04:50:39	36.7
185	08/02/25 12:51:39	39.6	665	08/02/25 20:51:39	38.0	1145	09/02/25 04:51:39	36.9
186	08/02/25 12:52:39	38.4	666	08/02/25 20:52:39	38.0	1146	09/02/25 04:52:39	36.9
187	08/02/25 12:53:39	39.6	667	08/02/25 20:53:39	38.2	1147	09/02/25 04:53:39	39.0
188	08/02/25 12:54:39	37.7	668	08/02/25 20:54:39	39.1	1148	09/02/25 04:54:39	38.1
189	08/02/25 12:55:39	38.8	669	08/02/25 20:55:39	36.1	1149	09/02/25 04:55:39	37.6
190	08/02/25 12:56:39	35.4	670	08/02/25 20:56:39	39.5	1150	09/02/25 04:56:39	37.4
191	08/02/25 12:57:39	35.6	671	08/02/25 20:57:39	37.6	1151	09/02/25 04:57:39	35.8
192	08/02/25 12:58:39	36.0	672	08/02/25 20:58:39	36.7	1152	09/02/25 04:58:39	38.7
193	08/02/25 12:59:39	39.4	673	08/02/25 20:59:39	36.3	1153	09/02/25 04:59:39	38.6
194	08/02/25 13:00:39	35.1	674	08/02/25 21:00:39	38.0	1154	09/02/25 05:00:39	37.7
195	08/02/25 13:01:39	37.4	675	08/02/25 21:01:39	38.7	1155	09/02/25 05:01:39	38.1
196	08/02/25 13:02:39	35.7	676	08/02/25 21:02:39	37.6	1156	09/02/25 05:02:39	37.4
197	08/02/25 13:03:39	36.4	677	08/02/25 21:03:39	39.3	1157	09/02/25 05:03:39	35.3
198	08/02/25 13:04:39	37.6	678	08/02/25 21:04:39	37.2	1158	09/02/25 05:04:39	38.1
199	08/02/25 13:05:39	35.0	679	08/02/25 21:05:39	37.4	1159	09/02/25 05:05:39	36.6
200	08/02/25 13:06:39	37.6	680	08/02/25 21:06:39	37.9	1160	09/02/25 05:06:39	38.6
201	08/02/25 13:07:39	38.4	681	08/02/25 21:07:39	39.7	1161	09/02/25 05:07:39	39.1
202	08/02/25 13:08:39	38.0	682	08/02/25 21:08:39	36.5	1162	09/02/25 05:08:39	37.8

Data_Record

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204	08/02/25 13:10:39	35.7	684	08/02/25 21:10:39	36.1	1164	09/02/25 05:10:39	37.5
205	08/02/25 13:11:39	38.5	685	08/02/25 21:11:39	39.9	1165	09/02/25 05:11:39	37.2
206	08/02/25 13:12:39	39.8	686	08/02/25 21:12:39	38.6	1166	09/02/25 05:12:39	39.7
207	08/02/25 13:13:39	35.0	687	08/02/25 21:13:39	39.7	1167	09/02/25 05:13:39	36.8
208	08/02/25 13:14:39	35.2	688	08/02/25 21:14:39	35.7	1168	09/02/25 05:14:39	36.0
209	08/02/25 13:15:39	39.9	689	08/02/25 21:15:39	36.5	1169	09/02/25 05:15:39	38.5
210	08/02/25 13:16:39	35.6	690	08/02/25 21:16:39	38.0	1170	09/02/25 05:16:39	36.6
211	08/02/25 13:17:39	35.2	691	08/02/25 21:17:39	35.2	1171	09/02/25 05:17:39	40.0
212	08/02/25 13:18:39	58.2	692	08/02/25 21:18:39	37.4	1172	09/02/25 05:18:39	35.5
213	08/02/25 13:19:39	39.4	693	08/02/25 21:19:39	36.3	1173	09/02/25 05:19:39	36.6
214	08/02/25 13:20:39	36.4	694	08/02/25 21:20:39	36.7	1174	09/02/25 05:20:39	38.6
215	08/02/25 13:21:39	36.6	695	08/02/25 21:21:39	35.5	1175	09/02/25 05:21:39	38.2
216	08/02/25 13:22:39	38.6	696	08/02/25 21:22:39	36.9	1176	09/02/25 05:22:39	38.7
217	08/02/25 13:23:39	38.3	697	08/02/25 21:23:39	39.4	1177	09/02/25 05:23:39	36.3
218	08/02/25 13:24:39	35.6	698	08/02/25 21:24:39	35.5	1178	09/02/25 05:24:39	39.4
219	08/02/25 13:25:39	36.6	699	08/02/25 21:25:39	38.2	1179	09/02/25 05:25:39	35.7
220	08/02/25 13:26:39	37.1	700	08/02/25 21:26:39	39.2	1180	09/02/25 05:26:39	35.7
221	08/02/25 13:27:39	36.4	701	08/02/25 21:27:39	37.0	1181	09/02/25 05:27:39	36.2
222	08/02/25 13:28:39	35.0	702	08/02/25 21:28:39	36.5	1182	09/02/25 05:28:39	37.9
223	08/02/25 13:29:39	35.7	703	08/02/25 21:29:39	38.1	1183	09/02/25 05:29:39	38.9
224	08/02/25 13:30:39	38.0	704	08/02/25 21:30:39	36.5	1184	09/02/25 05:30:39	39.8
225	08/02/25 13:31:39	37.9	705	08/02/25 21:31:39	36.8	1185	09/02/25 05:31:39	37.1
226	08/02/25 13:32:39	37.7	706	08/02/25 21:32:39	35.6	1186	09/02/25 05:32:39	37.3
227	08/02/25 13:33:39	39.8	707	08/02/25 21:33:39	35.3	1187	09/02/25 05:33:39	35.2
228	08/02/25 13:34:39	39.6	708	08/02/25 21:34:39	37.0	1188	09/02/25 05:34:39	38.0
229	08/02/25 13:35:39	39.6	709	08/02/25 21:35:39	39.2	1189	09/02/25 05:35:39	37.9
230	08/02/25 13:36:39	36.1	710	08/02/25 21:36:39	36.5	1190	09/02/25 05:36:39	37.1
231	08/02/25 13:37:39	37.5	711	08/02/25 21:37:39	38.0	1191	09/02/25 05:37:39	36.2
232	08/02/25 13:38:39	36.7	712	08/02/25 21:38:39	35.2	1192	09/02/25 05:38:39	35.3
233	08/02/25 13:39:39	36.7	713	08/02/25 21:39:39	37.8	1193	09/02/25 05:39:39	35.9
234	08/02/25 13:40:39	36.3	714	08/02/25 21:40:39	37.0	1194	09/02/25 05:40:39	36.2
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236	08/02/25 13:42:39	39.1	716	08/02/25 21:42:39	35.7	1196	09/02/25 05:42:39	38.0
237	08/02/25 13:43:39	36.7	717	08/02/25 21:43:39	36.5	1197	09/02/25 05:43:39	36.0
238	08/02/25 13:44:39	39.0	718	08/02/25 21:44:39	35.6	1198	09/02/25 05:44:39	37.3
239	08/02/25 13:45:39	35.8	719	08/02/25 21:45:39	38.9	1199	09/02/25 05:45:39	35.3
240	08/02/25 13:46:39	37.7	720	08/02/25 21:46:39	36.6	1200	09/02/25 05:46:39	35.6
241	08/02/25 13:47:39	35.1	721	08/02/25 21:47:39	40.0	1201	09/02/25 05:47:39	38.5
242	08/02/25 13:48:39	35.2	722	08/02/25 21:48:39	37.7	1202	09/02/25 05:48:39	35.9
243	08/02/25 13:49:39	36.8	723	08/02/25 21:49:39	39.8	1203	09/02/25 05:49:39	38.6
244	08/02/25 13:50:39	56.0	724	08/02/25 21:50:39	37.5	1204	09/02/25 05:50:39	44.1
245	08/02/25 13:51:39	54.9	725	08/02/25 21:51:39	37.2	1205	09/02/25 05:51:39	44.3
246	08/02/25 13:52:39	46.6	726	08/02/25 21:52:39	36.9	1206	09/02/25 05:52:39	38.8
247	08/02/25 13:53:39	54.9	727	08/02/25 21:53:39	38.9	1207	09/02/25 05:53:39	39.3
248	08/02/25 13:54:39	44.9	728	08/02/25 21:54:39	35.4	1208	09/02/25 05:54:39	36.1
249	08/02/25 13:55:39	38.8	729	08/02/25 21:55:39	38.7	1209	09/02/25 05:55:39	38.7
250	08/02/25 13:56:39	40.8	730	08/02/25 21:56:39	36.0	1210	09/02/25 05:56:39	44.0
251	08/02/25 13:57:39	51.4	731	08/02/25 21:57:39	39.8	1211	09/02/25 05:57:39	41.3
252	08/02/25 13:58:39	39.5	732	08/02/25 21:58:39	36.5	1212	09/02/25 05:58:39	40.7
253	08/02/25 13:59:39	38.4	733	08/02/25 21:59:39	39.9	1213	09/02/25 05:59:39	38.8

Data_Record

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255	08/02/25 14:01:39	53.0	735	08/02/25 22:01:39	39.2	1215	09/02/25 06:01:39	36.7
256	08/02/25 14:02:39	53.0	736	08/02/25 22:02:39	35.3	1216	09/02/25 06:02:39	37.4
257	08/02/25 14:03:39	44.2	737	08/02/25 22:03:39	36.2	1217	09/02/25 06:03:39	36.6
258	08/02/25 14:04:39	32.3	738	08/02/25 22:04:39	37.8	1218	09/02/25 06:04:39	37.4
259	08/02/25 14:05:39	45.2	739	08/02/25 22:05:39	36.9	1219	09/02/25 06:05:39	39.5
260	08/02/25 14:06:39	47.7	740	08/02/25 22:06:39	35.8	1220	09/02/25 06:06:39	39.9
261	08/02/25 14:07:39	38.7	741	08/02/25 22:07:39	36.5	1221	09/02/25 06:07:39	35.4
262	08/02/25 14:08:39	40.2	742	08/02/25 22:08:39	38.7	1222	09/02/25 06:08:39	39.6
263	08/02/25 14:09:39	55.8	743	08/02/25 22:09:39	38.2	1223	09/02/25 06:09:39	36.2
264	08/02/25 14:10:39	47.7	744	08/02/25 22:10:39	35.9	1224	09/02/25 06:10:39	39.6
265	08/02/25 14:11:39	56.9	745	08/02/25 22:11:39	36.2	1225	09/02/25 06:11:39	38.6
266	08/02/25 14:12:39	43.4	746	08/02/25 22:12:39	37.2	1226	09/02/25 06:12:39	36.3
267	08/02/25 14:13:39	54.8	747	08/02/25 22:13:39	36.5	1227	09/02/25 06:13:39	37.1
268	08/02/25 14:14:39	52.2	748	08/02/25 22:14:39	39.3	1228	09/02/25 06:14:39	35.1
269	08/02/25 14:15:39	42.5	749	08/02/25 22:15:39	37.1	1229	09/02/25 06:15:39	38.6
270	08/02/25 14:16:39	38.3	750	08/02/25 22:16:39	36.0	1230	09/02/25 06:16:39	37.4
271	08/02/25 14:17:39	43.7	751	08/02/25 22:17:39	37.8	1231	09/02/25 06:17:39	36.9
272	08/02/25 14:18:39	47.9	752	08/02/25 22:18:39	36.0	1232	09/02/25 06:18:39	36.5
273	08/02/25 14:19:39	50.2	753	08/02/25 22:19:39	38.2	1233	09/02/25 06:19:39	39.0
274	08/02/25 14:20:39	40.4	754	08/02/25 22:20:39	37.5	1234	09/02/25 06:20:39	37.8
275	08/02/25 14:21:39	45.5	755	08/02/25 22:21:39	35.5	1235	09/02/25 06:21:39	39.2
276	08/02/25 14:22:39	53.2	756	08/02/25 22:22:39	36.3	1236	09/02/25 06:22:39	37.3
277	08/02/25 14:23:39	40.3	757	08/02/25 22:23:39	38.3	1237	09/02/25 06:23:39	37.9
278	08/02/25 14:24:39	44.9	758	08/02/25 22:24:39	37.6	1238	09/02/25 06:24:39	36.8
279	08/02/25 14:25:39	39.3	759	08/02/25 22:25:39	36.3	1239	09/02/25 06:25:39	38.9
280	08/02/25 14:26:39	42.1	760	08/02/25 22:26:39	38.8	1240	09/02/25 06:26:39	39.4
281	08/02/25 14:27:39	43.2	761	08/02/25 22:27:39	38.8	1241	09/02/25 06:27:39	38.2
282	08/02/25 14:28:39	46.0	762	08/02/25 22:28:39	37.2	1242	09/02/25 06:28:39	38.4
283	08/02/25 14:29:39	55.8	763	08/02/25 22:29:39	39.0	1243	09/02/25 06:29:39	39.6
284	08/02/25 14:30:39	46.2	764	08/02/25 22:30:39	36.1	1244	09/02/25 06:30:39	38.3
285	08/02/25 14:31:39	54.7	765	08/02/25 22:31:39	39.6	1245	09/02/25 06:31:39	37.4
286	08/02/25 14:32:39	44.9	766	08/02/25 22:32:39	35.5	1246	09/02/25 06:32:39	42.2
287	08/02/25 14:33:39	55.2	767	08/02/25 22:33:39	38.0	1247	09/02/25 06:33:39	40.6
288	08/02/25 14:34:39	41.0	768	08/02/25 22:34:39	36.5	1248	09/02/25 06:34:39	38.2
289	08/02/25 14:35:39	42.3	769	08/02/25 22:35:39	35.9	1249	09/02/25 06:35:39	42.6
290	08/02/25 14:36:39	49.3	770	08/02/25 22:36:39	36.4	1250	09/02/25 06:36:39	39.4
291	08/02/25 14:37:39	47.2	771	08/02/25 22:37:39	36.4	1251	09/02/25 06:37:39	35.4
292	08/02/25 14:38:39	52.1	772	08/02/25 22:38:39	36.1	1252	09/02/25 06:38:39	39.9
293	08/02/25 14:39:39	45.9	773	08/02/25 22:39:39	39.2	1253	09/02/25 06:39:39	43.4
294	08/02/25 14:40:39	51.0	774	08/02/25 22:40:39	38.2	1254	09/02/25 06:40:39	41.7
295	08/02/25 14:41:39	38.7	775	08/02/25 22:41:39	38.9	1255	09/02/25 06:41:39	40.5
296	08/02/25 14:42:39	39.7	776	08/02/25 22:42:39	35.2	1256	09/02/25 06:42:39	39.1
297	08/02/25 14:43:39	47.4	777	08/02/25 22:43:39	38.5	1257	09/02/25 06:43:39	39.9
298	08/02/25 14:44:39	41.0	778	08/02/25 22:44:39	39.6	1258	09/02/25 06:44:39	38.7
299	08/02/25 14:45:39	49.3	779	08/02/25 22:45:39	36.3	1259	09/02/25 06:45:39	38.9
300	08/02/25 14:46:39	44.3	780	08/02/25 22:46:39	38.6	1260	09/02/25 06:46:39	35.8
301	08/02/25 14:47:39	39.2	781	08/02/25 22:47:39	37.9	1261	09/02/25 06:47:39	42.5
302	08/02/25 14:48:39	49.9	782	08/02/25 22:48:39	39.3	1262	09/02/25 06:48:39	39.1
303	08/02/25 14:49:39	54.9	783	08/02/25 22:49:39	37.1	1263	09/02/25 06:49:39	36.6
304	08/02/25 14:50:39	44.6	784	08/02/25 22:50:39	38.5	1264	09/02/25 06:50:39	40.9

Data_Record

305	08/02/25 14:51:39	53.1	785	08/02/25 22:51:39	35.4	1265	09/02/25 06:51:39	36.4
306	08/02/25 14:52:39	50.9	786	08/02/25 22:52:39	37.5	1266	09/02/25 06:52:39	39.5
307	08/02/25 14:53:39	45.0	787	08/02/25 22:53:39	39.4	1267	09/02/25 06:53:39	38.3
308	08/02/25 14:54:39	48.7	788	08/02/25 22:54:39	36.7	1268	09/02/25 06:54:39	38.0
309	08/02/25 14:55:39	55.6	789	08/02/25 22:55:39	35.1	1269	09/02/25 06:55:39	42.9
310	08/02/25 14:56:39	42.3	790	08/02/25 22:56:39	38.8	1270	09/02/25 06:56:39	44.6
311	08/02/25 14:57:39	44.3	791	08/02/25 22:57:39	35.7	1271	09/02/25 06:57:39	35.7
312	08/02/25 14:58:39	49.8	792	08/02/25 22:58:39	35.5	1272	09/02/25 06:58:39	43.6
313	08/02/25 14:59:39	39.5	793	08/02/25 22:59:39	35.6	1273	09/02/25 06:59:39	42.6
314	08/02/25 15:00:39	48.0	794	08/02/25 23:00:39	38.8	1274	09/02/25 07:00:39	36.4
315	08/02/25 15:01:39	39.3	795	08/02/25 23:01:39	39.5	1275	09/02/25 07:01:39	39.8
316	08/02/25 15:02:39	41.7	796	08/02/25 23:02:39	39.7	1276	09/02/25 07:02:39	35.8
317	08/02/25 15:03:39	43.7	797	08/02/25 23:03:39	39.7	1277	09/02/25 07:03:39	38.2
318	08/02/25 15:04:39	46.9	798	08/02/25 23:04:39	39.1	1278	09/02/25 07:04:39	44.9
319	08/02/25 15:05:39	42.2	799	08/02/25 23:05:39	38.8	1279	09/02/25 07:05:39	36.2
320	08/02/25 15:06:39	39.4	800	08/02/25 23:06:39	39.3	1280	09/02/25 07:06:39	40.4
321	08/02/25 15:07:39	50.4	801	08/02/25 23:07:39	38.8	1281	09/02/25 07:07:39	43.2
322	08/02/25 15:08:39	43.7	802	08/02/25 23:08:39	35.9	1282	09/02/25 07:08:39	44.0
323	08/02/25 15:09:39	41.5	803	08/02/25 23:09:39	37.7	1283	09/02/25 07:09:39	35.1
324	08/02/25 15:10:39	54.6	804	08/02/25 23:10:39	38.9	1284	09/02/25 07:10:39	36.4
325	08/02/25 15:11:39	43.2	805	08/02/25 23:11:39	37.0	1285	09/02/25 07:11:39	38.9
326	08/02/25 15:12:39	45.7	806	08/02/25 23:12:39	36.4	1286	09/02/25 07:12:39	44.6
327	08/02/25 15:13:39	40.3	807	08/02/25 23:13:39	37.1	1287	09/02/25 07:13:39	40.3
328	08/02/25 15:14:39	53.3	808	08/02/25 23:14:39	35.0	1288	09/02/25 07:14:39	40.0
329	08/02/25 15:15:39	43.4	809	08/02/25 23:15:39	39.0	1289	09/02/25 07:15:39	39.3
330	08/02/25 15:16:39	44.4	810	08/02/25 23:16:39	35.7	1290	09/02/25 07:16:39	38.3
331	08/02/25 15:17:39	39.3	811	08/02/25 23:17:39	37.4	1291	09/02/25 07:17:39	40.9
332	08/02/25 15:18:39	44.2	812	08/02/25 23:18:39	38.8	1292	09/02/25 07:18:39	41.1
333	08/02/25 15:19:39	50.4	813	08/02/25 23:19:39	38.1	1293	09/02/25 07:19:39	40.5
334	08/02/25 15:20:39	38.2	814	08/02/25 23:20:39	36.6	1294	09/02/25 07:20:39	36.3
335	08/02/25 15:21:39	38.3	815	08/02/25 23:21:39	38.0	1295	09/02/25 07:21:39	38.3
336	08/02/25 15:22:39	38.3	816	08/02/25 23:22:39	37.4	1296	09/02/25 07:22:39	40.4
337	08/02/25 15:23:39	40.4	817	08/02/25 23:23:39	38.6	1297	09/02/25 07:23:39	42.4
338	08/02/25 15:24:39	52.9	818	08/02/25 23:24:39	38.4	1298	09/02/25 07:24:39	39.6
339	08/02/25 15:25:39	39.4	819	08/02/25 23:25:39	37.2	1299	09/02/25 07:25:39	35.1
340	08/02/25 15:26:39	50.5	820	08/02/25 23:26:39	39.7	1300	09/02/25 07:26:39	41.1
341	08/02/25 15:27:39	54.4	821	08/02/25 23:27:39	39.8	1301	09/02/25 07:27:39	40.9
342	08/02/25 15:28:39	39.0	822	08/02/25 23:28:39	35.0	1302	09/02/25 07:28:39	41.0
343	08/02/25 15:29:39	38.9	823	08/02/25 23:29:39	39.6	1303	09/02/25 07:29:39	34.3
344	08/02/25 15:30:39	44.8	824	08/02/25 23:30:39	38.5	1304	09/02/25 07:30:39	56.5
345	08/02/25 15:31:39	39.4	825	08/02/25 23:31:39	36.7	1305	09/02/25 07:31:39	40.1
346	08/02/25 15:32:39	38.8	826	08/02/25 23:32:39	37.4	1306	09/02/25 07:32:39	56.8
347	08/02/25 15:33:39	40.6	827	08/02/25 23:33:39	35.7	1307	09/02/25 07:33:39	51.1
348	08/02/25 15:34:39	39.3	828	08/02/25 23:34:39	38.5	1308	09/02/25 07:34:39	30.2
349	08/02/25 15:35:39	44.4	829	08/02/25 23:35:39	38.8	1309	09/02/25 07:35:39	32.3
350	08/02/25 15:36:39	50.5	830	08/02/25 23:36:39	37.2	1310	09/02/25 07:36:39	33.5
351	08/02/25 15:37:39	54.0	831	08/02/25 23:37:39	37.2	1311	09/02/25 07:37:39	36.5
352	08/02/25 15:38:39	48.5	832	08/02/25 23:38:39	38.6	1312	09/02/25 07:38:39	35.4
353	08/02/25 15:39:39	47.4	833	08/02/25 23:39:39	40.0	1313	09/02/25 07:39:39	39.8
354	08/02/25 15:40:39	50.4	834	08/02/25 23:40:39	37.0	1314	09/02/25 07:40:39	33.3
355	08/02/25 15:41:39	44.1	835	08/02/25 23:41:39	36.5	1315	09/02/25 07:41:39	38.3

Data_Record

356	08/02/25 15:42:39	39.2	836	08/02/25 23:42:39	39.1	1316	09/02/25 07:42:39	45.8
357	08/02/25 15:43:39	42.5	837	08/02/25 23:43:39	35.3	1317	09/02/25 07:43:39	35.8
358	08/02/25 15:44:39	44.5	838	08/02/25 23:44:39	38.8	1318	09/02/25 07:44:39	40.0
359	08/02/25 15:45:39	38.4	839	08/02/25 23:45:39	39.1	1319	09/02/25 07:45:39	37.0
360	08/02/25 15:46:39	46.1	840	08/02/25 23:46:39	35.7	1320	09/02/25 07:46:39	37.4
361	08/02/25 15:47:39	37.2	841	08/02/25 23:47:39	36.8	1321	09/02/25 07:47:39	36.0
362	08/02/25 15:48:39	38.2	842	08/02/25 23:48:39	38.5	1322	09/02/25 07:48:39	38.6
363	08/02/25 15:49:39	33.2	843	08/02/25 23:49:39	36.2	1323	09/02/25 07:49:39	35.2
364	08/02/25 15:50:39	39.3	844	08/02/25 23:50:39	38.1	1324	09/02/25 07:50:39	36.7
365	08/02/25 15:51:39	38.4	845	08/02/25 23:51:39	35.9	1325	09/02/25 07:51:39	38.5
366	08/02/25 15:52:39	40.3	846	08/02/25 23:52:39	38.6	1326	09/02/25 07:52:39	37.4
367	08/02/25 15:53:39	42.3	847	08/02/25 23:53:39	39.0	1327	09/02/25 07:53:39	38.0
368	08/02/25 15:54:39	40.2	848	08/02/25 23:54:39	37.0	1328	09/02/25 07:54:39	35.4
369	08/02/25 15:55:39	39.4	849	08/02/25 23:55:39	37.7	1329	09/02/25 07:55:39	35.4
370	08/02/25 15:56:39	38.4	850	08/02/25 23:56:39	38.3	1330	09/02/25 07:56:39	39.8
371	08/02/25 15:57:39	40.4	851	08/02/25 23:57:39	36.3	1331	09/02/25 07:57:39	37.0
372	08/02/25 15:58:39	49.5	852	08/02/25 23:58:39	36.7	1332	09/02/25 07:58:39	38.5
373	08/02/25 15:59:39	40.9	853	08/02/25 23:59:39	35.5	1333	09/02/25 07:59:39	35.9
374	08/02/25 16:00:39	56.9	854	09/02/25 00:00:39	38.1	1334	09/02/25 08:00:39	37.3
375	08/02/25 16:01:39	42.2	855	09/02/25 00:01:39	36.4	1335	09/02/25 08:01:39	39.9
376	08/02/25 16:02:39	45.7	856	09/02/25 00:02:39	37.0	1336	09/02/25 08:02:39	38.1
377	08/02/25 16:03:39	30.2	857	09/02/25 00:03:39	38.6	1337	09/02/25 08:03:39	32.2
378	08/02/25 16:04:39	52.1	858	09/02/25 00:04:39	37.0	1338	09/02/25 08:04:39	30.2
379	08/02/25 16:05:39	43.2	859	09/02/25 00:05:39	37.2	1339	09/02/25 08:05:39	39.2
380	08/02/25 16:06:39	40.3	860	09/02/25 00:06:39	39.7	1340	09/02/25 08:06:39	32.3
381	08/02/25 16:07:39	44.2	861	09/02/25 00:07:39	39.6	1341	09/02/25 08:07:39	39.1
382	08/02/25 16:08:39	47.2	862	09/02/25 00:08:39	39.0	1342	09/02/25 08:08:39	38.9
383	08/02/25 16:09:39	39.2	863	09/02/25 00:09:39	37.5	1343	09/02/25 08:09:39	35.2
384	08/02/25 16:10:39	49.3	864	09/02/25 00:10:39	37.4	1344	09/02/25 08:10:39	35.2
385	08/02/25 16:11:39	56.2	865	09/02/25 00:11:39	36.4	1345	09/02/25 08:11:39	39.6
386	08/02/25 16:12:39	44.3	866	09/02/25 00:12:39	38.4	1346	09/02/25 08:12:39	35.4
387	08/02/25 16:13:39	47.6	867	09/02/25 00:13:39	38.9	1347	09/02/25 08:13:39	37.8
388	08/02/25 16:14:39	56.6	868	09/02/25 00:14:39	35.9	1348	09/02/25 08:14:39	38.7
389	08/02/25 16:15:39	39.3	869	09/02/25 00:15:39	37.6	1349	09/02/25 08:15:39	36.8
390	08/02/25 16:16:39	40.3	870	09/02/25 00:16:39	35.5	1350	09/02/25 08:16:39	36.5
391	08/02/25 16:17:39	50.8	871	09/02/25 00:17:39	36.9	1351	09/02/25 08:17:39	35.5
392	08/02/25 16:18:39	58.5	872	09/02/25 00:18:39	39.9	1352	09/02/25 08:18:39	37.5
393	08/02/25 16:19:39	38.8	873	09/02/25 00:19:39	38.3	1353	09/02/25 08:19:39	37.8
394	08/02/25 16:20:39	39.7	874	09/02/25 00:20:39	35.5	1354	09/02/25 08:20:39	35.7
395	08/02/25 16:21:39	37.6	875	09/02/25 00:21:39	35.5	1355	09/02/25 08:21:39	37.1
396	08/02/25 16:22:39	35.9	876	09/02/25 00:22:39	36.5	1356	09/02/25 08:22:39	38.0
397	08/02/25 16:23:39	35.3	877	09/02/25 00:23:39	39.9	1357	09/02/25 08:23:39	35.2
398	08/02/25 16:24:39	39.0	878	09/02/25 00:24:39	38.8	1358	09/02/25 08:24:39	37.2
399	08/02/25 16:25:39	39.7	879	09/02/25 00:25:39	37.5	1359	09/02/25 08:25:39	39.8
400	08/02/25 16:26:39	39.2	880	09/02/25 00:26:39	37.3	1360	09/02/25 08:26:39	38.5
401	08/02/25 16:27:39	38.0	881	09/02/25 00:27:39	39.1	1361	09/02/25 08:27:39	36.5
402	08/02/25 16:28:39	39.0	882	09/02/25 00:28:39	35.1	1362	09/02/25 08:28:39	36.3
403	08/02/25 16:29:39	39.8	883	09/02/25 00:29:39	37.7	1363	09/02/25 08:29:39	37.3
404	08/02/25 16:30:39	38.8	884	09/02/25 00:30:39	37.5	1364	09/02/25 08:30:39	39.2
405	08/02/25 16:31:39	36.8	885	09/02/25 00:31:39	39.8	1365	09/02/25 08:31:39	38.3
406	08/02/25 16:32:39	35.9	886	09/02/25 00:32:39	39.0	1366	09/02/25 08:32:39	48.5

Data_Record

407	08/02/25 16:33:39	39.1	887	09/02/25 00:33:39	39.1	1367	09/02/25 08:33:39	42.6
408	08/02/25 16:34:39	38.1	888	09/02/25 00:34:39	37.8	1368	09/02/25 08:34:39	46.1
409	08/02/25 16:35:39	40.0	889	09/02/25 00:35:39	39.6	1369	09/02/25 08:35:39	51.5
410	08/02/25 16:36:39	37.6	890	09/02/25 00:36:39	36.6	1370	09/02/25 08:36:39	48.0
411	08/02/25 16:37:39	38.7	891	09/02/25 00:37:39	37.4	1371	09/02/25 08:37:39	39.9
412	08/02/25 16:38:39	39.3	892	09/02/25 00:38:39	39.1	1372	09/02/25 08:38:39	56.8
413	08/02/25 16:39:39	36.3	893	09/02/25 00:39:39	37.1	1373	09/02/25 08:39:39	55.1
414	08/02/25 16:40:39	37.9	894	09/02/25 00:40:39	38.6	1374	09/02/25 08:40:39	45.9
415	08/02/25 16:41:39	38.9	895	09/02/25 00:41:39	35.7	1375	09/02/25 08:41:39	40.5
416	08/02/25 16:42:39	35.6	896	09/02/25 00:42:39	37.1	1376	09/02/25 08:42:39	43.6
417	08/02/25 16:43:39	38.1	897	09/02/25 00:43:39	36.5	1377	09/02/25 08:43:39	47.2
418	08/02/25 16:44:39	60.7	898	09/02/25 00:44:39	35.6	1378	09/02/25 08:44:39	49.9
419	08/02/25 16:45:39	40.2	899	09/02/25 00:45:39	39.2	1379	09/02/25 08:45:39	48.5
420	08/02/25 16:46:39	32.3	900	09/02/25 00:46:39	36.7	1380	09/02/25 08:46:39	50.9
421	08/02/25 16:47:39	37.9	901	09/02/25 00:47:39	36.1	1381	09/02/25 08:47:39	45.8
422	08/02/25 16:48:39	39.0	902	09/02/25 00:48:39	36.2	1382	09/02/25 08:48:39	45.9
423	08/02/25 16:49:39	35.0	903	09/02/25 00:49:39	37.1	1383	09/02/25 08:49:39	54.0
424	08/02/25 16:50:39	39.3	904	09/02/25 00:50:39	36.2	1384	09/02/25 08:50:39	52.2
425	08/02/25 16:51:39	35.4	905	09/02/25 00:51:39	37.9	1385	09/02/25 08:51:39	54.5
426	08/02/25 16:52:39	38.3	906	09/02/25 00:52:39	35.8	1386	09/02/25 08:52:39	44.6
427	08/02/25 16:53:39	36.3	907	09/02/25 00:53:39	38.4	1387	09/02/25 08:53:39	51.5
428	08/02/25 16:54:39	38.1	908	09/02/25 00:54:39	39.3	1388	09/02/25 08:54:39	46.3
429	08/02/25 16:55:39	35.6	909	09/02/25 00:55:39	38.6	1389	09/02/25 08:55:39	42.4
430	08/02/25 16:56:39	38.5	910	09/02/25 00:56:39	35.3	1390	09/02/25 08:56:39	48.5
431	08/02/25 16:57:39	36.2	911	09/02/25 00:57:39	36.5	1391	09/02/25 08:57:39	50.8
432	08/02/25 16:58:39	36.4	912	09/02/25 00:58:39	38.3	1392	09/02/25 08:58:39	44.3
433	08/02/25 16:59:39	37.0	913	09/02/25 00:59:39	38.5	1393	09/02/25 08:59:39	42.5
434	08/02/25 17:00:39	37.9	914	09/02/25 01:00:39	38.4	1394	09/02/25 09:00:39	58.7
435	08/02/25 17:01:39	36.2	915	09/02/25 01:01:39	35.0	1395	09/02/25 09:01:39	52.2
436	08/02/25 17:02:39	39.8	916	09/02/25 01:02:39	36.8	1396	09/02/25 09:02:39	53.2
437	08/02/25 17:03:39	37.4	917	09/02/25 01:03:39	36.6	1397	09/02/25 09:03:39	4.9
438	08/02/25 17:04:39	38.7	918	09/02/25 01:04:39	39.5	1398	09/02/25 09:04:39	58.2
439	08/02/25 17:05:39	39.1	919	09/02/25 01:05:39	39.3	1399	09/02/25 09:05:39	56.2
440	08/02/25 17:06:39	38.7	920	09/02/25 01:06:39	36.7	1400	09/02/25 09:06:39	33.5
441	08/02/25 17:07:39	36.9	921	09/02/25 01:07:39	39.2	1401	09/02/25 09:07:39	38.4
442	08/02/25 17:08:39	36.3	922	09/02/25 01:08:39	39.2	1402	09/02/25 09:08:39	33.0
443	08/02/25 17:09:39	38.2	923	09/02/25 01:09:39	39.3	1403	09/02/25 09:09:39	44.3
444	08/02/25 17:10:39	35.6	924	09/02/25 01:10:39	37.2	1404	09/02/25 09:10:39	54.6
445	08/02/25 17:11:39	39.7	925	09/02/25 01:11:39	35.8	1405	09/02/25 09:11:39	48.0
446	08/02/25 17:12:39	37.5	926	09/02/25 01:12:39	36.9	1406	09/02/25 09:12:39	53.1
447	08/02/25 17:13:39	39.1	927	09/02/25 01:13:39	36.0	1407	09/02/25 09:13:39	35.4
448	08/02/25 17:14:39	37.8	928	09/02/25 01:14:39	36.4	1408	09/02/25 09:14:39	37.9
449	08/02/25 17:15:39	36.9	929	09/02/25 01:15:39	37.5	1409	09/02/25 09:15:39	37.8
450	08/02/25 17:16:39	39.7	930	09/02/25 01:16:39	35.8	1410	09/02/25 09:16:39	37.7
451	08/02/25 17:17:39	39.7	931	09/02/25 01:17:39	38.1	1411	09/02/25 09:17:39	36.8
452	08/02/25 17:18:39	35.8	932	09/02/25 01:18:39	35.7	1412	09/02/25 09:18:39	37.9
453	08/02/25 17:19:39	39.9	933	09/02/25 01:19:39	37.8	1413	09/02/25 09:19:39	39.1
454	08/02/25 17:20:39	38.3	934	09/02/25 01:20:39	35.6	1414	09/02/25 09:20:39	36.6
455	08/02/25 17:21:39	58.2	935	09/02/25 01:21:39	39.8	1415	09/02/25 09:21:39	35.9
456	08/02/25 17:22:39	43.2	936	09/02/25 01:22:39	35.8	1416	09/02/25 09:22:39	39.4
457	08/02/25 17:23:39	57.4	937	09/02/25 01:23:39	37.0	1417	09/02/25 09:23:39	37.5

Data_Record

458	08/02/25 17:24:39	45.2	938	09/02/25 01:24:39	35.1	1418	09/02/25 09:24:39	36.3
459	08/02/25 17:25:39	58.7	939	09/02/25 01:25:39	38.0	1419	09/02/25 09:25:39	38.8
460	08/02/25 17:26:39	38.3	940	09/02/25 01:26:39	36.4	1420	09/02/25 09:26:39	39.9
461	08/02/25 17:27:39	54.0	941	09/02/25 01:27:39	38.3	1421	09/02/25 09:27:39	39.7
462	08/02/25 17:28:39	52.3	942	09/02/25 01:28:39	35.3	1422	09/02/25 09:28:39	39.7
463	08/02/25 17:29:39	64.4	943	09/02/25 01:29:39	35.4	1423	09/02/25 09:29:39	38.0
464	08/02/25 17:30:39	51.1	944	09/02/25 01:30:39	38.3	1424	09/02/25 09:30:39	35.3
465	08/02/25 17:31:39	57.7	945	09/02/25 01:31:39	38.5	1425	09/02/25 09:31:39	33.4
466	08/02/25 17:32:39	38.3	946	09/02/25 01:32:39	39.2	1426	09/02/25 09:32:39	47.0
467	08/02/25 17:33:39	57.8	947	09/02/25 01:33:39	39.1	1427	09/02/25 09:33:39	52.2
468	08/02/25 17:34:39	55.5	948	09/02/25 01:34:39	37.2	1428	09/02/25 09:34:39	45.1
469	08/02/25 17:35:39	53.7	949	09/02/25 01:35:39	35.2	1429	09/02/25 09:35:39	49.7
470	08/02/25 17:36:39	42.2	950	09/02/25 01:36:39	38.9	1430	09/02/25 09:36:39	40.3
471	08/02/25 17:37:39	54.8	951	09/02/25 01:37:39	35.1	1431	09/02/25 09:37:39	28.4
472	08/02/25 17:38:39	42.3	952	09/02/25 01:38:39	35.0	1432	09/02/25 09:38:39	47.4
473	08/02/25 17:39:39	47.5	953	09/02/25 01:39:39	39.9	1433	09/02/25 09:39:39	46.3
474	08/02/25 17:40:39	40.3	954	09/02/25 01:40:39	37.1	1434	09/02/25 09:40:39	39.4
475	08/02/25 17:41:39	42.3	955	09/02/25 01:41:39	38.6	1435	09/02/25 09:41:39	55.9
476	08/02/25 17:42:39	59.7	956	09/02/25 01:42:39	38.5	1436	09/02/25 09:42:39	32.9
477	08/02/25 17:43:39	45.8	957	09/02/25 01:43:39	40.0	1437	09/02/25 09:43:39	56.6
478	08/02/25 17:44:39	33.2	958	09/02/25 01:44:39	38.6	1438	09/02/25 09:44:39	45.6
479	08/02/25 17:45:39	32.3	959	09/02/25 01:45:39	37.7	1439	09/02/25 09:45:39	48.8
480	08/02/25 17:46:39	30.2	960	09/02/25 01:46:39	39.1	1440	09/02/25 09:46:39	57.1

Data_Record

Record	Time	Noise (dB)	Record	Time	Noise (dB)	Record	Time	Noise (dB)
1	09/02/25 09:54:52	42.8	481	09/02/25 17:54:52	40.6	961	10/02/25 01:54:52	37.9
2	09/02/25 09:55:52	48.0	482	09/02/25 17:55:52	44.0	962	10/02/25 01:55:52	37.1
3	09/02/25 09:56:52	42.9	483	09/02/25 17:56:52	49.6	963	10/02/25 01:56:52	38.8
4	09/02/25 09:57:52	41.5	484	09/02/25 17:57:52	42.0	964	10/02/25 01:57:52	39.1
5	09/02/25 09:58:52	46.9	485	09/02/25 17:58:52	46.3	965	10/02/25 01:58:52	35.7
6	09/02/25 09:59:52	48.3	486	09/02/25 17:59:52	44.5	966	10/02/25 01:59:52	37.5
7	09/02/25 10:00:52	43.6	487	09/02/25 18:00:52	46.5	967	10/02/25 02:00:52	39.9
8	09/02/25 10:01:52	46.5	488	09/02/25 18:01:52	42.8	968	10/02/25 02:01:52	38.3
9	09/02/25 10:02:52	44.5	489	09/02/25 18:02:52	47.2	969	10/02/25 02:02:52	38.5
10	09/02/25 10:03:52	44.4	490	09/02/25 18:03:52	47.3	970	10/02/25 02:03:52	36.9
11	09/02/25 10:04:52	41.1	491	09/02/25 18:04:52	47.1	971	10/02/25 02:04:52	39.6
12	09/02/25 10:05:52	45.2	492	09/02/25 18:05:52	42.1	972	10/02/25 02:05:52	38.3
13	09/02/25 10:06:52	49.4	493	09/02/25 18:06:52	44.9	973	10/02/25 02:06:52	38.3
14	09/02/25 10:07:52	44.3	494	09/02/25 18:07:52	45.3	974	10/02/25 02:07:52	37.3
15	09/02/25 10:08:52	41.9	495	09/02/25 18:08:52	44.0	975	10/02/25 02:08:52	36.0
16	09/02/25 10:09:52	54.3	496	09/02/25 18:09:52	40.1	976	10/02/25 02:09:52	36.3
17	09/02/25 10:10:52	41.5	497	09/02/25 18:10:52	45.2	977	10/02/25 02:10:52	40.0
18	09/02/25 10:11:52	47.4	498	09/02/25 18:11:52	42.0	978	10/02/25 02:11:52	35.3
19	09/02/25 10:12:52	44.8	499	09/02/25 18:12:52	46.4	979	10/02/25 02:12:52	36.4
20	09/02/25 10:13:52	40.2	500	09/02/25 18:13:52	42.1	980	10/02/25 02:13:52	38.5
21	09/02/25 10:14:52	40.8	501	09/02/25 18:14:52	48.5	981	10/02/25 02:14:52	38.2
22	09/02/25 10:15:52	46.9	502	09/02/25 18:15:52	42.4	982	10/02/25 02:15:52	36.3
23	09/02/25 10:16:52	43.7	503	09/02/25 18:16:52	40.9	983	10/02/25 02:16:52	37.6
24	09/02/25 10:17:52	47.1	504	09/02/25 18:17:52	46.5	984	10/02/25 02:17:52	37.5
25	09/02/25 10:18:52	46.7	505	09/02/25 18:18:52	40.9	985	10/02/25 02:18:52	36.2
26	09/02/25 10:19:52	40.8	506	09/02/25 18:19:52	47.6	986	10/02/25 02:19:52	38.5
27	09/02/25 10:20:52	43.3	507	09/02/25 18:20:52	47.6	987	10/02/25 02:20:52	35.1
28	09/02/25 10:21:52	47.4	508	09/02/25 18:21:52	45.0	988	10/02/25 02:21:52	35.0
29	09/02/25 10:22:52	47.5	509	09/02/25 18:22:52	47.6	989	10/02/25 02:22:52	39.9
30	09/02/25 10:23:52	48.7	510	09/02/25 18:23:52	45.5	990	10/02/25 02:23:52	38.9
31	09/02/25 10:24:52	49.7	511	09/02/25 18:24:52	49.9	991	10/02/25 02:24:52	36.2
32	09/02/25 10:25:52	43.6	512	09/02/25 18:25:52	43.7	992	10/02/25 02:25:52	39.2
33	09/02/25 10:26:52	49.8	513	09/02/25 18:26:52	41.6	993	10/02/25 02:26:52	38.8
34	09/02/25 10:27:52	43.2	514	09/02/25 18:27:52	44.0	994	10/02/25 02:27:52	36.3
35	09/02/25 10:28:52	43.5	515	09/02/25 18:28:52	47.5	995	10/02/25 02:28:52	37.8
36	09/02/25 10:29:52	45.9	516	09/02/25 18:29:52	40.0	996	10/02/25 02:29:52	36.6
37	09/02/25 10:30:52	60.3	517	09/02/25 18:30:52	45.8	997	10/02/25 02:30:52	39.5
38	09/02/25 10:31:52	46.1	518	09/02/25 18:31:52	40.3	998	10/02/25 02:31:52	37.7
39	09/02/25 10:32:52	46.6	519	09/02/25 18:32:52	44.1	999	10/02/25 02:32:52	38.3
40	09/02/25 10:33:52	41.3	520	09/02/25 18:33:52	47.8	1000	10/02/25 02:33:52	37.0
41	09/02/25 10:34:52	46.7	521	09/02/25 18:34:52	48.7	1001	10/02/25 02:34:52	36.8
42	09/02/25 10:35:52	40.4	522	09/02/25 18:35:52	44.3	1002	10/02/25 02:35:52	36.2
43	09/02/25 10:36:52	47.6	523	09/02/25 18:36:52	49.0	1003	10/02/25 02:36:52	36.8
44	09/02/25 10:37:52	52.2	524	09/02/25 18:37:52	47.4	1004	10/02/25 02:37:52	35.5
45	09/02/25 10:38:52	43.0	525	09/02/25 18:38:52	42.2	1005	10/02/25 02:38:52	35.5
46	09/02/25 10:39:52	48.2	526	09/02/25 18:39:52	42.8	1006	10/02/25 02:39:52	37.8
47	09/02/25 10:40:52	45.1	527	09/02/25 18:40:52	48.6	1007	10/02/25 02:40:52	38.2
48	09/02/25 10:41:52	48.3	528	09/02/25 18:41:52	47.3	1008	10/02/25 02:41:52	37.9
49	09/02/25 10:42:52	42.6	529	09/02/25 18:42:52	46.2	1009	10/02/25 02:42:52	35.1

Data_Record

50	09/02/25 10:43:52	40.4	530	09/02/25 18:43:52	42.8	1010	10/02/25 02:43:52	35.5
51	09/02/25 10:44:52	58.3	531	09/02/25 18:44:52	44.0	1011	10/02/25 02:44:52	35.6
52	09/02/25 10:45:52	45.7	532	09/02/25 18:45:52	48.8	1012	10/02/25 02:45:52	37.0
53	09/02/25 10:46:52	45.1	533	09/02/25 18:46:52	44.1	1013	10/02/25 02:46:52	39.5
54	09/02/25 10:47:52	44.8	534	09/02/25 18:47:52	41.4	1014	10/02/25 02:47:52	35.3
55	09/02/25 10:48:52	45.6	535	09/02/25 18:48:52	46.6	1015	10/02/25 02:48:52	38.2
56	09/02/25 10:49:52	49.1	536	09/02/25 18:49:52	40.2	1016	10/02/25 02:49:52	40.0
57	09/02/25 10:50:52	49.9	537	09/02/25 18:50:52	43.4	1017	10/02/25 02:50:52	35.8
58	09/02/25 10:51:52	45.4	538	09/02/25 18:51:52	40.8	1018	10/02/25 02:51:52	36.1
59	09/02/25 10:52:52	49.4	539	09/02/25 18:52:52	49.5	1019	10/02/25 02:52:52	35.2
60	09/02/25 10:53:52	41.2	540	09/02/25 18:53:52	47.0	1020	10/02/25 02:53:52	37.4
61	09/02/25 10:54:52	46.5	541	09/02/25 18:54:52	42.7	1021	10/02/25 02:54:52	35.5
62	09/02/25 10:55:52	58.3	542	09/02/25 18:55:52	48.3	1022	10/02/25 02:55:52	37.9
63	09/02/25 10:56:52	52.2	543	09/02/25 18:56:52	45.8	1023	10/02/25 02:56:52	36.4
64	09/02/25 10:57:52	53.2	544	09/02/25 18:57:52	49.9	1024	10/02/25 02:57:52	35.5
65	09/02/25 10:58:52	44.1	545	09/02/25 18:58:52	47.1	1025	10/02/25 02:58:52	36.8
66	09/02/25 10:59:52	44.5	546	09/02/25 18:59:52	42.3	1026	10/02/25 02:59:52	39.4
67	09/02/25 11:00:52	41.7	547	09/02/25 19:00:52	46.7	1027	10/02/25 03:00:52	37.1
68	09/02/25 11:01:52	45.4	548	09/02/25 19:01:52	42.6	1028	10/02/25 03:01:52	37.0
69	09/02/25 11:02:52	40.3	549	09/02/25 19:02:52	44.0	1029	10/02/25 03:02:52	36.9
70	09/02/25 11:03:52	47.2	550	09/02/25 19:03:52	46.0	1030	10/02/25 03:03:52	37.6
71	09/02/25 11:04:52	43.5	551	09/02/25 19:04:52	41.5	1031	10/02/25 03:04:52	36.3
72	09/02/25 11:05:52	49.0	552	09/02/25 19:05:52	45.2	1032	10/02/25 03:05:52	37.4
73	09/02/25 11:06:52	48.8	553	09/02/25 19:06:52	44.0	1033	10/02/25 03:06:52	39.7
74	09/02/25 11:07:52	48.6	554	09/02/25 19:07:52	44.0	1034	10/02/25 03:07:52	38.3
75	09/02/25 11:08:52	48.8	555	09/02/25 19:08:52	43.2	1035	10/02/25 03:08:52	36.9
76	09/02/25 11:09:52	45.0	556	09/02/25 19:09:52	48.4	1036	10/02/25 03:09:52	36.7
77	09/02/25 11:10:52	42.0	557	09/02/25 19:10:52	44.5	1037	10/02/25 03:10:52	37.8
78	09/02/25 11:11:52	42.5	558	09/02/25 19:11:52	47.4	1038	10/02/25 03:11:52	36.0
79	09/02/25 11:12:52	42.9	559	09/02/25 19:12:52	42.0	1039	10/02/25 03:12:52	36.6
80	09/02/25 11:13:52	46.3	560	09/02/25 19:13:52	41.5	1040	10/02/25 03:13:52	37.1
81	09/02/25 11:14:52	48.4	561	09/02/25 19:14:52	40.6	1041	10/02/25 03:14:52	35.9
82	09/02/25 11:15:52	45.5	562	09/02/25 19:15:52	40.9	1042	10/02/25 03:15:52	36.5
83	09/02/25 11:16:52	45.6	563	09/02/25 19:16:52	43.9	1043	10/02/25 03:16:52	36.3
84	09/02/25 11:17:52	45.0	564	09/02/25 19:17:52	42.5	1044	10/02/25 03:17:52	37.5
85	09/02/25 11:18:52	47.2	565	09/02/25 19:18:52	48.4	1045	10/02/25 03:18:52	38.9
86	09/02/25 11:19:52	49.8	566	09/02/25 19:19:52	48.2	1046	10/02/25 03:19:52	39.5
87	09/02/25 11:20:52	40.6	567	09/02/25 19:20:52	47.4	1047	10/02/25 03:20:52	36.9
88	09/02/25 11:21:52	41.6	568	09/02/25 19:21:52	47.5	1048	10/02/25 03:21:52	38.3
89	09/02/25 11:22:52	42.3	569	09/02/25 19:22:52	42.4	1049	10/02/25 03:22:52	36.0
90	09/02/25 11:23:52	44.5	570	09/02/25 19:23:52	44.2	1050	10/02/25 03:23:52	39.3
91	09/02/25 11:24:52	48.0	571	09/02/25 19:24:52	47.5	1051	10/02/25 03:24:52	37.7
92	09/02/25 11:25:52	45.1	572	09/02/25 19:25:52	46.9	1052	10/02/25 03:25:52	35.1
93	09/02/25 11:26:52	44.4	573	09/02/25 19:26:52	40.4	1053	10/02/25 03:26:52	38.0
94	09/02/25 11:27:52	44.5	574	09/02/25 19:27:52	46.8	1054	10/02/25 03:27:52	38.8
95	09/02/25 11:28:52	47.3	575	09/02/25 19:28:52	42.0	1055	10/02/25 03:28:52	38.7
96	09/02/25 11:29:52	44.4	576	09/02/25 19:29:52	47.0	1056	10/02/25 03:29:52	36.1
97	09/02/25 11:30:52	47.2	577	09/02/25 19:30:52	47.4	1057	10/02/25 03:30:52	39.4
98	09/02/25 11:31:52	41.3	578	09/02/25 19:31:52	49.5	1058	10/02/25 03:31:52	35.1
99	09/02/25 11:32:52	48.5	579	09/02/25 19:32:52	40.1	1059	10/02/25 03:32:52	36.1
100	09/02/25 11:33:52	40.9	580	09/02/25 19:33:52	43.7	1060	10/02/25 03:33:52	38.8

Data_Record

101	09/02/25 11:34:52	42.6	581	09/02/25 19:34:52	40.3	1061	10/02/25 03:34:52	35.4
102	09/02/25 11:35:52	42.6	582	09/02/25 19:35:52	44.9	1062	10/02/25 03:35:52	36.2
103	09/02/25 11:36:52	40.8	583	09/02/25 19:36:52	42.6	1063	10/02/25 03:36:52	35.1
104	09/02/25 11:37:52	42.3	584	09/02/25 19:37:52	46.8	1064	10/02/25 03:37:52	35.7
105	09/02/25 11:38:52	42.0	585	09/02/25 19:38:52	43.8	1065	10/02/25 03:38:52	35.2
106	09/02/25 11:39:52	50.0	586	09/02/25 19:39:52	46.3	1066	10/02/25 03:39:52	35.7
107	09/02/25 11:40:52	47.5	587	09/02/25 19:40:52	48.0	1067	10/02/25 03:40:52	38.1
108	09/02/25 11:41:52	42.9	588	09/02/25 19:41:52	43.5	1068	10/02/25 03:41:52	39.1
109	09/02/25 11:42:52	47.8	589	09/02/25 19:42:52	46.4	1069	10/02/25 03:42:52	38.5
110	09/02/25 11:43:52	42.7	590	09/02/25 19:43:52	41.2	1070	10/02/25 03:43:52	39.9
111	09/02/25 11:44:52	44.3	591	09/02/25 19:44:52	43.5	1071	10/02/25 03:44:52	38.7
112	09/02/25 11:45:52	44.2	592	09/02/25 19:45:52	45.6	1072	10/02/25 03:45:52	38.9
113	09/02/25 11:46:52	43.8	593	09/02/25 19:46:52	42.3	1073	10/02/25 03:46:52	35.6
114	09/02/25 11:47:52	49.3	594	09/02/25 19:47:52	43.0	1074	10/02/25 03:47:52	39.0
115	09/02/25 11:48:52	43.3	595	09/02/25 19:48:52	42.3	1075	10/02/25 03:48:52	35.5
116	09/02/25 11:49:52	60.4	596	09/02/25 19:49:52	42.0	1076	10/02/25 03:49:52	36.3
117	09/02/25 11:50:52	48.5	597	09/02/25 19:50:52	31.9	1077	10/02/25 03:50:52	38.9
118	09/02/25 11:51:52	40.9	598	09/02/25 19:51:52	33.5	1078	10/02/25 03:51:52	35.1
119	09/02/25 11:52:52	43.9	599	09/02/25 19:52:52	30.7	1079	10/02/25 03:52:52	37.0
120	09/02/25 11:53:52	48.1	600	09/02/25 19:53:52	37.7	1080	10/02/25 03:53:52	39.6
121	09/02/25 11:54:52	42.8	601	09/02/25 19:54:52	38.1	1081	10/02/25 03:54:52	40.0
122	09/02/25 11:55:52	48.9	602	09/02/25 19:55:52	31.8	1082	10/02/25 03:55:52	35.3
123	09/02/25 11:56:52	45.4	603	09/02/25 19:56:52	35.0	1083	10/02/25 03:56:52	39.5
124	09/02/25 11:57:52	43.9	604	09/02/25 19:57:52	36.3	1084	10/02/25 03:57:52	39.6
125	09/02/25 11:58:52	44.3	605	09/02/25 19:58:52	31.9	1085	10/02/25 03:58:52	37.4
126	09/02/25 11:59:52	45.5	606	09/02/25 19:59:52	35.5	1086	10/02/25 03:59:52	35.3
127	09/02/25 12:00:52	43.1	607	09/02/25 20:00:52	37.6	1087	10/02/25 04:00:52	37.1
128	09/02/25 12:01:52	49.4	608	09/02/25 20:01:52	36.6	1088	10/02/25 04:01:52	37.3
129	09/02/25 12:02:52	41.0	609	09/02/25 20:02:52	38.2	1089	10/02/25 04:02:52	37.2
130	09/02/25 12:03:52	41.5	610	09/02/25 20:03:52	37.1	1090	10/02/25 04:03:52	35.5
131	09/02/25 12:04:52	42.0	611	09/02/25 20:04:52	36.6	1091	10/02/25 04:04:52	36.5
132	09/02/25 12:05:52	42.4	612	09/02/25 20:05:52	32.1	1092	10/02/25 04:05:52	35.2
133	09/02/25 12:06:52	40.5	613	09/02/25 20:06:52	31.9	1093	10/02/25 04:06:52	40.0
134	09/02/25 12:07:52	55.4	614	09/02/25 20:07:52	33.5	1094	10/02/25 04:07:52	38.5
135	09/02/25 12:08:52	40.2	615	09/02/25 20:08:52	30.7	1095	10/02/25 04:08:52	36.0
136	09/02/25 12:09:52	43.0	616	09/02/25 20:09:52	37.7	1096	10/02/25 04:09:52	39.8
137	09/02/25 12:10:52	41.4	617	09/02/25 20:10:52	38.1	1097	10/02/25 04:10:52	35.7
138	09/02/25 12:11:52	45.7	618	09/02/25 20:11:52	31.8	1098	10/02/25 04:11:52	38.2
139	09/02/25 12:12:52	43.3	619	09/02/25 20:12:52	35.0	1099	10/02/25 04:12:52	35.1
140	09/02/25 12:13:52	43.6	620	09/02/25 20:13:52	36.3	1100	10/02/25 04:13:52	37.2
141	09/02/25 12:14:52	40.3	621	09/02/25 20:14:52	31.9	1101	10/02/25 04:14:52	37.5
142	09/02/25 12:15:52	48.4	622	09/02/25 20:15:52	35.5	1102	10/02/25 04:15:52	35.9
143	09/02/25 12:16:52	42.0	623	09/02/25 20:16:52	37.6	1103	10/02/25 04:16:52	39.9
144	09/02/25 12:17:52	42.0	624	09/02/25 20:17:52	36.6	1104	10/02/25 04:17:52	37.2
145	09/02/25 12:18:52	42.9	625	09/02/25 20:18:52	38.2	1105	10/02/25 04:18:52	36.5
146	09/02/25 12:19:52	46.7	626	09/02/25 20:19:52	37.1	1106	10/02/25 04:19:52	37.8
147	09/02/25 12:20:52	43.2	627	09/02/25 20:20:52	36.6	1107	10/02/25 04:20:52	35.1
148	09/02/25 12:21:52	42.7	628	09/02/25 20:21:52	32.1	1108	10/02/25 04:21:52	35.6
149	09/02/25 12:22:52	43.5	629	09/02/25 20:22:52	42.2	1109	10/02/25 04:22:52	36.6
150	09/02/25 12:23:52	45.0	630	09/02/25 20:23:52	46.9	1110	10/02/25 04:23:52	37.0
151	09/02/25 12:24:52	48.6	631	09/02/25 20:24:52	40.9	1111	10/02/25 04:24:52	37.2

Data_Record

152	09/02/25 12:25:52	40.5	632	09/02/25 20:25:52	44.9	1112	10/02/25 04:25:52	37.0
153	09/02/25 12:26:52	47.0	633	09/02/25 20:26:52	40.5	1113	10/02/25 04:26:52	37.7
154	09/02/25 12:27:52	40.3	634	09/02/25 20:27:52	49.0	1114	10/02/25 04:27:52	39.7
155	09/02/25 12:28:52	42.3	635	09/02/25 20:28:52	46.8	1115	10/02/25 04:28:52	37.6
156	09/02/25 12:29:52	48.3	636	09/02/25 20:29:52	46.6	1116	10/02/25 04:29:52	38.1
157	09/02/25 12:30:52	43.1	637	09/02/25 20:30:52	41.2	1117	10/02/25 04:30:52	35.7
158	09/02/25 12:31:52	49.9	638	09/02/25 20:31:52	40.3	1118	10/02/25 04:31:52	37.2
159	09/02/25 12:32:52	45.6	639	09/02/25 20:32:52	45.3	1119	10/02/25 04:32:52	38.3
160	09/02/25 12:33:52	44.0	640	09/02/25 20:33:52	45.2	1120	10/02/25 04:33:52	36.5
161	09/02/25 12:34:52	40.2	641	09/02/25 20:34:52	46.0	1121	10/02/25 04:34:52	36.9
162	09/02/25 12:35:52	41.6	642	09/02/25 20:35:52	45.4	1122	10/02/25 04:35:52	39.8
163	09/02/25 12:36:52	45.5	643	09/02/25 20:36:52	47.9	1123	10/02/25 04:36:52	35.5
164	09/02/25 12:37:52	47.4	644	09/02/25 20:37:52	49.0	1124	10/02/25 04:37:52	36.0
165	09/02/25 12:38:52	41.9	645	09/02/25 20:38:52	46.4	1125	10/02/25 04:38:52	35.1
166	09/02/25 12:39:52	43.1	646	09/02/25 20:39:52	49.9	1126	10/02/25 04:39:52	36.4
167	09/02/25 12:40:52	47.0	647	09/02/25 20:40:52	44.3	1127	10/02/25 04:40:52	38.5
168	09/02/25 12:41:52	41.3	648	09/02/25 20:41:52	43.5	1128	10/02/25 04:41:52	37.0
169	09/02/25 12:42:52	40.6	649	09/02/25 20:42:52	49.0	1129	10/02/25 04:42:52	35.0
170	09/02/25 12:43:52	40.4	650	09/02/25 20:43:52	46.1	1130	10/02/25 04:43:52	38.8
171	09/02/25 12:44:52	45.3	651	09/02/25 20:44:52	41.4	1131	10/02/25 04:44:52	38.3
172	09/02/25 12:45:52	48.5	652	09/02/25 20:45:52	41.9	1132	10/02/25 04:45:52	37.5
173	09/02/25 12:46:52	48.7	653	09/02/25 20:46:52	41.8	1133	10/02/25 04:46:52	39.5
174	09/02/25 12:47:52	44.0	654	09/02/25 20:47:52	47.0	1134	10/02/25 04:47:52	38.2
175	09/02/25 12:48:52	41.3	655	09/02/25 20:48:52	44.3	1135	10/02/25 04:48:52	37.2
176	09/02/25 12:49:52	41.0	656	09/02/25 20:49:52	40.2	1136	10/02/25 04:49:52	38.1
177	09/02/25 12:50:52	45.2	657	09/02/25 20:50:52	40.6	1137	10/02/25 04:50:52	35.3
178	09/02/25 12:51:52	45.2	658	09/02/25 20:51:52	41.1	1138	10/02/25 04:51:52	38.7
179	09/02/25 12:52:52	40.8	659	09/02/25 20:52:52	41.7	1139	10/02/25 04:52:52	37.7
180	09/02/25 12:53:52	47.5	660	09/02/25 20:53:52	44.5	1140	10/02/25 04:53:52	39.6
181	09/02/25 12:54:52	42.5	661	09/02/25 20:54:52	42.4	1141	10/02/25 04:54:52	36.9
182	09/02/25 12:55:52	45.7	662	09/02/25 20:55:52	47.3	1142	10/02/25 04:55:52	36.8
183	09/02/25 12:56:52	49.9	663	09/02/25 20:56:52	49.5	1143	10/02/25 04:56:52	37.9
184	09/02/25 12:57:52	47.0	664	09/02/25 20:57:52	47.5	1144	10/02/25 04:57:52	36.6
185	09/02/25 12:58:52	43.6	665	09/02/25 20:58:52	48.3	1145	10/02/25 04:58:52	36.5
186	09/02/25 12:59:52	46.0	666	09/02/25 20:59:52	46.4	1146	10/02/25 04:59:52	37.7
187	09/02/25 13:00:52	42.6	667	09/02/25 21:00:52	39.4	1147	10/02/25 05:00:52	35.7
188	09/02/25 13:01:52	47.7	668	09/02/25 21:01:52	36.5	1148	10/02/25 05:01:52	39.7
189	09/02/25 13:02:52	47.6	669	09/02/25 21:02:52	39.9	1149	10/02/25 05:02:52	35.1
190	09/02/25 13:03:52	47.6	670	09/02/25 21:03:52	36.7	1150	10/02/25 05:03:52	35.6
191	09/02/25 13:04:52	41.3	671	09/02/25 21:04:52	35.8	1151	10/02/25 05:04:52	36.3
192	09/02/25 13:05:52	45.8	672	09/02/25 21:05:52	39.6	1152	10/02/25 05:05:52	37.3
193	09/02/25 13:06:52	42.5	673	09/02/25 21:06:52	39.7	1153	10/02/25 05:06:52	39.2
194	09/02/25 13:07:52	41.6	674	09/02/25 21:07:52	39.6	1154	10/02/25 05:07:52	36.9
195	09/02/25 13:08:52	40.5	675	09/02/25 21:08:52	39.1	1155	10/02/25 05:08:52	36.4
196	09/02/25 13:09:52	45.0	676	09/02/25 21:09:52	37.7	1156	10/02/25 05:09:52	36.2
197	09/02/25 13:10:52	47.4	677	09/02/25 21:10:52	39.2	1157	10/02/25 05:10:52	38.9
198	09/02/25 13:11:52	40.5	678	09/02/25 21:11:52	35.2	1158	10/02/25 05:11:52	38.4
199	09/02/25 13:12:52	45.6	679	09/02/25 21:12:52	38.6	1159	10/02/25 05:12:52	38.1
200	09/02/25 13:13:52	49.8	680	09/02/25 21:13:52	35.2	1160	10/02/25 05:13:52	35.2
201	09/02/25 13:14:52	49.4	681	09/02/25 21:14:52	38.2	1161	10/02/25 05:14:52	37.1
202	09/02/25 13:15:52	49.3	682	09/02/25 21:15:52	39.0	1162	10/02/25 05:15:52	38.9

Data_Record

203	09/02/25 13:16:52	40.7	683	09/02/25 21:16:52	37.8	1163	10/02/25 05:16:52	37.6
204	09/02/25 13:17:52	46.3	684	09/02/25 21:17:52	35.8	1164	10/02/25 05:17:52	36.5
205	09/02/25 13:18:52	48.3	685	09/02/25 21:18:52	37.8	1165	10/02/25 05:18:52	39.3
206	09/02/25 13:19:52	45.5	686	09/02/25 21:19:52	35.0	1166	10/02/25 05:19:52	37.4
207	09/02/25 13:20:52	46.5	687	09/02/25 21:20:52	37.1	1167	10/02/25 05:20:52	38.6
208	09/02/25 13:21:52	44.8	688	09/02/25 21:21:52	35.8	1168	10/02/25 05:21:52	38.5
209	09/02/25 13:22:52	45.6	689	09/02/25 21:22:52	35.7	1169	10/02/25 05:22:52	36.4
210	09/02/25 13:23:52	40.6	690	09/02/25 21:23:52	39.6	1170	10/02/25 05:23:52	35.6
211	09/02/25 13:24:52	42.0	691	09/02/25 21:24:52	38.4	1171	10/02/25 05:24:52	36.6
212	09/02/25 13:25:52	49.1	692	09/02/25 21:25:52	35.1	1172	10/02/25 05:25:52	39.4
213	09/02/25 13:26:52	41.3	693	09/02/25 21:26:52	39.6	1173	10/02/25 05:26:52	38.2
214	09/02/25 13:27:52	49.9	694	09/02/25 21:27:52	38.5	1174	10/02/25 05:27:52	35.7
215	09/02/25 13:28:52	48.7	695	09/02/25 21:28:52	39.1	1175	10/02/25 05:28:52	37.8
216	09/02/25 13:29:52	42.6	696	09/02/25 21:29:52	35.2	1176	10/02/25 05:29:52	37.6
217	09/02/25 13:30:52	43.0	697	09/02/25 21:30:52	37.1	1177	10/02/25 05:30:52	38.5
218	09/02/25 13:31:52	42.7	698	09/02/25 21:31:52	38.5	1178	10/02/25 05:31:52	37.8
219	09/02/25 13:32:52	42.5	699	09/02/25 21:32:52	37.0	1179	10/02/25 05:32:52	38.5
220	09/02/25 13:33:52	49.3	700	09/02/25 21:33:52	39.1	1180	10/02/25 05:33:52	39.8
221	09/02/25 13:34:52	44.6	701	09/02/25 21:34:52	37.6	1181	10/02/25 05:34:52	37.5
222	09/02/25 13:35:52	40.1	702	09/02/25 21:35:52	38.4	1182	10/02/25 05:35:52	35.1
223	09/02/25 13:36:52	41.0	703	09/02/25 21:36:52	35.3	1183	10/02/25 05:36:52	35.8
224	09/02/25 13:37:52	41.3	704	09/02/25 21:37:52	36.5	1184	10/02/25 05:37:52	36.4
225	09/02/25 13:38:52	41.7	705	09/02/25 21:38:52	39.3	1185	10/02/25 05:38:52	38.6
226	09/02/25 13:39:52	43.7	706	09/02/25 21:39:52	37.0	1186	10/02/25 05:39:52	38.0
227	09/02/25 13:40:52	45.3	707	09/02/25 21:40:52	36.5	1187	10/02/25 05:40:52	39.3
228	09/02/25 13:41:52	49.2	708	09/02/25 21:41:52	37.9	1188	10/02/25 05:41:52	38.2
229	09/02/25 13:42:52	42.8	709	09/02/25 21:42:52	37.9	1189	10/02/25 05:42:52	36.4
230	09/02/25 13:43:52	47.4	710	09/02/25 21:43:52	37.1	1190	10/02/25 05:43:52	36.9
231	09/02/25 13:44:52	50.0	711	09/02/25 21:44:52	39.0	1191	10/02/25 05:44:52	39.9
232	09/02/25 13:45:52	48.6	712	09/02/25 21:45:52	39.0	1192	10/02/25 05:45:52	38.6
233	09/02/25 13:46:52	46.7	713	09/02/25 21:46:52	38.0	1193	10/02/25 05:46:52	39.9
234	09/02/25 13:47:52	47.3	714	09/02/25 21:47:52	37.1	1194	10/02/25 05:47:52	38.0
235	09/02/25 13:48:52	49.1	715	09/02/25 21:48:52	37.9	1195	10/02/25 05:48:52	39.6
236	09/02/25 13:49:52	45.7	716	09/02/25 21:49:52	38.2	1196	10/02/25 05:49:52	37.2
237	09/02/25 13:50:52	43.2	717	09/02/25 21:50:52	35.8	1197	10/02/25 05:50:52	40.6
238	09/02/25 13:51:52	44.6	718	09/02/25 21:51:52	35.1	1198	10/02/25 05:51:52	42.8
239	09/02/25 13:52:52	40.2	719	09/02/25 21:52:52	37.8	1199	10/02/25 05:52:52	44.5
240	09/02/25 13:53:52	48.7	720	09/02/25 21:53:52	37.3	1200	10/02/25 05:53:52	36.4
241	09/02/25 13:54:52	42.1	721	09/02/25 21:54:52	36.4	1201	10/02/25 05:54:52	37.3
242	09/02/25 13:55:52	46.8	722	09/02/25 21:55:52	38.8	1202	10/02/25 05:55:52	37.0
243	09/02/25 13:56:52	45.6	723	09/02/25 21:56:52	36.1	1203	10/02/25 05:56:52	37.4
244	09/02/25 13:57:52	41.9	724	09/02/25 21:57:52	39.6	1204	10/02/25 05:57:52	37.1
245	09/02/25 13:58:52	42.7	725	09/02/25 21:58:52	39.7	1205	10/02/25 05:58:52	39.7
246	09/02/25 13:59:52	45.2	726	09/02/25 21:59:52	35.6	1206	10/02/25 05:59:52	36.3
247	09/02/25 14:00:52	42.3	727	09/02/25 22:00:52	37.5	1207	10/02/25 06:00:52	33.6
248	09/02/25 14:01:52	48.1	728	09/02/25 22:01:52	39.3	1208	10/02/25 06:01:52	33.1
249	09/02/25 14:02:52	48.0	729	09/02/25 22:02:52	39.3	1209	10/02/25 06:02:52	36.7
250	09/02/25 14:03:52	49.6	730	09/02/25 22:03:52	35.4	1210	10/02/25 06:03:52	30.6
251	09/02/25 14:04:52	41.4	731	09/02/25 22:04:52	39.8	1211	10/02/25 06:04:52	38.5
252	09/02/25 14:05:52	47.6	732	09/02/25 22:05:52	35.5	1212	10/02/25 06:05:52	30.3
253	09/02/25 14:06:52	48.7	733	09/02/25 22:06:52	37.5	1213	10/02/25 06:06:52	35.3

Data_Record

254	09/02/25 14:07:52	40.5	734	09/02/25 22:07:52	39.4	1214	10/02/25 06:07:52	36.4
255	09/02/25 14:08:52	49.7	735	09/02/25 22:08:52	39.9	1215	10/02/25 06:08:52	40.0
256	09/02/25 14:09:52	40.6	736	09/02/25 22:09:52	37.5	1216	10/02/25 06:09:52	34.9
257	09/02/25 14:10:52	48.4	737	09/02/25 22:10:52	35.3	1217	10/02/25 06:10:52	38.2
258	09/02/25 14:11:52	48.4	738	09/02/25 22:11:52	36.5	1218	10/02/25 06:11:52	32.4
259	09/02/25 14:12:52	43.9	739	09/02/25 22:12:52	36.7	1219	10/02/25 06:12:52	30.2
260	09/02/25 14:13:52	44.8	740	09/02/25 22:13:52	38.8	1220	10/02/25 06:13:52	34.3
261	09/02/25 14:14:52	42.7	741	09/02/25 22:14:52	38.0	1221	10/02/25 06:14:52	35.1
262	09/02/25 14:15:52	49.5	742	09/02/25 22:15:52	39.5	1222	10/02/25 06:15:52	31.8
263	09/02/25 14:16:52	42.8	743	09/02/25 22:16:52	36.1	1223	10/02/25 06:16:52	38.2
264	09/02/25 14:17:52	44.9	744	09/02/25 22:17:52	37.4	1224	10/02/25 06:17:52	37.6
265	09/02/25 14:18:52	41.1	745	09/02/25 22:18:52	37.4	1225	10/02/25 06:18:52	34.7
266	09/02/25 14:19:52	40.1	746	09/02/25 22:19:52	39.4	1226	10/02/25 06:19:52	37.3
267	09/02/25 14:20:52	40.9	747	09/02/25 22:20:52	37.4	1227	10/02/25 06:20:52	32.7
268	09/02/25 14:21:52	45.1	748	09/02/25 22:21:52	36.8	1228	10/02/25 06:21:52	39.4
269	09/02/25 14:22:52	43.0	749	09/02/25 22:22:52	35.1	1229	10/02/25 06:22:52	33.7
270	09/02/25 14:23:52	40.9	750	09/02/25 22:23:52	39.4	1230	10/02/25 06:23:52	35.8
271	09/02/25 14:24:52	44.7	751	09/02/25 22:24:52	39.0	1231	10/02/25 06:24:52	39.6
272	09/02/25 14:25:52	43.2	752	09/02/25 22:25:52	35.1	1232	10/02/25 06:25:52	35.6
273	09/02/25 14:26:52	41.1	753	09/02/25 22:26:52	38.6	1233	10/02/25 06:26:52	34.2
274	09/02/25 14:27:52	44.3	754	09/02/25 22:27:52	38.4	1234	10/02/25 06:27:52	39.8
275	09/02/25 14:28:52	40.2	755	09/02/25 22:28:52	37.9	1235	10/02/25 06:28:52	32.8
276	09/02/25 14:29:52	41.0	756	09/02/25 22:29:52	35.3	1236	10/02/25 06:29:52	39.3
277	09/02/25 14:30:52	49.6	757	09/02/25 22:30:52	38.3	1237	10/02/25 06:30:52	33.0
278	09/02/25 14:31:52	41.1	758	09/02/25 22:31:52	35.4	1238	10/02/25 06:31:52	36.4
279	09/02/25 14:32:52	48.5	759	09/02/25 22:32:52	38.0	1239	10/02/25 06:32:52	39.9
280	09/02/25 14:33:52	47.6	760	09/02/25 22:33:52	36.9	1240	10/02/25 06:33:52	37.7
281	09/02/25 14:34:52	50.0	761	09/02/25 22:34:52	36.8	1241	10/02/25 06:34:52	34.8
282	09/02/25 14:35:52	42.5	762	09/02/25 22:35:52	38.1	1242	10/02/25 06:35:52	38.5
283	09/02/25 14:36:52	46.7	763	09/02/25 22:36:52	39.3	1243	10/02/25 06:36:52	35.4
284	09/02/25 14:37:52	40.9	764	09/02/25 22:37:52	35.5	1244	10/02/25 06:37:52	37.1
285	09/02/25 14:38:52	41.5	765	09/02/25 22:38:52	39.5	1245	10/02/25 06:38:52	37.0
286	09/02/25 14:39:52	45.6	766	09/02/25 22:39:52	37.8	1246	10/02/25 06:39:52	30.0
287	09/02/25 14:40:52	42.7	767	09/02/25 22:40:52	39.7	1247	10/02/25 06:40:52	36.2
288	09/02/25 14:41:52	40.7	768	09/02/25 22:41:52	37.8	1248	10/02/25 06:41:52	34.9
289	09/02/25 14:42:52	45.1	769	09/02/25 22:42:52	39.5	1249	10/02/25 06:42:52	32.5
290	09/02/25 14:43:52	43.5	770	09/02/25 22:43:52	38.8	1250	10/02/25 06:43:52	34.2
291	09/02/25 14:44:52	42.3	771	09/02/25 22:44:52	36.4	1251	10/02/25 06:44:52	37.5
292	09/02/25 14:45:52	46.1	772	09/02/25 22:45:52	36.1	1252	10/02/25 06:45:52	38.0
293	09/02/25 14:46:52	45.1	773	09/02/25 22:46:52	39.9	1253	10/02/25 06:46:52	37.9
294	09/02/25 14:47:52	44.0	774	09/02/25 22:47:52	39.9	1254	10/02/25 06:47:52	38.4
295	09/02/25 14:48:52	45.7	775	09/02/25 22:48:52	39.8	1255	10/02/25 06:48:52	39.1
296	09/02/25 14:49:52	49.8	776	09/02/25 22:49:52	38.3	1256	10/02/25 06:49:52	34.8
297	09/02/25 14:50:52	42.4	777	09/02/25 22:50:52	39.7	1257	10/02/25 06:50:52	36.9
298	09/02/25 14:51:52	43.7	778	09/02/25 22:51:52	35.4	1258	10/02/25 06:51:52	36.9
299	09/02/25 14:52:52	48.2	779	09/02/25 22:52:52	36.0	1259	10/02/25 06:52:52	32.1
300	09/02/25 14:53:52	48.2	780	09/02/25 22:53:52	37.9	1260	10/02/25 06:53:52	37.6
301	09/02/25 14:54:52	48.3	781	09/02/25 22:54:52	36.8	1261	10/02/25 06:54:52	31.8
302	09/02/25 14:55:52	42.9	782	09/02/25 22:55:52	38.7	1262	10/02/25 06:55:52	31.2
303	09/02/25 14:56:52	47.4	783	09/02/25 22:56:52	39.5	1263	10/02/25 06:56:52	30.3
304	09/02/25 14:57:52	45.8	784	09/02/25 22:57:52	39.8	1264	10/02/25 06:57:52	37.3

Data_Record

305	09/02/25 14:58:52	44.9	785	09/02/25 22:58:52	36.6	1265	10/02/25 06:58:52	31.9
306	09/02/25 14:59:52	40.6	786	09/02/25 22:59:52	37.3	1266	10/02/25 06:59:52	33.5
307	09/02/25 15:00:52	42.6	787	09/02/25 23:00:52	39.9	1267	10/02/25 07:00:52	30.7
308	09/02/25 15:01:52	44.4	788	09/02/25 23:01:52	39.1	1268	10/02/25 07:01:52	37.7
309	09/02/25 15:02:52	45.5	789	09/02/25 23:02:52	36.6	1269	10/02/25 07:02:52	38.1
310	09/02/25 15:03:52	43.8	790	09/02/25 23:03:52	39.3	1270	10/02/25 07:03:52	31.8
311	09/02/25 15:04:52	42.9	791	09/02/25 23:04:52	37.6	1271	10/02/25 07:04:52	35.0
312	09/02/25 15:05:52	49.6	792	09/02/25 23:05:52	39.5	1272	10/02/25 07:05:52	36.3
313	09/02/25 15:06:52	43.8	793	09/02/25 23:06:52	38.7	1273	10/02/25 07:06:52	31.9
314	09/02/25 15:07:52	44.6	794	09/02/25 23:07:52	37.7	1274	10/02/25 07:07:52	35.5
315	09/02/25 15:08:52	41.2	795	09/02/25 23:08:52	39.6	1275	10/02/25 07:08:52	37.6
316	09/02/25 15:09:52	46.0	796	09/02/25 23:09:52	36.4	1276	10/02/25 07:09:52	36.6
317	09/02/25 15:10:52	48.9	797	09/02/25 23:10:52	36.7	1277	10/02/25 07:10:52	38.2
318	09/02/25 15:11:52	48.3	798	09/02/25 23:11:52	39.2	1278	10/02/25 07:11:52	37.1
319	09/02/25 15:12:52	50.0	799	09/02/25 23:12:52	38.8	1279	10/02/25 07:12:52	36.6
320	09/02/25 15:13:52	43.7	800	09/02/25 23:13:52	39.4	1280	10/02/25 07:13:52	32.1
321	09/02/25 15:14:52	49.7	801	09/02/25 23:14:52	38.5	1281	10/02/25 07:14:52	36.5
322	09/02/25 15:15:52	45.4	802	09/02/25 23:15:52	37.0	1282	10/02/25 07:15:52	30.2
323	09/02/25 15:16:52	42.8	803	09/02/25 23:16:52	35.0	1283	10/02/25 07:16:52	35.8
324	09/02/25 15:17:52	45.2	804	09/02/25 23:17:52	38.5	1284	10/02/25 07:17:52	32.0
325	09/02/25 15:18:52	40.7	805	09/02/25 23:18:52	37.4	1285	10/02/25 07:18:52	39.7
326	09/02/25 15:19:52	45.6	806	09/02/25 23:19:52	35.9	1286	10/02/25 07:19:52	34.8
327	09/02/25 15:20:52	49.3	807	09/02/25 23:20:52	39.9	1287	10/02/25 07:20:52	38.0
328	09/02/25 15:21:52	44.1	808	09/02/25 23:21:52	38.7	1288	10/02/25 07:21:52	31.5
329	09/02/25 15:22:52	40.1	809	09/02/25 23:22:52	37.2	1289	10/02/25 07:22:52	38.0
330	09/02/25 15:23:52	49.0	810	09/02/25 23:23:52	38.4	1290	10/02/25 07:23:52	33.6
331	09/02/25 15:24:52	46.7	811	09/02/25 23:24:52	36.4	1291	10/02/25 07:24:52	34.0
332	09/02/25 15:25:52	44.1	812	09/02/25 23:25:52	36.1	1292	10/02/25 07:25:52	31.4
333	09/02/25 15:26:52	48.1	813	09/02/25 23:26:52	38.8	1293	10/02/25 07:26:52	31.8
334	09/02/25 15:27:52	43.3	814	09/02/25 23:27:52	39.1	1294	10/02/25 07:27:52	32.5
335	09/02/25 15:28:52	50.0	815	09/02/25 23:28:52	37.0	1295	10/02/25 07:28:52	37.7
336	09/02/25 15:29:52	48.6	816	09/02/25 23:29:52	39.6	1296	10/02/25 07:29:52	34.2
337	09/02/25 15:30:52	40.5	817	09/02/25 23:30:52	39.3	1297	10/02/25 07:30:52	30.7
338	09/02/25 15:31:52	46.7	818	09/02/25 23:31:52	36.3	1298	10/02/25 07:31:52	37.8
339	09/02/25 15:32:52	45.0	819	09/02/25 23:32:52	38.2	1299	10/02/25 07:32:52	32.3
340	09/02/25 15:33:52	45.6	820	09/02/25 23:33:52	38.6	1300	10/02/25 07:33:52	36.0
341	09/02/25 15:34:52	40.8	821	09/02/25 23:34:52	35.1	1301	10/02/25 07:34:52	30.0
342	09/02/25 15:35:52	44.0	822	09/02/25 23:35:52	35.1	1302	10/02/25 07:35:52	37.0
343	09/02/25 15:36:52	45.9	823	09/02/25 23:36:52	36.7	1303	10/02/25 07:36:52	35.0
344	09/02/25 15:37:52	42.9	824	09/02/25 23:37:52	39.1	1304	10/02/25 07:37:52	39.9
345	09/02/25 15:38:52	47.5	825	09/02/25 23:38:52	37.9	1305	10/02/25 07:38:52	37.2
346	09/02/25 15:39:52	44.1	826	09/02/25 23:39:52	38.3	1306	10/02/25 07:39:52	34.6
347	09/02/25 15:40:52	46.3	827	09/02/25 23:40:52	36.0	1307	10/02/25 07:40:52	31.1
348	09/02/25 15:41:52	43.4	828	09/02/25 23:41:52	39.8	1308	10/02/25 07:41:52	35.7
349	09/02/25 15:42:52	47.8	829	09/02/25 23:42:52	37.0	1309	10/02/25 07:42:52	31.2
350	09/02/25 15:43:52	44.3	830	09/02/25 23:43:52	38.5	1310	10/02/25 07:43:52	30.3
351	09/02/25 15:44:52	44.2	831	09/02/25 23:44:52	36.2	1311	10/02/25 07:44:52	33.6
352	09/02/25 15:45:52	40.9	832	09/02/25 23:45:52	38.0	1312	10/02/25 07:45:52	40.3
353	09/02/25 15:46:52	42.0	833	09/02/25 23:46:52	37.6	1313	10/02/25 07:46:52	32.8
354	09/02/25 15:47:52	48.8	834	09/02/25 23:47:52	39.3	1314	10/02/25 07:47:52	32.9
355	09/02/25 15:48:52	45.9	835	09/02/25 23:48:52	36.2	1315	10/02/25 07:48:52	35.0

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356	09/02/25 15:49:52	49.3	836	09/02/25 23:49:52	39.3	1316	10/02/25 07:49:52	30.1
357	09/02/25 15:50:52	41.4	837	09/02/25 23:50:52	35.0	1317	10/02/25 07:50:52	32.6
358	09/02/25 15:51:52	48.9	838	09/02/25 23:51:52	37.2	1318	10/02/25 07:51:52	33.9
359	09/02/25 15:52:52	47.0	839	09/02/25 23:52:52	36.1	1319	10/02/25 07:52:52	35.7
360	09/02/25 15:53:52	47.3	840	09/02/25 23:53:52	35.3	1320	10/02/25 07:53:52	37.3
361	09/02/25 15:54:52	41.9	841	09/02/25 23:54:52	37.7	1321	10/02/25 07:54:52	32.6
362	09/02/25 15:55:52	40.2	842	09/02/25 23:55:52	35.2	1322	10/02/25 07:55:52	35.9
363	09/02/25 15:56:52	41.7	843	09/02/25 23:56:52	39.6	1323	10/02/25 07:56:52	36.9
364	09/02/25 15:57:52	41.3	844	09/02/25 23:57:52	37.6	1324	10/02/25 07:57:52	44.2
365	09/02/25 15:58:52	49.0	845	09/02/25 23:58:52	35.1	1325	10/02/25 07:58:52	38.9
366	09/02/25 15:59:52	40.9	846	09/02/25 23:59:52	37.2	1326	10/02/25 07:59:52	42.2
367	09/02/25 16:00:52	43.0	847	10/02/25 00:00:52	36.1	1327	10/02/25 08:00:52	34.5
368	09/02/25 16:01:52	42.4	848	10/02/25 00:01:52	37.2	1328	10/02/25 08:01:52	36.0
369	09/02/25 16:02:52	46.1	849	10/02/25 00:02:52	39.2	1329	10/02/25 08:02:52	39.9
370	09/02/25 16:03:52	45.6	850	10/02/25 00:03:52	35.3	1330	10/02/25 08:03:52	37.1
371	09/02/25 16:04:52	43.8	851	10/02/25 00:04:52	36.2	1331	10/02/25 08:04:52	32.0
372	09/02/25 16:05:52	46.8	852	10/02/25 00:05:52	37.8	1332	10/02/25 08:05:52	34.7
373	09/02/25 16:06:52	31.9	853	10/02/25 00:06:52	35.2	1333	10/02/25 08:06:52	38.2
374	09/02/25 16:07:52	33.5	854	10/02/25 00:07:52	35.8	1334	10/02/25 08:07:52	33.4
375	09/02/25 16:08:52	30.7	855	10/02/25 00:08:52	39.4	1335	10/02/25 08:08:52	33.6
376	09/02/25 16:09:52	37.7	856	10/02/25 00:09:52	38.2	1336	10/02/25 08:09:52	32.1
377	09/02/25 16:10:52	38.1	857	10/02/25 00:10:52	35.2	1337	10/02/25 08:10:52	44.3
378	09/02/25 16:11:52	31.8	858	10/02/25 00:11:52	37.2	1338	10/02/25 08:11:52	35.3
379	09/02/25 16:12:52	35.0	859	10/02/25 00:12:52	37.3	1339	10/02/25 08:12:52	37.9
380	09/02/25 16:13:52	36.3	860	10/02/25 00:13:52	39.1	1340	10/02/25 08:13:52	36.3
381	09/02/25 16:14:52	31.9	861	10/02/25 00:14:52	35.2	1341	10/02/25 08:14:52	30.8
382	09/02/25 16:15:52	35.5	862	10/02/25 00:15:52	36.0	1342	10/02/25 08:15:52	31.6
383	09/02/25 16:16:52	37.6	863	10/02/25 00:16:52	35.1	1343	10/02/25 08:16:52	39.9
384	09/02/25 16:17:52	36.6	864	10/02/25 00:17:52	36.3	1344	10/02/25 08:17:52	39.6
385	09/02/25 16:18:52	38.2	865	10/02/25 00:18:52	39.0	1345	10/02/25 08:18:52	32.8
386	09/02/25 16:19:52	37.1	866	10/02/25 00:19:52	36.7	1346	10/02/25 08:19:52	41.4
387	09/02/25 16:20:52	36.6	867	10/02/25 00:20:52	37.3	1347	10/02/25 08:20:52	49.3
388	09/02/25 16:21:52	32.1	868	10/02/25 00:21:52	39.8	1348	10/02/25 08:21:52	34.7
389	09/02/25 16:22:52	46.8	869	10/02/25 00:22:52	35.4	1349	10/02/25 08:22:52	45.6
390	09/02/25 16:23:52	49.7	870	10/02/25 00:23:52	39.8	1350	10/02/25 08:23:52	42.3
391	09/02/25 16:24:52	46.9	871	10/02/25 00:24:52	39.8	1351	10/02/25 08:24:52	43.0
392	09/02/25 16:25:52	46.3	872	10/02/25 00:25:52	37.7	1352	10/02/25 08:25:52	42.3
393	09/02/25 16:26:52	42.4	873	10/02/25 00:26:52	38.5	1353	10/02/25 08:26:52	42.0
394	09/02/25 16:27:52	47.9	874	10/02/25 00:27:52	37.9	1354	10/02/25 08:27:52	48.0
395	09/02/25 16:28:52	44.4	875	10/02/25 00:28:52	35.2	1355	10/02/25 08:28:52	43.8
396	09/02/25 16:29:52	46.1	876	10/02/25 00:29:52	39.8	1356	10/02/25 08:29:52	41.3
397	09/02/25 16:30:52	49.7	877	10/02/25 00:30:52	39.8	1357	10/02/25 08:30:52	41.7
398	09/02/25 16:31:52	41.7	878	10/02/25 00:31:52	39.8	1358	10/02/25 08:31:52	47.5
399	09/02/25 16:32:52	31.9	879	10/02/25 00:32:52	38.7	1359	10/02/25 08:32:52	47.6
400	09/02/25 16:33:52	33.5	880	10/02/25 00:33:52	38.1	1360	10/02/25 08:33:52	40.9
401	09/02/25 16:34:52	30.7	881	10/02/25 00:34:52	38.1	1361	10/02/25 08:34:52	45.8
402	09/02/25 16:35:52	37.7	882	10/02/25 00:35:52	38.0	1362	10/02/25 08:35:52	44.9
403	09/02/25 16:36:52	38.1	883	10/02/25 00:36:52	39.3	1363	10/02/25 08:36:52	47.3
404	09/02/25 16:37:52	31.8	884	10/02/25 00:37:52	36.5	1364	10/02/25 08:37:52	32.4
405	09/02/25 16:38:52	35.0	885	10/02/25 00:38:52	36.2	1365	10/02/25 08:38:52	32.9
406	09/02/25 16:39:52	36.3	886	10/02/25 00:39:52	36.2	1366	10/02/25 08:39:52	35.9

Data_Record

407	09/02/25 16:40:52	31.9	887	10/02/25 00:40:52	39.4	1367	10/02/25 08:40:52	33.4
408	09/02/25 16:41:52	35.5	888	10/02/25 00:41:52	36.2	1368	10/02/25 08:41:52	42.2
409	09/02/25 16:42:52	37.6	889	10/02/25 00:42:52	38.1	1369	10/02/25 08:42:52	32.3
410	09/02/25 16:43:52	36.6	890	10/02/25 00:43:52	38.7	1370	10/02/25 08:43:52	36.3
411	09/02/25 16:44:52	38.2	891	10/02/25 00:44:52	39.6	1371	10/02/25 08:44:52	30.9
412	09/02/25 16:45:52	37.1	892	10/02/25 00:45:52	36.7	1372	10/02/25 08:45:52	35.0
413	09/02/25 16:46:52	36.6	893	10/02/25 00:46:52	38.6	1373	10/02/25 08:46:52	31.8
414	09/02/25 16:47:52	32.1	894	10/02/25 00:47:52	36.7	1374	10/02/25 08:47:52	38.7
415	09/02/25 16:48:52	48.9	895	10/02/25 00:48:52	38.7	1375	10/02/25 08:48:52	45.6
416	09/02/25 16:49:52	49.0	896	10/02/25 00:49:52	39.4	1376	10/02/25 08:49:52	42.3
417	09/02/25 16:50:52	44.3	897	10/02/25 00:50:52	37.8	1377	10/02/25 08:50:52	43.0
418	09/02/25 16:51:52	41.2	898	10/02/25 00:51:52	37.3	1378	10/02/25 08:51:52	42.3
419	09/02/25 16:52:52	47.5	899	10/02/25 00:52:52	35.5	1379	10/02/25 08:52:52	42.0
420	09/02/25 16:53:52	43.6	900	10/02/25 00:53:52	37.9	1380	10/02/25 08:53:52	48.0
421	09/02/25 16:54:52	43.2	901	10/02/25 00:54:52	38.6	1381	10/02/25 08:54:52	43.8
422	09/02/25 16:55:52	42.2	902	10/02/25 00:55:52	39.8	1382	10/02/25 08:55:52	41.3
423	09/02/25 16:56:52	47.7	903	10/02/25 00:56:52	36.6	1383	10/02/25 08:56:52	41.7
424	09/02/25 16:57:52	45.8	904	10/02/25 00:57:52	39.6	1384	10/02/25 08:57:52	47.5
425	09/02/25 16:58:52	42.6	905	10/02/25 00:58:52	39.8	1385	10/02/25 08:58:52	47.6
426	09/02/25 16:59:52	40.8	906	10/02/25 00:59:52	39.8	1386	10/02/25 08:59:52	40.9
427	09/02/25 17:00:52	43.5	907	10/02/25 01:00:52	35.3	1387	10/02/25 09:00:52	49.9
428	09/02/25 17:01:52	40.5	908	10/02/25 01:01:52	38.6	1388	10/02/25 09:01:52	41.7
429	09/02/25 17:02:52	41.4	909	10/02/25 01:02:52	35.9	1389	10/02/25 09:02:52	43.4
430	09/02/25 17:03:52	42.9	910	10/02/25 01:03:52	35.1	1390	10/02/25 09:03:52	42.0
431	09/02/25 17:04:52	48.0	911	10/02/25 01:04:52	35.5	1391	10/02/25 09:04:52	47.6
432	09/02/25 17:05:52	41.4	912	10/02/25 01:05:52	36.6	1392	10/02/25 09:05:52	43.9
433	09/02/25 17:06:52	42.1	913	10/02/25 01:06:52	35.2	1393	10/02/25 09:06:52	42.3
434	09/02/25 17:07:52	46.0	914	10/02/25 01:07:52	35.8	1394	10/02/25 09:07:52	46.7
435	09/02/25 17:08:52	45.3	915	10/02/25 01:08:52	39.0	1395	10/02/25 09:08:52	48.7
436	09/02/25 17:09:52	45.8	916	10/02/25 01:09:52	39.0	1396	10/02/25 09:09:52	44.6
437	09/02/25 17:10:52	40.5	917	10/02/25 01:10:52	36.5	1397	10/02/25 09:10:52	42.1
438	09/02/25 17:11:52	48.5	918	10/02/25 01:11:52	36.1	1398	10/02/25 09:11:52	42.7
439	09/02/25 17:12:52	45.3	919	10/02/25 01:12:52	36.9	1399	10/02/25 09:12:52	45.5
440	09/02/25 17:13:52	48.3	920	10/02/25 01:13:52	37.6	1400	10/02/25 09:13:52	43.5
441	09/02/25 17:14:52	42.5	921	10/02/25 01:14:52	36.7	1401	10/02/25 09:14:52	40.8
442	09/02/25 17:15:52	49.2	922	10/02/25 01:15:52	37.7	1402	10/02/25 09:15:52	49.9
443	09/02/25 17:16:52	48.1	923	10/02/25 01:16:52	36.0	1403	10/02/25 09:16:52	40.5
444	09/02/25 17:17:52	47.4	924	10/02/25 01:17:52	37.6	1404	10/02/25 09:17:52	45.8
445	09/02/25 17:18:52	40.1	925	10/02/25 01:18:52	35.8	1405	10/02/25 09:18:52	46.1
446	09/02/25 17:19:52	46.7	926	10/02/25 01:19:52	35.0	1406	10/02/25 09:19:52	40.3
447	09/02/25 17:20:52	42.3	927	10/02/25 01:20:52	39.0	1407	10/02/25 09:20:52	43.4
448	09/02/25 17:21:52	45.4	928	10/02/25 01:21:52	36.3	1408	10/02/25 09:21:52	43.6
449	09/02/25 17:22:52	48.7	929	10/02/25 01:22:52	36.8	1409	10/02/25 09:22:52	47.4
450	09/02/25 17:23:52	46.9	930	10/02/25 01:23:52	39.1	1410	10/02/25 09:23:52	42.0
451	09/02/25 17:24:52	41.3	931	10/02/25 01:24:52	35.0	1411	10/02/25 09:24:52	43.1
452	09/02/25 17:25:52	42.6	932	10/02/25 01:25:52	39.5	1412	10/02/25 09:52:52	48.4
453	09/02/25 17:26:52	41.2	933	10/02/25 01:26:52	37.2	1413	10/02/25 09:26:52	48.1
454	09/02/25 17:27:52	49.5	934	10/02/25 01:27:52	38.0	1414	10/02/25 09:27:52	43.6
455	09/02/25 17:28:52	48.4	935	10/02/25 01:28:52	38.2	1415	10/02/25 09:28:52	50.2
456	09/02/25 17:29:52	48.8	936	10/02/25 01:29:52	35.5	1416	09/02/25 09:29:52	42.8
457	09/02/25 17:30:52	43.8	937	10/02/25 01:30:52	38.1	1417	10/02/25 09:30:52	40.2

Data_Record

458	09/02/25 17:31:52	47.6	938	10/02/25 01:31:52	39.6	1418	10/02/25 09:31:52	46.8
459	09/02/25 17:32:52	46.4	939	10/02/25 01:32:52	39.6	1419	10/02/25 09:32:52	42.7
460	09/02/25 17:33:52	40.8	940	10/02/25 01:33:52	38.5	1420	10/02/25 09:33:52	48.2
461	09/02/25 17:34:52	49.0	941	10/02/25 01:34:52	39.2	1421	10/02/25 09:34:52	40.9
462	09/02/25 17:35:52	40.2	942	10/02/25 01:35:52	39.1	1422	10/02/25 09:35:52	49.3
463	09/02/25 17:36:52	44.9	943	10/02/25 01:36:52	36.9	1423	10/02/25 09:36:52	45.4
464	09/02/25 17:37:52	41.0	944	10/02/25 01:37:52	38.9	1424	10/02/25 09:37:52	41.2
465	09/02/25 17:38:52	47.7	945	10/02/25 01:38:52	38.3	1425	10/02/25 09:38:52	44.0
466	09/02/25 17:39:52	42.2	946	10/02/25 01:39:52	38.1	1426	10/02/25 09:39:52	44.8
467	09/02/25 17:40:52	45.1	947	10/02/25 01:40:52	39.5	1427	10/02/25 09:40:52	42.8
468	09/02/25 17:41:52	40.5	948	10/02/25 01:41:52	36.3	1428	10/02/25 09:41:52	46.4
469	09/02/25 17:42:52	44.0	949	10/02/25 01:42:52	38.0	1429	10/02/25 09:42:52	45.6
470	09/02/25 17:43:52	47.1	950	10/02/25 01:43:52	39.2	1430	10/02/25 09:43:52	42.2
471	09/02/25 17:44:52	45.2	951	10/02/25 01:44:52	39.9	1431	10/02/25 09:44:52	49.7
472	09/02/25 17:45:52	41.9	952	10/02/25 01:45:52	35.2	1432	10/02/25 09:45:52	52.2
473	09/02/25 17:46:52	41.8	953	10/02/25 01:46:52	38.0	1433	10/02/25 09:46:52	40.2
474	09/02/25 17:47:52	45.7	954	10/02/25 01:47:52	36.6	1434	10/02/25 09:47:52	44.1
475	09/02/25 17:48:52	44.5	955	10/02/25 01:48:52	39.7	1435	10/02/25 09:48:52	46.0
476	09/02/25 17:49:52	44.5	956	10/02/25 01:49:52	38.8	1436	10/02/25 09:49:52	42.2
477	09/02/25 17:50:52	49.8	957	10/02/25 01:50:52	39.5	1437	10/02/25 09:50:52	48.4
478	09/02/25 17:51:52	47.4	958	10/02/25 01:51:52	38.5	1438	10/02/25 09:51:52	40.3
479	09/02/25 17:52:52	43.9	959	10/02/25 01:52:52	36.9	1439	10/02/25 09:52:52	44.1
480	09/02/25 17:53:52	45.9	960	10/02/25 01:53:52	38.9	1440	10/02/25 09:53:52	41.2

Raw Data Sheet for Day-2 (T-4/0)

Data_Record

Record	Time	Noise (dB)	Record	Time	Noise (dB)	Record	Time	Noise (dB)
1	10/02/25 10:01:13	47.8	481	10/02/25 18:01:13	44.5	961	11/02/25 02:01:13	30.6
2	10/02/25 10:02:13	49.9	482	10/02/25 18:02:13	37.2	962	11/02/25 02:02:13	33.1
3	10/02/25 10:03:13	47.1	483	10/02/25 18:03:13	34.6	963	11/02/25 02:03:13	32.1
4	10/02/25 10:04:13	43.5	484	10/02/25 18:04:13	42.5	964	11/02/25 02:04:13	37.8
5	10/02/25 10:05:13	44.9	485	10/02/25 18:05:13	40.7	965	11/02/25 02:05:13	31.7
6	10/02/25 10:06:13	39.8	486	10/02/25 18:06:13	31	966	11/02/25 02:06:13	30.3
7	10/02/25 10:07:13	49.7	487	10/02/25 18:07:13	39.9	967	11/02/25 02:07:13	38.5
8	10/02/25 10:08:13	43.5	488	10/02/25 18:08:13	40.9	968	11/02/25 02:08:13	35.2
9	10/02/25 10:09:13	46.2	489	10/02/25 18:09:13	32.1	969	11/02/25 02:09:13	32
10	10/02/25 10:10:13	40.8	490	10/02/25 18:10:13	35.8	970	11/02/25 02:10:13	37.7
11	10/02/25 10:11:13	45.3	491	10/02/25 18:11:13	33.5	971	11/02/25 02:11:13	32.3
12	10/02/25 10:12:13	38.7	492	10/02/25 18:12:13	40.5	972	11/02/25 02:12:13	37.2
13	10/02/25 10:13:13	49.4	493	10/02/25 18:13:13	34.4	973	11/02/25 02:13:13	36.7
14	10/02/25 10:14:13	38.3	494	10/02/25 18:14:13	37.2	974	11/02/25 02:14:13	32.3
15	10/02/25 10:15:13	49	495	10/02/25 18:15:13	34.3	975	11/02/25 02:15:13	35.9
16	10/02/25 10:16:13	48.1	496	10/02/25 18:16:13	39.7	976	11/02/25 02:16:13	39.1
17	10/02/25 10:17:13	42.7	497	10/02/25 18:17:13	35.1	977	11/02/25 02:17:13	33.6
18	10/02/25 10:18:13	38.3	498	10/02/25 18:18:13	38.4	978	11/02/25 02:18:13	36.1
19	10/02/25 10:19:13	42	499	10/02/25 18:19:13	44.3	979	11/02/25 02:19:13	34.7
20	10/02/25 10:20:13	42.8	500	10/02/25 18:20:13	31.8	980	11/02/25 02:20:13	34.2
21	10/02/25 10:21:13	42.1	501	10/02/25 18:21:13	33.2	981	11/02/25 02:21:13	38.9
22	10/02/25 10:22:13	38.5	502	10/02/25 18:22:13	40.3	982	11/02/25 02:22:13	38.8
23	10/02/25 10:23:13	47.2	503	10/02/25 18:23:13	37.3	983	11/02/25 02:23:13	30
24	10/02/25 10:24:13	42.1	504	10/02/25 18:24:13	39.7	984	11/02/25 02:24:13	37.7
25	10/02/25 10:25:13	44.3	505	10/02/25 18:25:13	34.4	985	11/02/25 02:25:13	32.3
26	10/02/25 10:26:13	51	506	10/02/25 18:26:13	30.2	986	11/02/25 02:26:13	35.8
27	10/02/25 10:27:13	41	507	10/02/25 18:27:13	36.1	987	11/02/25 02:27:13	39.7
28	10/02/25 10:28:13	41.4	508	10/02/25 18:28:13	34.1	988	11/02/25 02:28:13	32.2
29	10/02/25 10:29:13	51.9	509	10/02/25 18:29:13	30.9	989	11/02/25 02:29:13	35.9
30	10/02/25 10:30:13	45.9	510	10/02/25 18:30:13	36.1	990	11/02/25 02:30:13	30.8
31	10/02/25 10:31:13	43	511	10/02/25 18:31:13	39.1	991	11/02/25 02:31:13	37.3
32	10/02/25 10:32:13	41.2	512	10/02/25 18:32:13	43	992	11/02/25 02:32:13	36.9
33	10/02/25 10:33:13	46	513	10/02/25 18:33:13	41.1	993	11/02/25 02:33:13	38.3
34	10/02/25 10:34:13	40.4	514	10/02/25 18:34:13	37	994	11/02/25 02:34:13	39.8
35	10/02/25 10:35:13	45	515	10/02/25 18:35:13	43.9	995	11/02/25 02:35:13	31.5
36	10/02/25 10:36:13	42.4	516	10/02/25 18:36:13	30.3	996	11/02/25 02:36:13	36.6
37	10/02/25 10:37:13	50.9	517	10/02/25 18:37:13	35.9	997	11/02/25 02:37:13	38.4
38	10/02/25 10:38:13	49.7	518	10/02/25 18:38:13	31.5	998	11/02/25 02:38:13	38.6
39	10/02/25 10:39:13	52.1	519	10/02/25 18:39:13	43.5	999	11/02/25 02:39:13	34.6
40	10/02/25 10:40:13	43.5	520	10/02/25 18:40:13	32.8	1000	11/02/25 02:40:13	31.2
41	10/02/25 10:41:13	50.9	521	10/02/25 18:41:13	37.2	1001	11/02/25 02:41:13	37.8
42	10/02/25 10:42:13	38.2	522	10/02/25 18:42:13	31.6	1002	11/02/25 02:42:13	35.5
43	10/02/25 10:43:13	43.3	523	10/02/25 18:43:13	38.1	1003	11/02/25 02:43:13	38.1
44	10/02/25 10:44:13	39.8	524	10/02/25 18:44:13	34.4	1004	11/02/25 02:44:13	32.5
45	10/02/25 10:45:13	50.7	525	10/02/25 18:45:13	42.6	1005	11/02/25 02:45:13	39
46	10/02/25 10:46:13	41.6	526	10/02/25 18:46:13	44.1	1006	11/02/25 02:46:13	33.6
47	10/02/25 10:47:13	48.5	527	10/02/25 18:47:13	40.4	1007	11/02/25 02:47:13	32
48	10/02/25 10:48:13	41.6	528	10/02/25 18:48:13	39.6	1008	11/02/25 02:48:13	36.6
49	10/02/25 10:49:13	52.8	529	10/02/25 18:49:13	32.6	1009	11/02/25 02:49:13	36.2

Data_Record

50	10/02/25 10:50:13	48	530	10/02/25 18:50:13	39.9	1010	11/02/25 02:50:13	34.5
51	10/02/25 10:51:13	43.2	531	10/02/25 18:51:13	36.6	1011	11/02/25 02:51:13	30.9
52	10/02/25 10:52:13	38.9	532	10/02/25 18:52:13	40	1012	11/02/25 02:52:13	35.3
53	10/02/25 10:53:13	38.8	533	10/02/25 18:53:13	44.8	1013	11/02/25 02:53:13	32
54	10/02/25 10:54:13	43.7	534	10/02/25 18:54:13	41.6	1014	11/02/25 02:54:13	39.3
55	10/02/25 10:55:13	47.2	535	10/02/25 18:55:13	40	1015	11/02/25 02:55:13	37
56	10/02/25 10:56:13	50.6	536	10/02/25 18:56:13	43.3	1016	11/02/25 02:56:13	38
57	10/02/25 10:57:13	41.2	537	10/02/25 18:57:13	41.2	1017	11/02/25 02:57:13	32.5
58	10/02/25 10:58:13	38.2	538	10/02/25 18:58:13	38.8	1018	11/02/25 02:58:13	32.7
59	10/02/25 10:59:13	41.5	539	10/02/25 18:59:13	43.1	1019	11/02/25 02:59:13	31.3
60	10/02/25 11:00:13	44.9	540	10/02/25 19:00:13	35.2	1020	11/02/25 03:00:13	31.9
61	10/02/25 11:01:13	45.9	541	10/02/25 19:01:13	44.4	1021	11/02/25 03:01:13	33.3
62	10/02/25 11:02:13	42.6	542	10/02/25 19:02:13	31.1	1022	11/02/25 03:02:13	31
63	10/02/25 11:03:13	43.3	543	10/02/25 19:03:13	35.5	1023	11/02/25 03:03:13	39.1
64	10/02/25 11:04:13	47.5	544	10/02/25 19:04:13	33.8	1024	11/02/25 03:04:13	37.3
65	10/02/25 11:05:13	51	545	10/02/25 19:05:13	33.4	1025	11/02/25 03:05:13	33.9
66	10/02/25 11:06:13	48.9	546	10/02/25 19:06:13	41.3	1026	11/02/25 03:06:13	33.5
67	10/02/25 11:07:13	46.9	547	10/02/25 19:07:13	35.6	1027	11/02/25 03:07:13	38.9
68	10/02/25 11:08:13	41.3	548	10/02/25 19:08:13	30.2	1028	11/02/25 03:08:13	37.6
69	10/02/25 11:09:13	44.7	549	10/02/25 19:09:13	38.8	1029	11/02/25 03:09:13	34.6
70	10/02/25 11:10:13	51.5	550	10/02/25 19:10:13	41.1	1030	11/02/25 03:10:13	31.6
71	10/02/25 11:11:13	41.1	551	10/02/25 19:11:13	39.8	1031	11/02/25 03:11:13	32.9
72	10/02/25 11:12:13	43.6	552	10/02/25 19:12:13	35.5	1032	11/02/25 03:12:13	35.8
73	10/02/25 11:13:13	45	553	10/02/25 19:13:13	32.3	1033	11/02/25 03:13:13	35.5
74	10/02/25 11:14:13	39.4	554	10/02/25 19:14:13	39.7	1034	11/02/25 03:14:13	31.3
75	10/02/25 11:15:13	45.6	555	10/02/25 19:15:13	38.3	1035	11/02/25 03:15:13	33.9
76	10/02/25 11:16:13	39	556	10/02/25 19:16:13	39.7	1036	11/02/25 03:16:13	30.5
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149	10/02/25 12:29:13	46.7	629	10/02/25 20:29:13	31.7	1109	11/02/25 04:29:13	38.2
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151	10/02/25 12:31:13	49.8	631	10/02/25 20:31:13	37.1	1111	11/02/25 04:31:13	38.3

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158	10/02/25 12:38:13	52	638	10/02/25 20:38:13	43.6	1118	11/02/25 04:38:13	35.4
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164	10/02/25 12:44:13	46.5	644	10/02/25 20:44:13	40.7	1124	11/02/25 04:44:13	32.3
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192	10/02/25 13:12:13	49.5	672	10/02/25 21:12:13	34.4	1152	11/02/25 05:12:13	32.7
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194	10/02/25 13:14:13	47.8	674	10/02/25 21:14:13	36.9	1154	11/02/25 05:14:13	32.3
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199	10/02/25 13:19:13	47.8	679	10/02/25 21:19:13	31.4	1159	11/02/25 05:19:13	32.4
200	10/02/25 13:20:13	51	680	10/02/25 21:20:13	37.2	1160	11/02/25 05:20:13	32.6
201	10/02/25 13:21:13	45.1	681	10/02/25 21:21:13	34.6	1161	11/02/25 05:21:13	35.2
202	10/02/25 13:22:13	40.4	682	10/02/25 21:22:13	39.5	1162	11/02/25 05:22:13	30.8

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205	10/02/25 13:25:13	48.6	685	10/02/25 21:25:13	38.6	1165	11/02/25 05:25:13	37.1
206	10/02/25 13:26:13	50.9	686	10/02/25 21:26:13	38.2	1166	11/02/25 05:26:13	37.5
207	10/02/25 13:27:13	50.4	687	10/02/25 21:27:13	34.2	1167	11/02/25 05:27:13	33.4
208	10/02/25 13:28:13	42	688	10/02/25 21:28:13	34.4	1168	11/02/25 05:28:13	33.4
209	10/02/25 13:29:13	52.8	689	10/02/25 21:29:13	30.4	1169	11/02/25 05:29:13	33.6
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215	10/02/25 13:35:13	43.2	695	10/02/25 21:35:13	32.4	1175	11/02/25 05:35:13	30.9
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218	10/02/25 13:38:13	48	698	10/02/25 21:38:13	36.3	1178	11/02/25 05:38:13	35.3
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233	10/02/25 13:53:13	49.8	713	10/02/25 21:53:13	31.7	1193	11/02/25 05:53:13	37.2
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236	10/02/25 13:56:13	38.4	716	10/02/25 21:56:13	34.5	1196	11/02/25 05:56:13	44.1
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242	10/02/25 14:02:13	46.3	722	10/02/25 22:02:13	33.8	1202	11/02/25 06:02:13	43.3
243	10/02/25 14:03:13	49.8	723	10/02/25 22:03:13	35.1	1203	11/02/25 06:03:13	48.1
244	10/02/25 14:04:13	50.1	724	10/02/25 22:04:13	31.5	1204	11/02/25 06:04:13	38.9
245	10/02/25 14:05:13	49.5	725	10/02/25 22:05:13	32.4	1205	11/02/25 06:05:13	40.9
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247	10/02/25 14:07:13	41.1	727	10/02/25 22:07:13	37.1	1207	11/02/25 06:07:13	44.4
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251	10/02/25 14:11:13	43.6	731	10/02/25 22:11:13	32.8	1211	11/02/25 06:11:13	48.6
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265	10/02/25 14:25:13	44.9	745	10/02/25 22:25:13	35.2	1225	11/02/25 06:25:13	45.4
266	10/02/25 14:26:13	49.6	746	10/02/25 22:26:13	31.8	1226	11/02/25 06:26:13	41.6
267	10/02/25 14:27:13	43.8	747	10/02/25 22:27:13	36.1	1227	11/02/25 06:27:13	45.5
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271	10/02/25 14:31:13	50.6	751	10/02/25 22:31:13	36.3	1231	11/02/25 06:31:13	43.7
272	10/02/25 14:32:13	38.7	752	10/02/25 22:32:13	31	1232	11/02/25 06:32:13	45.9
273	10/02/25 14:33:13	40.9	753	10/02/25 22:33:13	30.2	1233	11/02/25 06:33:13	44
274	10/02/25 14:34:13	41.7	754	10/02/25 22:34:13	34.8	1234	11/02/25 06:34:13	41
275	10/02/25 14:35:13	44	755	10/02/25 22:35:13	30.9	1235	11/02/25 06:35:13	37.4
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280	10/02/25 14:40:13	52.6	760	10/02/25 22:40:13	31.4	1240	11/02/25 06:40:13	38.1
281	10/02/25 14:41:13	51	761	10/02/25 22:41:13	33.7	1241	11/02/25 06:41:13	44.6
282	10/02/25 14:42:13	48.8	762	10/02/25 22:42:13	33.5	1242	11/02/25 06:42:13	36.1
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286	10/02/25 14:46:13	42.1	766	10/02/25 22:46:13	38.2	1246	11/02/25 06:46:13	35.1
287	10/02/25 14:47:13	39	767	10/02/25 22:47:13	39.3	1247	11/02/25 06:47:13	40.4
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289	10/02/25 14:49:13	39.9	769	10/02/25 22:49:13	37.2	1249	11/02/25 06:49:13	37.1
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292	10/02/25 14:52:13	36	772	10/02/25 22:52:13	34.7	1252	11/02/25 06:52:13	38.2
293	10/02/25 14:53:13	35.4	773	10/02/25 22:53:13	38.4	1253	11/02/25 06:53:13	48.2
294	10/02/25 14:54:13	40.5	774	10/02/25 22:54:13	30.9	1254	11/02/25 06:54:13	37
295	10/02/25 14:55:13	31.8	775	10/02/25 22:55:13	31.9	1255	11/02/25 06:55:13	45.5
296	10/02/25 14:56:13	30.7	776	10/02/25 22:56:13	32.2	1256	11/02/25 06:56:13	38
297	10/02/25 14:57:13	37.6	777	10/02/25 22:57:13	30.9	1257	11/02/25 06:57:13	37.3
298	10/02/25 14:58:13	35.2	778	10/02/25 22:58:13	36.4	1258	11/02/25 06:58:13	44.5
299	10/02/25 14:59:13	30.7	779	10/02/25 22:59:13	38.6	1259	11/02/25 06:59:13	35.3
300	10/02/25 15:00:13	45	780	10/02/25 23:00:13	36.2	1260	11/02/25 07:00:13	47.2
301	10/02/25 15:01:13	43.4	781	10/02/25 23:01:13	33.9	1261	11/02/25 07:01:13	45.6
302	10/02/25 15:02:13	41.7	782	10/02/25 23:02:13	39.3	1262	11/02/25 07:02:13	36.6
303	10/02/25 15:03:13	40.2	783	10/02/25 23:03:13	36.1	1263	11/02/25 07:03:13	42.2
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306	10/02/25 15:06:13	33.8	786	10/02/25 23:06:13	30.1	1266	11/02/25 07:06:13	35.6
307	10/02/25 15:07:13	35	787	10/02/25 23:07:13	35.2	1267	11/02/25 07:07:13	46.6
308	10/02/25 15:08:13	41.1	788	10/02/25 23:08:13	33.8	1268	11/02/25 07:08:13	44.4
309	10/02/25 15:09:13	41.7	789	10/02/25 23:09:13	39.3	1269	11/02/25 07:09:13	40.6
310	10/02/25 15:10:13	30.5	790	10/02/25 23:10:13	31.5	1270	11/02/25 07:10:13	43.5
311	10/02/25 15:11:13	38.8	791	10/02/25 23:11:13	37.8	1271	11/02/25 07:11:13	42.2
312	10/02/25 15:12:13	35.4	792	10/02/25 23:12:13	31.3	1272	11/02/25 07:12:13	47.8
313	10/02/25 15:13:13	38.5	793	10/02/25 23:13:13	31.1	1273	11/02/25 07:13:13	36.9
314	10/02/25 15:14:13	34.4	794	10/02/25 23:14:13	34.4	1274	11/02/25 07:14:13	38.3
315	10/02/25 15:15:13	43.1	795	10/02/25 23:15:13	37	1275	11/02/25 07:15:13	40.4
316	10/02/25 15:16:13	35	796	10/02/25 23:16:13	34.2	1276	11/02/25 07:16:13	36
317	10/02/25 15:17:13	41.8	797	10/02/25 23:17:13	36.6	1277	11/02/25 07:17:13	39.8
318	10/02/25 15:18:13	43.2	798	10/02/25 23:18:13	39.2	1278	11/02/25 07:18:13	43.9
319	10/02/25 15:19:13	42.3	799	10/02/25 23:19:13	30.1	1279	11/02/25 07:19:13	41.1
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322	10/02/25 15:22:13	40.6	802	10/02/25 23:22:13	33.9	1282	11/02/25 07:22:13	35.4
323	10/02/25 15:23:13	32.1	803	10/02/25 23:23:13	30.2	1283	11/02/25 07:23:13	44.6
324	10/02/25 15:24:13	37.6	804	10/02/25 23:24:13	34.4	1284	11/02/25 07:24:13	46.8
325	10/02/25 15:25:13	42	805	10/02/25 23:25:13	31.6	1285	11/02/25 07:25:13	39.8
326	10/02/25 15:26:13	36.5	806	10/02/25 23:26:13	40	1286	11/02/25 07:26:13	47.1
327	10/02/25 15:27:13	40.5	807	10/02/25 23:27:13	39.5	1287	11/02/25 07:27:13	44.9
328	10/02/25 15:28:13	40.7	808	10/02/25 23:28:13	31.3	1288	11/02/25 07:28:13	43.6
329	10/02/25 15:29:13	43.8	809	10/02/25 23:29:13	34.3	1289	11/02/25 07:29:13	35.7
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332	10/02/25 15:32:13	41.2	812	10/02/25 23:32:13	35	1292	11/02/25 07:32:13	37.3
333	10/02/25 15:33:13	33.6	813	10/02/25 23:33:13	31.9	1293	11/02/25 07:33:13	49
334	10/02/25 15:34:13	37	814	10/02/25 23:34:13	38	1294	11/02/25 07:34:13	39.1
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337	10/02/25 15:37:13	33	817	10/02/25 23:37:13	36.8	1297	11/02/25 07:37:13	44.7
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340	10/02/25 15:40:13	40.2	820	10/02/25 23:40:13	35.7	1300	11/02/25 07:40:13	36
341	10/02/25 15:41:13	31.8	821	10/02/25 23:41:13	39.4	1301	11/02/25 07:41:13	45
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343	10/02/25 15:43:13	31.6	823	10/02/25 23:43:13	31.1	1303	11/02/25 07:43:13	46.8
344	10/02/25 15:44:13	44.3	824	10/02/25 23:44:13	34.9	1304	11/02/25 07:44:13	35.4
345	10/02/25 15:45:13	45	825	10/02/25 23:45:13	36.5	1305	11/02/25 07:45:13	48.2
346	10/02/25 15:46:13	42.3	826	10/02/25 23:46:13	30.5	1306	11/02/25 07:46:13	37.1
347	10/02/25 15:47:13	41.7	827	10/02/25 23:47:13	35.8	1307	11/02/25 07:47:13	42.9
348	10/02/25 15:48:13	38	828	10/02/25 23:48:13	35.2	1308	11/02/25 07:48:13	39.1
349	10/02/25 15:49:13	34.1	829	10/02/25 23:49:13	30.8	1309	11/02/25 07:49:13	46.2
350	10/02/25 15:50:13	41.2	830	10/02/25 23:50:13	33.9	1310	11/02/25 07:50:13	44.2
351	10/02/25 15:51:13	38	831	10/02/25 23:51:13	38.4	1311	11/02/25 07:51:13	44.5
352	10/02/25 15:52:13	35.2	832	10/02/25 23:52:13	31.5	1312	11/02/25 07:52:13	44.3
353	10/02/25 15:53:13	37	833	10/02/25 23:53:13	31.4	1313	11/02/25 07:53:13	46
354	10/02/25 15:54:13	40.6	834	10/02/25 23:54:13	30.9	1314	11/02/25 07:54:13	47.9
355	10/02/25 15:55:13	39	835	10/02/25 23:55:13	30.4	1315	11/02/25 07:55:13	42.7

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358	10/02/25 15:58:13	43.6	838	10/02/25 23:58:13	32.2	1318	11/02/25 07:58:13	46.7
359	10/02/25 15:59:13	30.7	839	10/02/25 23:59:13	30.8	1319	11/02/25 07:59:13	36.6
360	10/02/25 16:00:13	44.6	840	11/02/25 00:00:13	37.5	1320	11/02/25 08:00:13	35.9
361	10/02/25 16:01:13	40.5	841	11/02/25 00:01:13	35.5	1321	11/02/25 08:01:13	48.2
362	10/02/25 16:02:13	36.8	842	11/02/25 00:02:13	39	1322	11/02/25 08:02:13	37.1
363	10/02/25 16:03:13	38	843	11/02/25 00:03:13	36.4	1323	11/02/25 08:03:13	36
364	10/02/25 16:04:13	31.7	844	11/02/25 00:04:13	38.3	1324	11/02/25 08:04:13	35.2
365	10/02/25 16:05:13	45	845	11/02/25 00:05:13	38.9	1325	11/02/25 08:05:13	44.6
366	10/02/25 16:06:13	44.9	846	11/02/25 00:06:13	37.6	1326	11/02/25 08:06:13	46.3
367	10/02/25 16:07:13	41.5	847	11/02/25 00:07:13	31.8	1327	11/02/25 08:07:13	46.4
368	10/02/25 16:08:13	40.2	848	11/02/25 00:08:13	32.8	1328	11/02/25 08:08:13	35.4
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373	10/02/25 16:13:13	44.1	853	11/02/25 00:13:13	39.7	1333	11/02/25 08:13:13	42.2
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375	10/02/25 16:15:13	41.5	855	11/02/25 00:15:13	36.3	1335	11/02/25 08:15:13	41.4
376	10/02/25 16:16:13	35.9	856	11/02/25 00:16:13	35.5	1336	11/02/25 08:16:13	48.4
377	10/02/25 16:17:13	41.8	857	11/02/25 00:17:13	30.8	1337	11/02/25 08:17:13	41.3
378	10/02/25 16:18:13	39.9	858	11/02/25 00:18:13	38.2	1338	11/02/25 08:18:13	36.3
379	10/02/25 16:19:13	39.3	859	11/02/25 00:19:13	33.2	1339	11/02/25 08:19:13	43.7
380	10/02/25 16:20:13	40.8	860	11/02/25 00:20:13	30.2	1340	11/02/25 08:20:13	48.4
381	10/02/25 16:21:13	34.8	861	11/02/25 00:21:13	32.7	1341	11/02/25 08:21:13	42.4
382	10/02/25 16:22:13	33.6	862	11/02/25 00:22:13	33.2	1342	11/02/25 08:22:13	47.5
383	10/02/25 16:23:13	42.5	863	11/02/25 00:23:13	31.4	1343	11/02/25 08:23:13	44.4
384	10/02/25 16:24:13	41.8	864	11/02/25 00:24:13	35.7	1344	11/02/25 08:24:13	47.6
385	10/02/25 16:25:13	41.5	865	11/02/25 00:25:13	37.3	1345	11/02/25 08:25:13	36.8
386	10/02/25 16:26:13	43.4	866	11/02/25 00:26:13	36.3	1346	11/02/25 08:26:13	36.9
387	10/02/25 16:27:13	35.7	867	11/02/25 00:27:13	36	1347	11/02/25 08:27:13	37.6
388	10/02/25 16:28:13	42.4	868	11/02/25 00:28:13	34.5	1348	11/02/25 08:28:13	41.1
389	10/02/25 16:29:13	43.1	869	11/02/25 00:29:13	34.4	1349	11/02/25 08:29:13	39
390	10/02/25 16:30:13	32.8	870	11/02/25 00:30:13	34.3	1350	11/02/25 08:30:13	38
391	10/02/25 16:31:13	40	871	11/02/25 00:31:13	32.9	1351	11/02/25 08:31:13	40.9
392	10/02/25 16:32:13	42.4	872	11/02/25 00:32:13	35.9	1352	11/02/25 08:32:13	47.3
393	10/02/25 16:33:13	37.7	873	11/02/25 00:33:13	34.6	1353	11/02/25 08:33:13	36.4
394	10/02/25 16:34:13	44.7	874	11/02/25 00:34:13	34.2	1354	11/02/25 08:34:13	40.1
395	10/02/25 16:35:13	43.4	875	11/02/25 00:35:13	36.1	1355	11/02/25 08:35:13	47.5
396	10/02/25 16:36:13	32.8	876	11/02/25 00:36:13	36.1	1356	11/02/25 08:36:13	49
397	10/02/25 16:37:13	44.2	877	11/02/25 00:37:13	31.6	1357	11/02/25 08:37:13	37.2
398	10/02/25 16:38:13	44.8	878	11/02/25 00:38:13	34.9	1358	11/02/25 08:38:13	46.3
399	10/02/25 16:39:13	44.3	879	11/02/25 00:39:13	32.6	1359	11/02/25 08:39:13	36.4
400	10/02/25 16:40:13	42.9	880	11/02/25 00:40:13	38.1	1360	11/02/25 08:40:13	47.5
401	10/02/25 16:41:13	45	881	11/02/25 00:41:13	38.1	1361	11/02/25 08:41:13	37.5
402	10/02/25 16:42:13	35.1	882	11/02/25 00:42:13	39.5	1362	11/02/25 08:42:13	39.9
403	10/02/25 16:43:13	31	883	11/02/25 00:43:13	37.4	1363	11/02/25 08:43:13	46.7
404	10/02/25 16:44:13	44.8	884	11/02/25 00:44:13	37.9	1364	11/02/25 08:44:13	48.2
405	10/02/25 16:45:13	37.6	885	11/02/25 00:45:13	38.2	1365	11/02/25 08:45:13	35.6
406	10/02/25 16:46:13	35.4	886	11/02/25 00:46:13	33.7	1366	11/02/25 08:46:13	42.4

Data_Record

407	10/02/25 16:47:13	31.1	887	11/02/25 00:47:13	37.3	1367	11/02/25 08:47:13	44.6
408	10/02/25 16:48:13	36.4	888	11/02/25 00:48:13	34.5	1368	11/02/25 08:48:13	42.6
409	10/02/25 16:49:13	37.8	889	11/02/25 00:49:13	35	1369	11/02/25 08:49:13	48.6
410	10/02/25 16:50:13	39.3	890	11/02/25 00:50:13	38.5	1370	11/02/25 08:50:13	44.5
411	10/02/25 16:51:13	31.8	891	11/02/25 00:51:13	38.6	1371	11/02/25 08:51:13	40.5
412	10/02/25 16:52:13	38.1	892	11/02/25 00:52:13	31.6	1372	11/02/25 08:52:13	38.3
413	10/02/25 16:53:13	30.3	893	11/02/25 00:53:13	31.5	1373	11/02/25 08:53:13	36.3
414	10/02/25 16:54:13	44.7	894	11/02/25 00:54:13	31.7	1374	11/02/25 08:54:13	35.9
415	10/02/25 16:55:13	39.1	895	11/02/25 00:55:13	37.8	1375	11/02/25 08:55:13	49.5
416	10/02/25 16:56:13	40.5	896	11/02/25 00:56:13	33.8	1376	11/02/25 08:56:13	49
417	10/02/25 16:57:13	33.5	897	11/02/25 00:57:13	39.6	1377	11/02/25 08:57:13	39.8
418	10/02/25 16:58:13	31	898	11/02/25 00:58:13	34.3	1378	11/02/25 08:58:13	37
419	10/02/25 16:59:13	37.8	899	11/02/25 00:59:13	36.5	1379	11/02/25 08:59:13	46.6
420	10/02/25 17:00:13	39.4	900	11/02/25 01:00:13	32.7	1380	11/02/25 09:00:13	51
421	10/02/25 17:01:13	42.8	901	11/02/25 01:01:13	30.2	1381	11/02/25 09:01:13	40.5
422	10/02/25 17:02:13	40.9	902	11/02/25 01:02:13	39.7	1382	11/02/25 09:02:13	48
423	10/02/25 17:03:13	42.9	903	11/02/25 01:03:13	32.8	1383	11/02/25 09:03:13	52.7
424	10/02/25 17:04:13	34.6	904	11/02/25 01:04:13	36.1	1384	11/02/25 09:04:13	51.2
425	10/02/25 17:05:13	37.3	905	11/02/25 01:05:13	38	1385	11/02/25 09:05:13	43.7
426	10/02/25 17:06:13	44.6	906	11/02/25 01:06:13	38.1	1386	11/02/25 09:06:13	38
427	10/02/25 17:07:13	35.4	907	11/02/25 01:07:13	37.3	1387	11/02/25 09:07:13	39.2
428	10/02/25 17:08:13	31.8	908	11/02/25 01:08:13	36.6	1388	11/02/25 09:08:13	49.8
429	10/02/25 17:09:13	30.2	909	11/02/25 01:09:13	32.3	1389	11/02/25 09:09:13	48.8
430	10/02/25 17:10:13	36.6	910	11/02/25 01:10:13	33.3	1390	11/02/25 09:10:13	41.3
431	10/02/25 17:11:13	38.2	911	11/02/25 01:11:13	37.9	1391	11/02/25 09:11:13	52.3
432	10/02/25 17:12:13	39.8	912	11/02/25 01:12:13	32.5	1392	11/02/25 09:12:13	49.2
433	10/02/25 17:13:13	39.1	913	11/02/25 01:13:13	34.6	1393	11/02/25 09:13:13	46.1
434	10/02/25 17:14:13	37.5	914	11/02/25 01:14:13	37.2	1394	11/02/25 09:14:13	45.7
435	10/02/25 17:15:13	36.8	915	11/02/25 01:15:13	36.9	1395	11/02/25 09:15:13	38.4
436	10/02/25 17:16:13	31.3	916	11/02/25 01:16:13	34.9	1396	11/02/25 09:16:13	41.7
437	10/02/25 17:17:13	33.8	917	11/02/25 01:17:13	33.3	1397	11/02/25 09:17:13	38.8
438	10/02/25 17:18:13	31.7	918	11/02/25 01:18:13	32.7	1398	11/02/25 09:18:13	42.3
439	10/02/25 17:19:13	35.7	919	11/02/25 01:19:13	35.7	1399	11/02/25 09:19:13	42.9
440	10/02/25 17:20:13	44.3	920	11/02/25 01:20:13	38.5	1400	11/02/25 09:20:13	42.1
441	10/02/25 17:21:13	37.4	921	11/02/25 01:21:13	33.8	1401	11/02/25 09:21:13	44.8
442	10/02/25 17:22:13	42.3	922	11/02/25 01:22:13	30.4	1402	11/02/25 09:22:13	46.8
443	10/02/25 17:23:13	40.5	923	11/02/25 01:23:13	33.2	1403	11/02/25 09:23:13	51.5
444	10/02/25 17:24:13	37.3	924	11/02/25 01:24:13	31	1404	11/02/25 09:24:13	44.9
445	10/02/25 17:25:13	32.5	925	11/02/25 01:25:13	39.9	1405	11/02/25 09:25:13	39.9
446	10/02/25 17:26:13	39.3	926	11/02/25 01:26:13	31.9	1406	11/02/25 09:26:13	51
447	10/02/25 17:27:13	33.5	927	11/02/25 01:27:13	36.5	1407	11/02/25 09:27:13	47
448	10/02/25 17:28:13	36	928	11/02/25 01:28:13	38.6	1408	11/02/25 09:28:13	47.7
449	10/02/25 17:29:13	33.5	929	11/02/25 01:29:13	36	1409	11/02/25 09:29:13	46.3
450	10/02/25 17:30:13	36.7	930	11/02/25 01:30:13	30.2	1410	11/02/25 09:30:13	38.9
451	10/02/25 17:31:13	30.3	931	11/02/25 01:31:13	36.1	1411	11/02/25 09:31:13	38.2
452	10/02/25 17:32:13	38.4	932	11/02/25 01:32:13	32.2	1412	11/02/25 09:32:13	51.9
453	10/02/25 17:33:13	38.6	933	11/02/25 01:33:13	34.6	1413	11/02/25 09:33:13	46.7
454	10/02/25 17:34:13	37.2	934	11/02/25 01:34:13	32.7	1414	11/02/25 09:34:13	38.8
455	10/02/25 17:35:13	44.8	935	11/02/25 01:35:13	38.2	1415	11/02/25 09:35:13	42.8
456	10/02/25 17:36:13	30.1	936	11/02/25 01:36:13	31.6	1416	11/02/25 09:36:13	46.7
457	10/02/25 17:37:13	36.2	937	11/02/25 01:37:13	38	1417	11/02/25 09:37:13	47.8

Data_Record

458	10/02/25 17:38:13	32.3	938	11/02/25 01:38:13	31.3	1418	11/02/25 09:38:13	41.8
459	10/02/25 17:39:13	38.5	939	11/02/25 01:39:13	32.2	1419	11/02/25 09:39:13	39.7
460	10/02/25 17:40:13	35.8	940	11/02/25 01:40:13	33.2	1420	11/02/25 09:40:13	50
461	10/02/25 17:41:13	40.3	941	11/02/25 01:41:13	32.1	1421	11/02/25 09:41:13	44.9
462	10/02/25 17:42:13	39	942	11/02/25 01:42:13	38.7	1422	11/02/25 09:42:13	40.1
463	10/02/25 17:43:13	44.2	943	11/02/25 01:43:13	37.2	1423	11/02/25 09:43:13	43.1
464	10/02/25 17:44:13	35.8	944	11/02/25 01:44:13	37.4	1424	11/02/25 09:44:13	49.1
465	10/02/25 17:45:13	31.4	945	11/02/25 01:45:13	34.8	1425	11/02/25 09:45:13	41.7
466	10/02/25 17:46:13	40.5	946	11/02/25 01:46:13	30.1	1426	11/02/25 09:46:13	43.6
467	10/02/25 17:47:13	33.2	947	11/02/25 01:47:13	30.9	1427	11/02/25 09:47:13	46.3
468	10/02/25 17:48:13	30	948	11/02/25 01:48:13	39.4	1428	11/02/25 09:48:13	49.7
469	10/02/25 17:49:13	42.9	949	11/02/25 01:49:13	39.6	1429	11/02/25 09:49:13	43
470	10/02/25 17:50:13	30.9	950	11/02/25 01:50:13	36.2	1430	11/02/25 09:50:13	42.9
471	10/02/25 17:51:13	43.1	951	11/02/25 01:51:13	36.2	1431	11/02/25 09:51:13	47.4
472	10/02/25 17:52:13	38.3	952	11/02/25 01:52:13	33.7	1432	11/02/25 09:52:13	39.5
473	10/02/25 17:53:13	35.4	953	11/02/25 01:53:13	31.4	1433	11/02/25 09:53:13	52.6
474	10/02/25 17:54:13	44.9	954	11/02/25 01:54:13	34.3	1434	11/02/25 09:54:13	40.1
475	10/02/25 17:55:13	41.5	955	11/02/25 01:55:13	36.6	1435	11/02/25 09:55:13	50.3
476	10/02/25 17:56:13	42.8	956	11/02/25 01:56:13	31.9	1436	11/02/25 09:56:13	46.2
477	10/02/25 17:57:13	33.7	957	11/02/25 01:57:13	33.7	1437	11/02/25 09:57:13	44.9
478	10/02/25 17:58:13	32.1	958	11/02/25 01:58:13	30.6	1438	11/02/25 09:58:13	41.4
479	10/02/25 17:59:13	34.7	959	11/02/25 01:59:13	32.4	1439	11/02/25 09:59:13	48.9
480	10/02/25 18:00:13	43	960	11/02/25 02:00:13	30.8	1440	11/02/25 10:00:13	48.4

Raw Data Sheet for Day-3 (T-3/0)

Data_Record

Record	Time	Noise (dB)	Record	Time	Noise (dB)	Record	Time	Noise (dB)
1	11/02/25 09:57:30	37.1	481	11/02/25 17:57:30	45.4	961	12/02/25 01:57:30	37.7
2	11/02/25 09:58:30	41.5	482	11/02/25 17:58:30	44.8	962	12/02/25 01:58:30	37
3	11/02/25 09:59:30	34.6	483	11/02/25 17:59:30	34.9	963	12/02/25 01:59:30	39
4	11/02/25 10:00:30	40.9	484	11/02/25 18:00:30	36.6	964	12/02/25 02:00:30	39.2
5	11/02/25 10:01:30	45.4	485	11/02/25 18:01:30	31.1	965	12/02/25 02:01:30	39.6
6	11/02/25 10:02:30	42.1	486	11/02/25 18:02:30	32.2	966	12/02/25 02:02:30	39.8
7	11/02/25 10:03:30	35.5	487	11/02/25 18:03:30	31.2	967	12/02/25 02:03:30	39.8
8	11/02/25 10:04:30	46.6	488	11/02/25 18:04:30	38.8	968	12/02/25 02:04:30	36.5
9	11/02/25 10:05:30	46.1	489	11/02/25 18:05:30	39	969	12/02/25 02:05:30	39.1
10	11/02/25 10:06:30	33.4	490	11/02/25 18:06:30	34.9	970	12/02/25 02:06:30	35.4
11	11/02/25 10:07:30	35	491	11/02/25 18:07:30	36	971	12/02/25 02:07:30	39.2
12	11/02/25 10:08:30	38	492	11/02/25 18:08:30	30.1	972	12/02/25 02:08:30	39.9
13	11/02/25 10:09:30	37.7	493	11/02/25 18:09:30	31.8	973	12/02/25 02:09:30	35.7
14	11/02/25 10:10:30	44.1	494	11/02/25 18:10:30	32	974	12/02/25 02:10:30	35.1
15	11/02/25 10:11:30	36.3	495	11/02/25 18:11:30	32.7	975	12/02/25 02:11:30	38.4
16	11/02/25 10:12:30	37.3	496	11/02/25 18:12:30	38.4	976	12/02/25 02:12:30	35.4
17	11/02/25 10:13:30	38.8	497	11/02/25 18:13:30	36.9	977	12/02/25 02:13:30	39.4
18	11/02/25 10:14:30	40.9	498	11/02/25 18:14:30	30.9	978	12/02/25 02:14:30	38.1
19	11/02/25 10:15:30	44.6	499	11/02/25 18:15:30	30.9	979	12/02/25 02:15:30	35.2
20	11/02/25 10:16:30	32.3	500	11/02/25 18:16:30	38.5	980	12/02/25 02:16:30	35.1
21	11/02/25 10:17:30	40.4	501	11/02/25 18:17:30	34.6	981	12/02/25 02:17:30	39.1
22	11/02/25 10:18:30	44.6	502	11/02/25 18:18:30	40	982	12/02/25 02:18:30	37
23	11/02/25 10:19:30	33.9	503	11/02/25 18:19:30	39.4	983	12/02/25 02:19:30	31.5
24	11/02/25 10:20:30	36.8	504	11/02/25 18:20:30	30.2	984	12/02/25 02:20:30	35.5
25	11/02/25 10:21:30	42.9	505	11/02/25 18:21:30	33.2	985	12/02/25 02:21:30	32.4
26	11/02/25 10:22:30	32.7	506	11/02/25 18:22:30	31.4	986	12/02/25 02:22:30	37.3
27	11/02/25 10:23:30	43.3	507	11/02/25 18:23:30	36.3	987	12/02/25 02:23:30	38.9
28	11/02/25 10:24:30	45.4	508	11/02/25 18:24:30	30.1	988	12/02/25 02:24:30	36.1
29	11/02/25 10:25:30	37	509	11/02/25 18:25:30	32.5	989	12/02/25 02:25:30	35.4
30	11/02/25 10:26:30	34.5	510	11/02/25 18:26:30	39.3	990	12/02/25 02:26:30	35.8
31	11/02/25 10:27:30	37.1	511	11/02/25 18:27:30	30.9	991	12/02/25 02:27:30	35.9
32	11/02/25 10:28:30	41.5	512	11/02/25 18:28:30	31.4	992	12/02/25 02:28:30	36.6
33	11/02/25 10:29:30	33.4	513	11/02/25 18:29:30	31.3	993	12/02/25 02:29:30	36.3
34	11/02/25 10:30:30	33.5	514	11/02/25 18:30:30	35.7	994	12/02/25 02:30:30	35
35	11/02/25 10:31:30	43.7	515	11/02/25 18:31:30	32.8	995	12/02/25 02:31:30	37.4
36	11/02/25 10:32:30	38	516	11/02/25 18:32:30	30.2	996	12/02/25 02:32:30	37.6
37	11/02/25 10:33:30	43.7	517	11/02/25 18:33:30	32.1	997	12/02/25 02:33:30	36.4
38	11/02/25 10:34:30	37.7	518	11/02/25 18:34:30	32.5	998	12/02/25 02:34:30	35.2
39	11/02/25 10:35:30	32.5	519	11/02/25 18:35:30	35.7	999	12/02/25 02:35:30	36.9
40	11/02/25 10:36:30	38.5	520	11/02/25 18:36:30	37	1000	12/02/25 02:36:30	35.1
41	11/02/25 10:37:30	34.4	521	11/02/25 18:37:30	30.2	1001	12/02/25 02:37:30	36.2
42	11/02/25 10:38:30	38.7	522	11/02/25 18:38:30	34.2	1002	12/02/25 02:38:30	38.7
43	11/02/25 10:39:30	40.1	523	11/02/25 18:39:30	32.2	1003	12/02/25 02:39:30	36.9
44	11/02/25 10:40:30	33.5	524	11/02/25 18:40:30	31.1	1004	12/02/25 02:40:30	36.3
45	11/02/25 10:41:30	42.2	525	11/02/25 18:41:30	32.3	1005	12/02/25 02:41:30	37
46	11/02/25 10:42:30	45.5	526	11/02/25 18:42:30	30.1	1006	12/02/25 02:42:30	37
47	11/02/25 10:43:30	44.8	527	11/02/25 18:43:30	36.8	1007	12/02/25 02:43:30	39.3
48	11/02/25 10:44:30	38.2	528	11/02/25 18:44:30	33.6	1008	12/02/25 02:44:30	39.3
49	11/02/25 10:45:30	42.1	529	11/02/25 18:45:30	36.5	1009	12/02/25 02:45:30	35.2

Data_Record

50	11/02/25 10:46:30	33.9	530	11/02/25 18:46:30	31.8	1010	12/02/25 02:46:30	39.4
51	11/02/25 10:47:30	44.1	531	11/02/25 18:47:30	36	1011	12/02/25 02:47:30	39.8
52	11/02/25 10:48:30	38.9	532	11/02/25 18:48:30	35	1012	12/02/25 02:48:30	35.8
53	11/02/25 10:49:30	34	533	11/02/25 18:49:30	34.8	1013	12/02/25 02:49:30	39.3
54	11/02/25 10:50:30	46.7	534	11/02/25 18:50:30	33.5	1014	12/02/25 02:50:30	35
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66	11/02/25 11:02:30	43	546	11/02/25 19:02:30	39.9	1026	12/02/25 03:02:30	38.1
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98	11/02/25 11:34:30	37.6	578	11/02/25 19:34:30	36.2	1058	12/02/25 03:34:30	39.8
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Data_Record

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141	11/02/25 12:17:30	40.2	621	11/02/25 20:17:30	30.4	1101	12/02/25 04:17:30	35.5
142	11/02/25 12:18:30	40.7	622	11/02/25 20:18:30	32.7	1102	12/02/25 04:18:30	37.1
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145	11/02/25 12:21:30	43.5	625	11/02/25 20:21:30	30.2	1105	12/02/25 04:21:30	36.5
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187	11/02/25 13:03:30	40.6	667	11/02/25 21:03:30	38.3	1147	12/02/25 05:03:30	36.6
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189	11/02/25 13:05:30	46.3	669	11/02/25 21:05:30	32.5	1149	12/02/25 05:05:30	37.8
190	11/02/25 13:06:30	44.1	670	11/02/25 21:06:30	36.5	1150	12/02/25 05:06:30	35.3
191	11/02/25 13:07:30	42.5	671	11/02/25 21:07:30	35	1151	12/02/25 05:07:30	38.4
192	11/02/25 13:08:30	46.8	672	11/02/25 21:08:30	35.3	1152	12/02/25 05:08:30	37.1
193	11/02/25 13:09:30	38.2	673	11/02/25 21:09:30	36.1	1153	12/02/25 05:09:30	36
194	11/02/25 13:10:30	32.5	674	11/02/25 21:10:30	40	1154	12/02/25 05:10:30	39.8
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196	11/02/25 13:12:30	41.2	676	11/02/25 21:12:30	37.8	1156	12/02/25 05:12:30	35.8
197	11/02/25 13:13:30	45.5	677	11/02/25 21:13:30	35.1	1157	12/02/25 05:13:30	35.8
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199	11/02/25 13:15:30	38.3	679	11/02/25 21:15:30	39.5	1159	12/02/25 05:15:30	39.9
200	11/02/25 13:16:30	37.1	680	11/02/25 21:16:30	37	1160	12/02/25 05:16:30	35
201	11/02/25 13:17:30	46.1	681	11/02/25 21:17:30	37.9	1161	12/02/25 05:17:30	35.2
202	11/02/25 13:18:30	35.1	682	11/02/25 21:18:30	36.9	1162	12/02/25 05:18:30	38.1

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204	11/02/25 13:20:30	33.4	684	11/02/25 21:20:30	35.8	1164	12/02/25 05:20:30	38.2
205	11/02/25 13:21:30	41.2	685	11/02/25 21:21:30	38.2	1165	12/02/25 05:21:30	35.4
206	11/02/25 13:22:30	36.8	686	11/02/25 21:22:30	39.3	1166	12/02/25 05:22:30	39.4
207	11/02/25 13:23:30	32.2	687	11/02/25 21:23:30	35.5	1167	12/02/25 05:23:30	36
208	11/02/25 13:24:30	46.3	688	11/02/25 21:24:30	37.8	1168	12/02/25 05:24:30	39.9
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273	11/02/25 14:29:30	40.3	753	11/02/25 22:29:30	35.2	1233	12/02/25 06:29:30	41.2
274	11/02/25 14:30:30	35.2	754	11/02/25 22:30:30	36.3	1234	12/02/25 06:30:30	32.7
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280	11/02/25 14:36:30	41.5	760	11/02/25 22:36:30	38.7	1240	12/02/25 06:36:30	37.4
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292	11/02/25 14:48:30	43.8	772	11/02/25 22:48:30	35.9	1252	12/02/25 06:48:30	42.4
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295	11/02/25 14:51:30	42.3	775	11/02/25 22:51:30	37.4	1255	12/02/25 06:51:30	41.1
296	11/02/25 14:52:30	46.5	776	11/02/25 22:52:30	36.6	1256	12/02/25 06:52:30	41.2
297	11/02/25 14:53:30	38.9	777	11/02/25 22:53:30	37.6	1257	12/02/25 06:53:30	42.2
298	11/02/25 14:54:30	36.9	778	11/02/25 22:54:30	38.7	1258	12/02/25 06:54:30	38.4
299	11/02/25 14:55:30	32.7	779	11/02/25 22:55:30	39.4	1259	12/02/25 06:55:30	46.1
300	11/02/25 14:56:30	33.2	780	11/02/25 22:56:30	39.2	1260	12/02/25 06:56:30	32.4
301	11/02/25 14:57:30	33.1	781	11/02/25 22:57:30	35.9	1261	12/02/25 06:57:30	32.7
302	11/02/25 14:58:30	34.3	782	11/02/25 22:58:30	39.8	1262	12/02/25 06:58:30	42.5
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304	11/02/25 15:00:30	43.5	784	11/02/25 23:00:30	36.7	1264	12/02/25 07:00:30	34.7

Data_Record

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307	11/02/25 15:03:30	32.5	787	11/02/25 23:03:30	37.2	1267	12/02/25 07:03:30	43.6
308	11/02/25 15:04:30	32.4	788	11/02/25 23:04:30	38.8	1268	12/02/25 07:04:30	46.5
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311	11/02/25 15:07:30	41	791	11/02/25 23:07:30	39.1	1271	12/02/25 07:07:30	32.4
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313	11/02/25 15:09:30	46.2	793	11/02/25 23:09:30	39.5	1273	12/02/25 07:09:30	45
314	11/02/25 15:10:30	36.8	794	11/02/25 23:10:30	35.8	1274	12/02/25 07:10:30	34.1
315	11/02/25 15:11:30	45.4	795	11/02/25 23:11:30	39.7	1275	12/02/25 07:11:30	37.5
316	11/02/25 15:12:30	36.5	796	11/02/25 23:12:30	35.1	1276	12/02/25 07:12:30	33
317	11/02/25 15:13:30	36.2	797	11/02/25 23:13:30	35.7	1277	12/02/25 07:13:30	44.5
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343	11/02/25 15:39:30	33	823	11/02/25 23:39:30	36.9	1303	12/02/25 07:39:30	45.4
344	11/02/25 15:40:30	41.9	824	11/02/25 23:40:30	39.6	1304	12/02/25 07:40:30	37
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347	11/02/25 15:43:30	33.1	827	11/02/25 23:43:30	38.1	1307	12/02/25 07:43:30	44.3
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353	11/02/25 15:49:30	46.1	833	11/02/25 23:49:30	36.1	1313	12/02/25 07:49:30	35.5
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355	11/02/25 15:51:30	42.3	835	11/02/25 23:51:30	35.5	1315	12/02/25 07:51:30	39.3

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358	11/02/25 15:54:30	36.2	838	11/02/25 23:54:30	39.8	1318	12/02/25 07:54:30	41
359	11/02/25 15:55:30	42.2	839	11/02/25 23:55:30	35.1	1319	12/02/25 07:55:30	44.3
360	11/02/25 15:56:30	35.2	840	11/02/25 23:56:30	36.9	1320	12/02/25 07:56:30	37.6
361	11/02/25 15:57:30	44.9	841	11/02/25 23:57:30	38.7	1321	12/02/25 07:57:30	46.6
362	11/02/25 15:58:30	40.5	842	11/02/25 23:58:30	36	1322	12/02/25 07:58:30	37.3
363	11/02/25 15:59:30	37.9	843	11/02/25 23:59:30	36.9	1323	12/02/25 07:59:30	34.3
364	11/02/25 16:00:30	36.3	844	12/02/25 00:00:30	39.2	1324	12/02/25 08:00:30	35.3
365	11/02/25 16:01:30	37	845	12/02/25 00:01:30	38	1325	12/02/25 08:01:30	42.7
366	11/02/25 16:02:30	44.6	846	12/02/25 00:02:30	37.3	1326	12/02/25 08:02:30	32.4
367	11/02/25 16:03:30	46.1	847	12/02/25 00:03:30	38.3	1327	12/02/25 08:03:30	43.3
368	11/02/25 16:04:30	40.7	848	12/02/25 00:04:30	35.7	1328	12/02/25 08:04:30	33.4
369	11/02/25 16:05:30	39.7	849	12/02/25 00:05:30	38.9	1329	12/02/25 08:05:30	38.5
370	11/02/25 16:06:30	41.5	850	12/02/25 00:06:30	39.3	1330	12/02/25 08:06:30	45.1
371	11/02/25 16:07:30	39.9	851	12/02/25 00:07:30	35.6	1331	12/02/25 08:07:30	44.8
372	11/02/25 16:08:30	43.5	852	12/02/25 00:08:30	37.2	1332	12/02/25 08:08:30	39.4
373	11/02/25 16:09:30	45.1	853	12/02/25 00:09:30	38.1	1333	12/02/25 08:09:30	46.2
374	11/02/25 16:10:30	37.4	854	12/02/25 00:10:30	35.5	1334	12/02/25 08:10:30	44.9
375	11/02/25 16:11:30	35.1	855	12/02/25 00:11:30	39.4	1335	12/02/25 08:11:30	37.8
376	11/02/25 16:12:30	36.3	856	12/02/25 00:12:30	37	1336	12/02/25 08:12:30	39.2
377	11/02/25 16:13:30	46.6	857	12/02/25 00:13:30	36.1	1337	12/02/25 08:13:30	33.5
378	11/02/25 16:14:30	42.4	858	12/02/25 00:14:30	37.5	1338	12/02/25 08:14:30	37.5
379	11/02/25 16:15:30	40.6	859	12/02/25 00:15:30	38.8	1339	12/02/25 08:15:30	46.3
380	11/02/25 16:16:30	34.4	860	12/02/25 00:16:30	38.3	1340	12/02/25 08:16:30	40.8
381	11/02/25 16:17:30	44.2	861	12/02/25 00:17:30	36.5	1341	12/02/25 08:17:30	33.9
382	11/02/25 16:18:30	34.5	862	12/02/25 00:18:30	36.8	1342	12/02/25 08:18:30	45.4
383	11/02/25 16:19:30	46.5	863	12/02/25 00:19:30	39.5	1343	12/02/25 08:19:30	42.7
384	11/02/25 16:20:30	41.6	864	12/02/25 00:20:30	36.2	1344	12/02/25 08:20:30	32
385	11/02/25 16:21:30	38.4	865	12/02/25 00:21:30	37.5	1345	12/02/25 08:21:30	45.1
386	11/02/25 16:22:30	41.9	866	12/02/25 00:22:30	36.4	1346	12/02/25 08:22:30	42.5
387	11/02/25 16:23:30	40.9	867	12/02/25 00:23:30	38.3	1347	12/02/25 08:23:30	33.2
388	11/02/25 16:24:30	34.2	868	12/02/25 00:24:30	39	1348	12/02/25 08:24:30	41.2
389	11/02/25 16:25:30	40	869	12/02/25 00:25:30	38.2	1349	12/02/25 08:25:30	36.2
390	11/02/25 16:26:30	45.7	870	12/02/25 00:26:30	38.6	1350	12/02/25 08:26:30	42.5
391	11/02/25 16:27:30	34.7	871	12/02/25 00:27:30	35.1	1351	12/02/25 08:27:30	40.2
392	11/02/25 16:28:30	40	872	12/02/25 00:28:30	38.4	1352	12/02/25 08:28:30	36.2
393	11/02/25 16:29:30	43.9	873	12/02/25 00:29:30	39.4	1353	12/02/25 08:29:30	32.7
394	11/02/25 16:30:30	35.9	874	12/02/25 00:30:30	36.1	1354	12/02/25 08:30:30	36.1
395	11/02/25 16:31:30	40.4	875	12/02/25 00:31:30	38.3	1355	12/02/25 08:31:30	32.9
396	11/02/25 16:32:30	38.7	876	12/02/25 00:32:30	36.1	1356	12/02/25 08:32:30	45.7
397	11/02/25 16:33:30	41.8	877	12/02/25 00:33:30	35.1	1357	12/02/25 08:33:30	35.2
398	11/02/25 16:34:30	34.2	878	12/02/25 00:34:30	35.1	1358	12/02/25 08:34:30	46.6
399	11/02/25 16:35:30	42.9	879	12/02/25 00:35:30	37.7	1359	12/02/25 08:35:30	44
400	11/02/25 16:36:30	36.9	880	12/02/25 00:36:30	39.3	1360	12/02/25 08:36:30	32.1
401	11/02/25 16:37:30	32.2	881	12/02/25 00:37:30	38.1	1361	12/02/25 08:37:30	44.7
402	11/02/25 16:38:30	43	882	12/02/25 00:38:30	37.6	1362	12/02/25 08:38:30	38.7
403	11/02/25 16:39:30	38.6	883	12/02/25 00:39:30	39.4	1363	12/02/25 08:39:30	37.6
404	11/02/25 16:40:30	34.9	884	12/02/25 00:40:30	39.2	1364	12/02/25 08:40:30	33.8
405	11/02/25 16:41:30	40.1	885	12/02/25 00:41:30	39.5	1365	12/02/25 08:41:30	34.5
406	11/02/25 16:42:30	44.7	886	12/02/25 00:42:30	37.5	1366	12/02/25 08:42:30	36.2

Data_Record

407	11/02/25 16:43:30	42.7	887	12/02/25 00:43:30	36.1	1367	12/02/25 08:43:30	41.4
408	11/02/25 16:44:30	44.1	888	12/02/25 00:44:30	37.8	1368	12/02/25 08:44:30	37.4
409	11/02/25 16:45:30	39.8	889	12/02/25 00:45:30	36.2	1369	12/02/25 08:45:30	37.2
410	11/02/25 16:46:30	34.6	890	12/02/25 00:46:30	38.8	1370	12/02/25 08:46:30	41.8
411	11/02/25 16:47:30	39.2	891	12/02/25 00:47:30	35.8	1371	12/02/25 08:47:30	45.6
412	11/02/25 16:48:30	34.8	892	12/02/25 00:48:30	37.5	1372	12/02/25 08:48:30	43.4
413	11/02/25 16:49:30	34.8	893	12/02/25 00:49:30	38.7	1373	12/02/25 08:49:30	38.1
414	11/02/25 16:50:30	34.1	894	12/02/25 00:50:30	36.9	1374	12/02/25 08:50:30	39.6
415	11/02/25 16:51:30	35.4	895	12/02/25 00:51:30	37.5	1375	12/02/25 08:51:30	43.9
416	11/02/25 16:52:30	41.6	896	12/02/25 00:52:30	37.5	1376	12/02/25 08:52:30	44.4
417	11/02/25 16:53:30	45.6	897	12/02/25 00:53:30	37.5	1377	12/02/25 08:53:30	41.9
418	11/02/25 16:54:30	42.4	898	12/02/25 00:54:30	35.6	1378	12/02/25 08:54:30	42
419	11/02/25 16:55:30	46.1	899	12/02/25 00:55:30	39.6	1379	12/02/25 08:55:30	36.6
420	11/02/25 16:56:30	43.1	900	12/02/25 00:56:30	40	1380	12/02/25 08:56:30	43.4
421	11/02/25 16:57:30	36.4	901	12/02/25 00:57:30	35.3	1381	12/02/25 08:57:30	35.4
422	11/02/25 16:58:30	42.4	902	12/02/25 00:58:30	38.6	1382	12/02/25 08:58:30	35.8
423	11/02/25 16:59:30	39.1	903	12/02/25 00:59:30	39.6	1383	12/02/25 08:59:30	35.4
424	11/02/25 17:00:30	43.6	904	12/02/25 01:00:30	35.4	1384	12/02/25 09:00:30	45
425	11/02/25 17:01:30	35.7	905	12/02/25 01:01:30	38.8	1385	12/02/25 09:01:30	38.5
426	11/02/25 17:02:30	32.1	906	12/02/25 01:02:30	36.1	1386	12/02/25 09:02:30	38.1
427	11/02/25 17:03:30	44	907	12/02/25 01:03:30	39.4	1387	12/02/25 09:03:30	34.6
428	11/02/25 17:04:30	46.1	908	12/02/25 01:04:30	37.7	1388	12/02/25 09:04:30	44.9
429	11/02/25 17:05:30	39.9	909	12/02/25 01:05:30	39.7	1389	12/02/25 09:05:30	39
430	11/02/25 17:06:30	41.7	910	12/02/25 01:06:30	38.5	1390	12/02/25 09:06:30	38
431	11/02/25 17:07:30	41.5	911	12/02/25 01:07:30	35.2	1391	12/02/25 09:07:30	40.5
432	11/02/25 17:08:30	40.1	912	12/02/25 01:08:30	40	1392	12/02/25 09:08:30	32.1
433	11/02/25 17:09:30	45.4	913	12/02/25 01:09:30	35.7	1393	12/02/25 09:09:30	39.6
434	11/02/25 17:10:30	36.2	914	12/02/25 01:10:30	36.3	1394	12/02/25 09:10:30	46.7
435	11/02/25 17:11:30	37.1	915	12/02/25 01:11:30	38.7	1395	12/02/25 09:11:30	39.6
436	11/02/25 17:12:30	44.4	916	12/02/25 01:12:30	39.2	1396	12/02/25 09:12:30	44.5
437	11/02/25 17:13:30	46.4	917	12/02/25 01:13:30	40	1397	12/02/25 09:13:30	40.4
438	11/02/25 17:14:30	44.4	918	12/02/25 01:14:30	36.1	1398	12/02/25 09:14:30	32.9
439	11/02/25 17:15:30	33.9	919	12/02/25 01:15:30	39.1	1399	12/02/25 09:15:30	43.1
440	11/02/25 17:16:30	41	920	12/02/25 01:16:30	38	1400	12/02/25 09:16:30	36.6
441	11/02/25 17:17:30	42.1	921	12/02/25 01:17:30	38.5	1401	12/02/25 09:17:30	37.4
442	11/02/25 17:18:30	43.9	922	12/02/25 01:18:30	35.8	1402	12/02/25 09:18:30	34.7
443	11/02/25 17:19:30	45.1	923	12/02/25 01:19:30	35.6	1403	12/02/25 09:19:30	32.2
444	11/02/25 17:20:30	39.1	924	12/02/25 01:20:30	39.9	1404	12/02/25 09:20:30	33.5
445	11/02/25 17:21:30	45.1	925	12/02/25 01:21:30	37	1405	12/02/25 09:21:30	41.4
446	11/02/25 17:22:30	39.4	926	12/02/25 01:22:30	39.9	1406	12/02/25 09:22:30	45.6
447	11/02/25 17:23:30	44.7	927	12/02/25 01:23:30	38.6	1407	12/02/25 09:23:30	46.2
448	11/02/25 17:24:30	44.1	928	12/02/25 01:24:30	38.9	1408	12/02/25 09:24:30	45.2
449	11/02/25 17:25:30	34.8	929	12/02/25 01:25:30	37.9	1409	12/02/25 09:25:30	35.8
450	11/02/25 17:26:30	32.6	930	12/02/25 01:26:30	38.9	1410	12/02/25 09:26:30	34.9
451	11/02/25 17:27:30	46	931	12/02/25 01:27:30	39.7	1411	12/02/25 09:27:30	46.7
452	11/02/25 17:28:30	32.5	932	12/02/25 01:28:30	37.3	1412	12/02/25 09:28:30	37.5
453	11/02/25 17:29:30	45.1	933	12/02/25 01:29:30	38.4	1413	12/02/25 09:29:30	42
454	11/02/25 17:30:30	32.6	934	12/02/25 01:30:30	35.7	1414	12/02/25 09:30:30	33.9
455	11/02/25 17:31:30	36.5	935	12/02/25 01:31:30	35.9	1415	12/02/25 09:31:30	42
456	11/02/25 17:32:30	47	936	12/02/25 01:32:30	36	1416	12/02/25 09:32:30	40.5
457	11/02/25 17:33:30	35.7	937	12/02/25 01:33:30	36	1417	12/02/25 09:33:30	43.2

Data_Record

458	11/02/25 17:34:30	33.5	938	12/02/25 01:34:30	39.1	1418	12/02/25 09:34:30	40.8
459	11/02/25 17:35:30	32.2	939	12/02/25 01:35:30	38.4	1419	12/02/25 09:35:30	35.4
460	11/02/25 17:36:30	44	940	12/02/25 01:36:30	35.9	1420	12/02/25 09:36:30	32.4
461	11/02/25 17:37:30	33.5	941	12/02/25 01:37:30	35.4	1421	12/02/25 09:37:30	32.9
462	11/02/25 17:38:30	33	942	12/02/25 01:38:30	36.6	1422	12/02/25 09:38:30	39.3
463	11/02/25 17:39:30	46.3	943	12/02/25 01:39:30	37.6	1423	12/02/25 09:39:30	46.4
464	11/02/25 17:40:30	34.1	944	12/02/25 01:40:30	39.5	1424	12/02/25 09:40:30	36.4
465	11/02/25 17:41:30	33.6	945	12/02/25 01:41:30	38.5	1425	12/02/25 09:41:30	39
466	11/02/25 17:42:30	35	946	12/02/25 01:42:30	37	1426	12/02/25 09:42:30	45.8
467	11/02/25 17:43:30	35.5	947	12/02/25 01:43:30	38.5	1427	12/02/25 09:43:30	32.3
468	11/02/25 17:44:30	46.4	948	12/02/25 01:44:30	37.4	1428	12/02/25 09:44:30	35.5
469	11/02/25 17:45:30	36.3	949	12/02/25 01:45:30	39	1429	12/02/25 09:45:30	33.9
470	11/02/25 17:46:30	34.5	950	12/02/25 01:46:30	36.5	1430	12/02/25 09:46:30	36
471	11/02/25 17:47:30	35.3	951	12/02/25 01:47:30	36.2	1431	12/02/25 09:47:30	38.3
472	11/02/25 17:48:30	38.9	952	12/02/25 01:48:30	38.4	1432	12/02/25 09:48:30	44.2
473	11/02/25 17:49:30	37.2	953	12/02/25 01:49:30	35.3	1433	12/02/25 09:49:30	38.7
474	11/02/25 17:50:30	40.6	954	12/02/25 01:50:30	36.7	1434	12/02/25 09:50:30	44.9
475	11/02/25 17:51:30	39.8	955	12/02/25 01:51:30	39.6	1435	12/02/25 09:51:30	34.1
476	11/02/25 17:52:30	43.4	956	12/02/25 01:52:30	40	1436	12/02/25 09:52:30	43.5
477	11/02/25 17:53:30	44.7	957	12/02/25 01:53:30	36	1437	12/02/25 09:53:30	35.9
478	11/02/25 17:54:30	33.1	958	12/02/25 01:54:30	37.2	1438	12/02/25 09:54:30	36.1
479	11/02/25 17:55:30	42.2	959	12/02/25 01:55:30	37.9	1439	12/02/25 09:55:30	35.8
480	11/02/25 17:56:30	44.1	960	12/02/25 01:56:30	36	1440	12/02/25 09:56:30	33.4

Raw Data Sheet for Day-04 (T-2/3)

Data_Record

Record	Time	Noise (dB)	Record	Time	Noise (dB)	Record	Time	Noise (dB)
1	12/02/25 11:05:39	49.6	481	12/02/25 19:05:39	31.4	961	13/02/25 03:05:39	37.0
2	12/02/25 11:06:39	37.7	482	12/02/25 19:06:39	33.6	962	13/02/25 03:06:39	39.0
3	12/02/25 11:07:39	41.9	483	12/02/25 19:07:39	34.9	963	13/02/25 03:07:39	38.8
4	12/02/25 11:08:39	37.6	484	12/02/25 19:08:39	33.3	964	13/02/25 03:08:39	37.7
5	12/02/25 11:09:39	40.8	485	12/02/25 19:09:39	32.4	965	13/02/25 03:09:39	36.7
6	12/02/25 11:10:39	49.0	486	12/02/25 19:10:39	33.4	966	13/02/25 03:10:39	35.7
7	12/02/25 11:11:39	35.9	487	12/02/25 19:11:39	34.1	967	13/02/25 03:11:39	39.6
8	12/02/25 11:12:39	46.7	488	12/02/25 19:12:39	33.2	968	13/02/25 03:12:39	38.9
9	12/02/25 11:13:39	36.8	489	12/02/25 19:13:39	34.7	969	13/02/25 03:13:39	38.5
10	12/02/25 11:14:39	39.0	490	12/02/25 19:14:39	30.3	970	13/02/25 03:14:39	35.4
11	12/02/25 11:15:39	36.7	491	12/02/25 19:15:39	32.6	971	13/02/25 03:15:39	37.9
12	12/02/25 11:16:39	49.9	492	12/02/25 19:16:39	32.3	972	13/02/25 03:16:39	36.9
13	12/02/25 11:17:39	44.4	493	12/02/25 19:17:39	30.9	973	13/02/25 03:17:39	38.2
14	12/02/25 11:18:39	42.6	494	12/02/25 19:18:39	33.5	974	13/02/25 03:18:39	39.8
15	12/02/25 11:19:39	38.7	495	12/02/25 19:19:39	31.9	975	13/02/25 03:19:39	38.4
16	12/02/25 11:20:39	47.1	496	12/02/25 19:20:39	33.3	976	13/02/25 03:20:39	35.3
17	12/02/25 11:21:39	41.8	497	12/02/25 19:21:39	30.1	977	13/02/25 03:21:39	38.0
18	12/02/25 11:22:39	42.2	498	12/02/25 19:22:39	31.6	978	13/02/25 03:22:39	37.3
19	12/02/25 11:23:39	40.1	499	12/02/25 19:23:39	31.2	979	13/02/25 03:23:39	38.1
20	12/02/25 11:24:39	43.8	500	12/02/25 19:24:39	32.7	980	13/02/25 03:24:39	35.9
21	12/02/25 11:25:39	46.9	501	12/02/25 19:25:39	30.3	981	13/02/25 03:25:39	36.9
22	12/02/25 11:26:39	44.9	502	12/02/25 19:26:39	34.3	982	13/02/25 03:26:39	39.0
23	12/02/25 11:27:39	40.4	503	12/02/25 19:27:39	32.0	983	13/02/25 03:27:39	36.6
24	12/02/25 11:28:39	41.5	504	12/02/25 19:28:39	31.1	984	13/02/25 03:28:39	36.5
25	12/02/25 11:29:39	48.7	505	12/02/25 19:29:39	32.3	985	13/02/25 03:29:39	38.3
26	12/02/25 11:30:39	36.7	506	12/02/25 19:30:39	34.1	986	13/02/25 03:30:39	35.7
27	12/02/25 11:31:39	49.8	507	12/02/25 19:31:39	32.0	987	13/02/25 03:31:39	37.6
28	12/02/25 11:32:39	41.2	508	12/02/25 19:32:39	32.8	988	13/02/25 03:32:39	36.7
29	12/02/25 11:33:39	41.6	509	12/02/25 19:33:39	34.9	989	13/02/25 03:33:39	38.1
30	12/02/25 11:34:39	42.0	510	12/02/25 19:34:39	31.4	990	13/02/25 03:34:39	39.7
31	12/02/25 11:35:39	40.1	511	12/02/25 19:35:39	30.9	991	13/02/25 03:35:39	38.9
32	12/02/25 11:36:39	36.3	512	12/02/25 19:36:39	30.6	992	13/02/25 03:36:39	36.7
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43	12/02/25 11:47:39	49.9	523	12/02/25 19:47:39	32.3	1003	13/02/25 03:47:39	39.8
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94	12/02/25 12:38:39	45.5	574	12/02/25 20:38:39	31.8	1054	13/02/25 04:38:39	36.1
95	12/02/25 12:39:39	45.6	575	12/02/25 20:39:39	30.1	1055	13/02/25 04:39:39	39.6
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97	12/02/25 12:41:39	45.3	577	12/02/25 20:41:39	32.4	1057	13/02/25 04:41:39	35.5
98	12/02/25 12:42:39	41.6	578	12/02/25 20:42:39	34.2	1058	13/02/25 04:42:39	36.9
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104	12/02/25 12:48:39	36.2	584	12/02/25 20:48:39	32.8	1064	13/02/25 04:48:39	39.9
105	12/02/25 12:49:39	37.8	585	12/02/25 20:49:39	31.4	1065	13/02/25 04:49:39	37.0
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108	12/02/25 12:52:39	41.8	588	12/02/25 20:52:39	32.1	1068	13/02/25 04:52:39	36.9
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113	12/02/25 12:57:39	45.7	593	12/02/25 20:57:39	31.1	1073	13/02/25 04:57:39	35.8
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135	12/02/25 13:19:39	44.6	615	12/02/25 21:19:39	36.3	1095	13/02/25 05:19:39	36.6
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138	12/02/25 13:22:39	39.4	618	12/02/25 21:22:39	36.9	1098	13/02/25 05:22:39	38.7
139	12/02/25 13:23:39	48.0	619	12/02/25 21:23:39	39.4	1099	13/02/25 05:23:39	36.3
140	12/02/25 13:24:39	37.3	620	12/02/25 21:24:39	35.5	1100	13/02/25 05:24:39	39.4
141	12/02/25 13:25:39	38.6	621	12/02/25 21:25:39	38.2	1101	13/02/25 05:25:39	35.7
142	12/02/25 13:26:39	42.6	622	12/02/25 21:26:39	39.2	1102	13/02/25 05:26:39	35.7
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148	12/02/25 13:32:39	47.6	628	12/02/25 21:32:39	35.6	1108	13/02/25 05:32:39	37.3
149	12/02/25 13:33:39	39.7	629	12/02/25 21:33:39	35.3	1109	13/02/25 05:33:39	35.2
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154	12/02/25 13:38:39	46.9	634	12/02/25 21:38:39	35.2	1114	13/02/25 05:38:39	35.3
155	12/02/25 13:39:39	40.5	635	12/02/25 21:39:39	37.8	1115	13/02/25 05:39:39	35.9
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185	12/02/25 14:09:39	41.8	665	12/02/25 22:09:39	38.2	1145	13/02/25 06:09:39	32.1
186	12/02/25 14:10:39	30.8	666	12/02/25 22:10:39	35.9	1146	13/02/25 06:10:39	30.5
187	12/02/25 14:11:39	44.7	667	12/02/25 22:11:39	36.2	1147	13/02/25 06:11:39	32.7
188	12/02/25 14:12:39	42.3	668	12/02/25 22:12:39	37.2	1148	13/02/25 06:12:39	34.8
189	12/02/25 14:13:39	31.4	669	12/02/25 22:13:39	36.5	1149	13/02/25 06:13:39	34.0
190	12/02/25 14:14:39	39.9	670	12/02/25 22:14:39	39.3	1150	13/02/25 06:14:39	34.1
191	12/02/25 14:15:39	42.8	671	12/02/25 22:15:39	37.1	1151	13/02/25 06:15:39	34.8
192	12/02/25 14:16:39	37.1	672	12/02/25 22:16:39	36.0	1152	13/02/25 06:16:39	30.6
193	12/02/25 14:17:39	41.5	673	12/02/25 22:17:39	37.8	1153	13/02/25 06:17:39	34.2
194	12/02/25 14:18:39	33.4	674	12/02/25 22:18:39	36.0	1154	13/02/25 06:18:39	33.6
195	12/02/25 14:19:39	41.8	675	12/02/25 22:19:39	38.2	1155	13/02/25 06:19:39	33.5
196	12/02/25 14:20:39	41.5	676	12/02/25 22:20:39	37.5	1156	13/02/25 06:20:39	32.6
197	12/02/25 14:21:39	37.5	677	12/02/25 22:21:39	35.5	1157	13/02/25 06:21:39	31.3
198	12/02/25 14:22:39	41.6	678	12/02/25 22:22:39	36.3	1158	13/02/25 06:22:39	31.0
199	12/02/25 14:23:39	43.5	679	12/02/25 22:23:39	38.3	1159	13/02/25 06:23:39	30.3
200	12/02/25 14:24:39	34.1	680	12/02/25 22:24:39	37.6	1160	13/02/25 06:24:39	32.3
201	12/02/25 14:25:39	37.1	681	12/02/25 22:25:39	36.3	1161	13/02/25 06:25:39	35.0
202	12/02/25 14:26:39	31.3	682	12/02/25 22:26:39	38.8	1162	13/02/25 06:26:39	33.5

Data_Record

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205	12/02/25 14:29:39	33.8	685	12/02/25 22:29:39	39.0	1165	13/02/25 06:29:39	30.1
206	12/02/25 14:30:39	44.6	686	12/02/25 22:30:39	36.1	1166	13/02/25 06:30:39	34.7
207	12/02/25 14:31:39	44.8	687	12/02/25 22:31:39	39.6	1167	13/02/25 06:31:39	31.9
208	12/02/25 14:32:39	30.6	688	12/02/25 22:32:39	35.5	1168	13/02/25 06:32:39	34.1
209	12/02/25 14:33:39	41.4	689	12/02/25 22:33:39	38.0	1169	13/02/25 06:33:39	34.2
210	12/02/25 14:34:39	44.9	690	12/02/25 22:34:39	36.5	1170	13/02/25 06:34:39	34.5
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212	12/02/25 14:36:39	40.5	692	12/02/25 22:36:39	36.4	1172	13/02/25 06:36:39	34.5
213	12/02/25 14:37:39	33.4	693	12/02/25 22:37:39	36.4	1173	13/02/25 06:37:39	34.0
214	12/02/25 14:38:39	41.4	694	12/02/25 22:38:39	36.1	1174	13/02/25 06:38:39	30.4
215	12/02/25 14:39:39	40.0	695	12/02/25 22:39:39	39.2	1175	13/02/25 06:39:39	34.1
216	12/02/25 14:40:39	32.7	696	12/02/25 22:40:39	38.2	1176	13/02/25 06:40:39	34.0
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219	12/02/25 14:43:39	43.5	699	12/02/25 22:43:39	38.5	1179	13/02/25 06:43:39	34.6
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221	12/02/25 14:45:39	42.2	701	12/02/25 22:45:39	36.3	1181	13/02/25 06:45:39	31.6
222	12/02/25 14:46:39	31.2	702	12/02/25 22:46:39	38.6	1182	13/02/25 06:46:39	34.1
223	12/02/25 14:47:39	33.7	703	12/02/25 22:47:39	37.9	1183	13/02/25 06:47:39	32.5
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225	12/02/25 14:49:39	40.3	705	12/02/25 22:49:39	37.1	1185	13/02/25 06:49:39	34.3
226	12/02/25 14:50:39	32.9	706	12/02/25 22:50:39	38.5	1186	13/02/25 06:50:39	34.2
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229	12/02/25 14:53:39	37.7	709	12/02/25 22:53:39	39.4	1189	13/02/25 06:53:39	32.1
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234	12/02/25 14:58:39	35.8	714	12/02/25 22:58:39	35.5	1194	13/02/25 06:58:39	32.7
235	12/02/25 14:59:39	40.1	715	12/02/25 22:59:39	35.6	1195	13/02/25 06:59:39	31.9
236	12/02/25 15:00:39	36.5	716	12/02/25 23:00:39	38.8	1196	13/02/25 07:00:39	30.5
237	12/02/25 15:01:39	31.9	717	12/02/25 23:01:39	39.5	1197	13/02/25 07:01:39	30.2
238	12/02/25 15:02:39	42.2	718	12/02/25 23:02:39	39.7	1198	13/02/25 07:02:39	34.1
239	12/02/25 15:03:39	43.9	719	12/02/25 23:03:39	39.7	1199	13/02/25 07:03:39	31.2
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242	12/02/25 15:06:39	37.8	722	12/02/25 23:06:39	39.3	1202	13/02/25 07:06:39	33.7
243	12/02/25 15:07:39	43.4	723	12/02/25 23:07:39	38.8	1203	13/02/25 07:07:39	31.6
244	12/02/25 15:08:39	38.6	724	12/02/25 23:08:39	35.9	1204	13/02/25 07:08:39	30.2
245	12/02/25 15:09:39	36.7	725	12/02/25 23:09:39	37.7	1205	13/02/25 07:09:39	31.2
246	12/02/25 15:10:39	44.2	726	12/02/25 23:10:39	38.9	1206	13/02/25 07:10:39	30.5
247	12/02/25 15:11:39	33.7	727	12/02/25 23:11:39	37.0	1207	13/02/25 07:11:39	30.4
248	12/02/25 15:12:39	34.2	728	12/02/25 23:12:39	36.4	1208	13/02/25 07:12:39	33.3
249	12/02/25 15:13:39	33.8	729	12/02/25 23:13:39	37.1	1209	13/02/25 07:13:39	30.8
250	12/02/25 15:14:39	43.2	730	12/02/25 23:14:39	35.0	1210	13/02/25 07:14:39	30.3
251	12/02/25 15:15:39	43.4	731	12/02/25 23:15:39	39.0	1211	13/02/25 07:15:39	34.6
252	12/02/25 15:16:39	35.3	732	12/02/25 23:16:39	35.7	1212	13/02/25 07:16:39	34.5
253	12/02/25 15:17:39	34.8	733	12/02/25 23:17:39	37.4	1213	13/02/25 07:17:39	34.1

Data_Record

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256	12/02/25 15:20:39	34.8	736	12/02/25 23:20:39	36.6	1216	13/02/25 07:20:39	33.9
257	12/02/25 15:21:39	41.8	737	12/02/25 23:21:39	38.0	1217	13/02/25 07:21:39	31.3
258	12/02/25 15:22:39	31.2	738	12/02/25 23:22:39	37.4	1218	13/02/25 07:22:39	33.2
259	12/02/25 15:23:39	41.8	739	12/02/25 23:23:39	38.6	1219	13/02/25 07:23:39	32.2
260	12/02/25 15:24:39	34.0	740	12/02/25 23:24:39	38.4	1220	13/02/25 07:24:39	34.7
261	12/02/25 15:25:39	44.0	741	12/02/25 23:25:39	37.2	1221	13/02/25 07:25:39	32.9
262	12/02/25 15:26:39	32.3	742	12/02/25 23:26:39	39.7	1222	13/02/25 07:26:39	32.7
263	12/02/25 15:27:39	43.8	743	12/02/25 23:27:39	39.8	1223	13/02/25 07:27:39	32.6
264	12/02/25 15:28:39	31.1	744	12/02/25 23:28:39	35.0	1224	13/02/25 07:28:39	34.2
265	12/02/25 15:29:39	31.7	745	12/02/25 23:29:39	39.6	1225	13/02/25 07:29:39	33.6
266	12/02/25 15:30:39	30.9	746	12/02/25 23:30:39	38.5	1226	13/02/25 07:30:39	30.5
267	12/02/25 15:31:39	32.1	747	12/02/25 23:31:39	36.7	1227	13/02/25 07:31:39	34.7
268	12/02/25 15:32:39	40.5	748	12/02/25 23:32:39	37.4	1228	13/02/25 07:32:39	34.5
269	12/02/25 15:33:39	40.9	749	12/02/25 23:33:39	35.7	1229	13/02/25 07:33:39	33.9
270	12/02/25 15:34:39	38.1	750	12/02/25 23:34:39	38.5	1230	13/02/25 07:34:39	33.9
271	12/02/25 15:35:39	35.4	751	12/02/25 23:35:39	38.8	1231	13/02/25 07:35:39	31.5
272	12/02/25 15:36:39	34.5	752	12/02/25 23:36:39	37.2	1232	13/02/25 07:36:39	37.8
273	12/02/25 15:37:39	34.6	753	12/02/25 23:37:39	37.2	1233	13/02/25 07:37:39	43.7
274	12/02/25 15:38:39	39.6	754	12/02/25 23:38:39	38.6	1234	13/02/25 07:38:39	47.1
275	12/02/25 15:39:39	37.9	755	12/02/25 23:39:39	40.0	1235	13/02/25 07:39:39	41.7
276	12/02/25 15:40:39	41.6	756	12/02/25 23:40:39	37.0	1236	13/02/25 07:40:39	36.4
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278	12/02/25 15:42:39	37.7	758	12/02/25 23:42:39	39.1	1238	13/02/25 07:42:39	47.7
279	12/02/25 15:43:39	41.6	759	12/02/25 23:43:39	35.3	1239	13/02/25 07:43:39	45.6
280	12/02/25 15:44:39	40.9	760	12/02/25 23:44:39	38.8	1240	13/02/25 07:44:39	40.8
281	12/02/25 15:45:39	36.1	761	12/02/25 23:45:39	39.1	1241	13/02/25 07:45:39	45.8
282	12/02/25 15:46:39	39.4	762	12/02/25 23:46:39	35.7	1242	13/02/25 07:46:39	39.9
283	12/02/25 15:47:39	41.6	763	12/02/25 23:47:39	36.8	1243	13/02/25 07:47:39	36.7
284	12/02/25 15:48:39	43.9	764	12/02/25 23:48:39	38.5	1244	13/02/25 07:48:39	38.8
285	12/02/25 15:49:39	36.6	765	12/02/25 23:49:39	36.2	1245	13/02/25 07:49:39	45.7
286	12/02/25 15:50:39	44.2	766	12/02/25 23:50:39	38.1	1246	13/02/25 07:50:39	45.0
287	12/02/25 15:51:39	38.7	767	12/02/25 23:51:39	35.9	1247	13/02/25 07:51:39	35.8
288	12/02/25 15:52:39	31.3	768	12/02/25 23:52:39	38.6	1248	13/02/25 07:52:39	48.2
289	12/02/25 15:53:39	31.5	769	12/02/25 23:53:39	39.0	1249	13/02/25 07:53:39	35.8
290	12/02/25 15:54:39	34.0	770	12/02/25 23:54:39	37.0	1250	13/02/25 07:54:39	36.0
291	12/02/25 15:55:39	37.1	771	12/02/25 23:55:39	37.7	1251	13/02/25 07:55:39	44.7
292	12/02/25 15:56:39	33.9	772	12/02/25 23:56:39	38.3	1252	13/02/25 07:56:39	36.1
293	12/02/25 15:57:39	31.7	773	12/02/25 23:57:39	36.3	1253	13/02/25 07:57:39	47.6
294	12/02/25 15:58:39	31.3	774	12/02/25 23:58:39	36.7	1254	13/02/25 07:58:39	35.9
295	12/02/25 15:59:39	33.3	775	12/02/25 23:59:39	35.5	1255	13/02/25 07:59:39	48.7
296	12/02/25 16:00:39	33.7	776	13/02/25 00:00:39	38.1	1256	13/02/25 08:00:39	42.2
297	12/02/25 16:01:39	31.8	777	13/02/25 00:01:39	36.4	1257	13/02/25 08:01:39	43.2
298	12/02/25 16:02:39	36.1	778	13/02/25 00:02:39	37.0	1258	13/02/25 08:02:39	40.7
299	12/02/25 16:03:39	43.3	779	13/02/25 00:03:39	38.6	1259	13/02/25 08:03:39	49.9
300	12/02/25 16:04:39	40.7	780	13/02/25 00:04:39	37.0	1260	13/02/25 08:04:39	42.4
301	12/02/25 16:05:39	35.9	781	13/02/25 00:05:39	37.2	1261	13/02/25 08:05:39	36.8
302	12/02/25 16:06:39	30.1	782	13/02/25 00:06:39	39.7	1262	13/02/25 08:06:39	36.0
303	12/02/25 16:07:39	37.2	783	13/02/25 00:07:39	39.6	1263	13/02/25 08:07:39	46.2
304	12/02/25 16:08:39	43.8	784	13/02/25 00:08:39	39.0	1264	13/02/25 08:08:39	49.8

Data_Record

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306	12/02/25 16:10:39	39.2	786	13/02/25 00:10:39	37.4	1266	13/02/25 08:10:39	43.5
307	12/02/25 16:11:39	36.8	787	13/02/25 00:11:39	36.4	1267	13/02/25 08:11:39	44.0
308	12/02/25 16:12:39	31.3	788	13/02/25 00:12:39	38.4	1268	13/02/25 08:12:39	35.5
309	12/02/25 16:13:39	36.6	789	13/02/25 00:13:39	38.9	1269	13/02/25 08:13:39	46.8
310	12/02/25 16:14:39	30.8	790	13/02/25 00:14:39	35.9	1270	13/02/25 08:14:39	37.8
311	12/02/25 16:15:39	34.4	791	13/02/25 00:15:39	37.6	1271	13/02/25 08:15:39	42.7
312	12/02/25 16:16:39	30.1	792	13/02/25 00:16:39	35.5	1272	13/02/25 08:16:39	46.5
313	12/02/25 16:17:39	43.6	793	13/02/25 00:17:39	36.9	1273	13/02/25 08:17:39	36.3
314	12/02/25 16:18:39	33.6	794	13/02/25 00:18:39	39.9	1274	13/02/25 08:18:39	45.7
315	12/02/25 16:19:39	42.6	795	13/02/25 00:19:39	38.3	1275	13/02/25 08:19:39	46.7
316	12/02/25 16:20:39	41.2	796	13/02/25 00:20:39	35.5	1276	13/02/25 08:20:39	38.7
317	12/02/25 16:21:39	34.6	797	13/02/25 00:21:39	35.5	1277	13/02/25 08:21:39	40.1
318	12/02/25 16:22:39	34.8	798	13/02/25 00:22:39	36.5	1278	13/02/25 08:22:39	38.2
319	12/02/25 16:23:39	30.7	799	13/02/25 00:23:39	39.9	1279	13/02/25 08:23:39	49.7
320	12/02/25 16:24:39	43.3	800	13/02/25 00:24:39	38.8	1280	13/02/25 08:24:39	47.6
321	12/02/25 16:25:39	32.7	801	13/02/25 00:25:39	37.5	1281	13/02/25 08:25:39	43.6
322	12/02/25 16:26:39	44.3	802	13/02/25 00:26:39	37.3	1282	13/02/25 08:26:39	47.9
323	12/02/25 16:27:39	37.8	803	13/02/25 00:27:39	39.1	1283	13/02/25 08:27:39	44.9
324	12/02/25 16:28:39	43.0	804	13/02/25 00:28:39	35.1	1284	13/02/25 08:28:39	49.0
325	12/02/25 16:29:39	40.5	805	13/02/25 00:29:39	37.7	1285	13/02/25 08:29:39	44.2
326	12/02/25 16:30:39	40.7	806	13/02/25 00:30:39	37.5	1286	13/02/25 08:30:39	49.2
327	12/02/25 16:31:39	42.1	807	13/02/25 00:31:39	39.8	1287	13/02/25 08:31:39	45.7
328	12/02/25 16:32:39	35.5	808	13/02/25 00:32:39	39.0	1288	13/02/25 08:32:39	43.5
329	12/02/25 16:33:39	31.1	809	13/02/25 00:33:39	39.1	1289	13/02/25 08:33:39	49.4
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331	12/02/25 16:35:39	38.3	811	13/02/25 00:35:39	39.6	1291	13/02/25 08:35:39	46.9
332	12/02/25 16:36:39	37.4	812	13/02/25 00:36:39	36.6	1292	13/02/25 08:36:39	44.0
333	12/02/25 16:37:39	44.4	813	13/02/25 00:37:39	37.4	1293	13/02/25 08:37:39	43.2
334	12/02/25 16:38:39	39.5	814	13/02/25 00:38:39	39.1	1294	13/02/25 08:38:39	36.8
335	12/02/25 16:39:39	34.1	815	13/02/25 00:39:39	37.1	1295	13/02/25 08:39:39	44.0
336	12/02/25 16:40:39	40.1	816	13/02/25 00:40:39	38.6	1296	13/02/25 08:40:39	39.8
337	12/02/25 16:41:39	43.6	817	13/02/25 00:41:39	35.7	1297	13/02/25 08:41:39	49.4
338	12/02/25 16:42:39	40.0	818	13/02/25 00:42:39	37.1	1298	13/02/25 08:42:39	39.4
339	12/02/25 16:43:39	36.9	819	13/02/25 00:43:39	36.5	1299	13/02/25 08:43:39	46.2
340	12/02/25 16:44:39	44.1	820	13/02/25 00:44:39	35.6	1300	13/02/25 08:44:39	48.8
341	12/02/25 16:45:39	42.7	821	13/02/25 00:45:39	39.2	1301	13/02/25 08:45:39	47.0
342	12/02/25 16:46:39	41.1	822	13/02/25 00:46:39	36.7	1302	13/02/25 08:46:39	39.8
343	12/02/25 16:47:39	31.4	823	13/02/25 00:47:39	36.1	1303	13/02/25 08:47:39	46.3
344	12/02/25 16:48:39	34.4	824	13/02/25 00:48:39	36.2	1304	13/02/25 08:48:39	49.1
345	12/02/25 16:49:39	40.4	825	13/02/25 00:49:39	37.1	1305	13/02/25 08:49:39	49.3
346	12/02/25 16:50:39	34.3	826	13/02/25 00:50:39	36.2	1306	13/02/25 08:50:39	49.6
347	12/02/25 16:51:39	44.6	827	13/02/25 00:51:39	37.9	1307	13/02/25 08:51:39	42.1
348	12/02/25 16:52:39	31.3	828	13/02/25 00:52:39	35.8	1308	13/02/25 08:52:39	41.5
349	12/02/25 16:53:39	41.7	829	13/02/25 00:53:39	38.4	1309	13/02/25 08:53:39	43.3
350	12/02/25 16:54:39	34.1	830	13/02/25 00:54:39	39.3	1310	13/02/25 08:54:39	36.3
351	12/02/25 16:55:39	41.4	831	13/02/25 00:55:39	38.6	1311	13/02/25 08:55:39	42.8
352	12/02/25 16:56:39	31.1	832	13/02/25 00:56:39	35.3	1312	13/02/25 08:56:39	37.0
353	12/02/25 16:57:39	40.1	833	13/02/25 00:57:39	36.5	1313	13/02/25 08:57:39	46.3
354	12/02/25 16:58:39	42.4	834	13/02/25 00:58:39	38.3	1314	13/02/25 08:58:39	40.8
355	12/02/25 16:59:39	38.9	835	13/02/25 00:59:39	38.5	1315	13/02/25 08:59:39	45.2

Data_Record

356	12/02/25 17:00:39	40.5	836	13/02/25 01:00:39	38.4	1316	13/02/25 09:00:39	36.8
357	12/02/25 17:01:39	43.5	837	13/02/25 01:01:39	35.0	1317	13/02/25 09:01:39	47.9
358	12/02/25 17:02:39	33.3	838	13/02/25 01:02:39	36.8	1318	13/02/25 09:02:39	46.8
359	12/02/25 17:03:39	39.6	839	13/02/25 01:03:39	36.6	1319	13/02/25 09:03:39	39.5
360	12/02/25 17:04:39	36.7	840	13/02/25 01:04:39	39.5	1320	13/02/25 09:04:39	41.0
361	12/02/25 17:05:39	34.1	841	13/02/25 01:05:39	39.3	1321	13/02/25 09:05:39	43.2
362	12/02/25 17:06:39	37.0	842	13/02/25 01:06:39	36.7	1322	13/02/25 09:06:39	49.3
363	12/02/25 17:07:39	31.0	843	13/02/25 01:07:39	39.2	1323	13/02/25 09:07:39	43.0
364	12/02/25 17:08:39	30.8	844	13/02/25 01:08:39	39.2	1324	13/02/25 09:08:39	37.7
365	12/02/25 17:09:39	34.5	845	13/02/25 01:09:39	39.3	1325	13/02/25 09:09:39	40.6
366	12/02/25 17:10:39	35.1	846	13/02/25 01:10:39	37.2	1326	13/02/25 09:10:39	49.6
367	12/02/25 17:11:39	37.0	847	13/02/25 01:11:39	35.8	1327	13/02/25 09:11:39	42.2
368	12/02/25 17:12:39	31.9	848	13/02/25 01:12:39	36.9	1328	13/02/25 09:12:39	38.1
369	12/02/25 17:13:39	32.1	849	13/02/25 01:13:39	36.0	1329	13/02/25 09:13:39	48.4
370	12/02/25 17:14:39	34.0	850	13/02/25 01:14:39	36.4	1330	13/02/25 09:14:39	42.4
371	12/02/25 17:15:39	44.8	851	13/02/25 01:15:39	37.5	1331	13/02/25 09:15:39	37.4
372	12/02/25 17:16:39	35.9	852	13/02/25 01:16:39	35.8	1332	13/02/25 09:16:39	35.9
373	12/02/25 17:17:39	38.0	853	13/02/25 01:17:39	38.1	1333	13/02/25 09:17:39	43.3
374	12/02/25 17:18:39	31.6	854	13/02/25 01:18:39	35.7	1334	13/02/25 09:18:39	41.7
375	12/02/25 17:19:39	35.1	855	13/02/25 01:19:39	37.8	1335	13/02/25 09:19:39	39.2
376	12/02/25 17:20:39	33.6	856	13/02/25 01:20:39	35.6	1336	13/02/25 09:20:39	46.5
377	12/02/25 17:21:39	39.5	857	13/02/25 01:21:39	39.8	1337	13/02/25 09:21:39	39.9
378	12/02/25 17:22:39	35.8	858	13/02/25 01:22:39	35.8	1338	13/02/25 09:22:39	43.9
379	12/02/25 17:23:39	36.2	859	13/02/25 01:23:39	37.0	1339	13/02/25 09:23:39	42.1
380	12/02/25 17:24:39	38.7	860	13/02/25 01:24:39	35.1	1340	13/02/25 09:24:39	35.2
381	12/02/25 17:25:39	36.8	861	13/02/25 01:25:39	38.0	1341	13/02/25 09:25:39	49.6
382	12/02/25 17:26:39	36.8	862	13/02/25 01:26:39	36.4	1342	13/02/25 09:26:39	40.6
383	12/02/25 17:27:39	32.5	863	13/02/25 01:27:39	38.3	1343	13/02/25 09:27:39	37.2
384	12/02/25 17:28:39	36.6	864	13/02/25 01:28:39	35.3	1344	13/02/25 09:28:39	49.3
385	12/02/25 17:29:39	38.1	865	13/02/25 01:29:39	35.4	1345	13/02/25 09:29:39	43.1
386	12/02/25 17:30:39	43.2	866	13/02/25 01:30:39	38.3	1346	13/02/25 09:30:39	46.7
387	12/02/25 17:31:39	44.1	867	13/02/25 01:31:39	38.5	1347	13/02/25 09:31:39	47.2
388	12/02/25 17:32:39	30.5	868	13/02/25 01:32:39	39.2	1348	13/02/25 09:32:39	44.8
389	12/02/25 17:33:39	36.7	869	13/02/25 01:33:39	39.1	1349	13/02/25 09:33:39	44.8
390	12/02/25 17:34:39	38.3	870	13/02/25 01:34:39	37.2	1350	13/02/25 09:34:39	47.6
391	12/02/25 17:35:39	31.2	871	13/02/25 01:35:39	35.2	1351	13/02/25 09:35:39	42.8
392	12/02/25 17:36:39	37.2	872	13/02/25 01:36:39	38.9	1352	13/02/25 09:36:39	39.1
393	12/02/25 17:37:39	44.7	873	13/02/25 01:37:39	35.1	1353	13/02/25 09:37:39	47.0
394	12/02/25 17:38:39	42.7	874	13/02/25 01:38:39	35.0	1354	13/02/25 09:38:39	35.8
395	12/02/25 17:39:39	32.6	875	13/02/25 01:39:39	39.9	1355	13/02/25 09:39:39	35.2
396	12/02/25 17:40:39	35.7	876	13/02/25 01:40:39	37.1	1356	13/02/25 09:40:39	39.9
397	12/02/25 17:41:39	33.5	877	13/02/25 01:41:39	38.6	1357	13/02/25 09:41:39	49.9
398	12/02/25 17:42:39	36.1	878	13/02/25 01:42:39	38.5	1358	13/02/25 09:42:39	45.0
399	12/02/25 17:43:39	34.2	879	13/02/25 01:43:39	40.0	1359	13/02/25 09:43:39	43.6
400	12/02/25 17:44:39	37.3	880	13/02/25 01:44:39	38.6	1360	13/02/25 09:44:39	37.9
401	12/02/25 17:45:39	33.1	881	13/02/25 01:45:39	37.7	1361	13/02/25 09:45:39	49.2
402	12/02/25 17:46:39	42.4	882	13/02/25 01:46:39	39.1	1362	13/02/25 09:46:39	46.0
403	12/02/25 17:47:39	36.7	883	13/02/25 01:47:39	36.9	1363	13/02/25 09:47:39	37.0
404	12/02/25 17:48:39	39.3	884	13/02/25 01:48:39	38.5	1364	13/02/25 09:48:39	38.4
405	12/02/25 17:49:39	43.2	885	13/02/25 01:49:39	38.3	1365	13/02/25 09:49:39	43.9
406	12/02/25 17:50:39	38.1	886	13/02/25 01:50:39	38.4	1366	13/02/25 09:50:39	38.5

Data_Record

407	12/02/25 17:51:39	40.2	887	13/02/25 01:51:39	35.8	1367	13/02/25 09:51:39	49.8
408	12/02/25 17:52:39	36.8	888	13/02/25 01:52:39	36.2	1368	13/02/25 09:52:39	44.7
409	12/02/25 17:53:39	33.5	889	13/02/25 01:53:39	38.3	1369	13/02/25 09:53:39	47.5
410	12/02/25 17:54:39	35.6	890	13/02/25 01:54:39	35.7	1370	13/02/25 09:54:39	47.6
411	12/02/25 17:55:39	33.5	891	13/02/25 01:55:39	36.6	1371	13/02/25 09:55:39	45.0
412	12/02/25 17:56:39	32.0	892	13/02/25 01:56:39	37.1	1372	13/02/25 09:56:39	41.3
413	12/02/25 17:57:39	35.9	893	13/02/25 01:57:39	37.4	1373	13/02/25 09:57:39	42.8
414	12/02/25 17:58:39	37.5	894	13/02/25 01:58:39	39.6	1374	13/02/25 09:58:39	42.1
415	12/02/25 17:59:39	34.7	895	13/02/25 01:59:39	39.0	1375	13/02/25 09:59:39	43.4
416	12/02/25 18:00:39	31.4	896	13/02/25 02:00:39	37.5	1376	13/02/25 10:00:39	47.6
417	12/02/25 18:01:39	42.2	897	13/02/25 02:01:39	35.6	1377	13/02/25 10:01:39	45.5
418	12/02/25 18:02:39	39.5	898	13/02/25 02:02:39	35.6	1378	13/02/25 10:02:39	44.9
419	12/02/25 18:03:39	39.1	899	13/02/25 02:03:39	36.4	1379	13/02/25 10:03:39	44.9
420	12/02/25 18:04:39	35.9	900	13/02/25 02:04:39	39.3	1380	13/02/25 10:04:39	48.9
421	12/02/25 18:05:39	41.8	901	13/02/25 02:05:39	36.2	1381	13/02/25 10:05:39	47.2
422	12/02/25 18:06:39	34.9	902	13/02/25 02:06:39	38.0	1382	13/02/25 10:06:39	37.6
423	12/02/25 18:07:39	38.7	903	13/02/25 02:07:39	35.6	1383	13/02/25 10:07:39	35.5
424	12/02/25 18:08:39	43.0	904	13/02/25 02:08:39	38.4	1384	13/02/25 10:08:39	44.0
425	12/02/25 18:09:39	36.4	905	13/02/25 02:09:39	38.9	1385	13/02/25 10:09:39	35.8
426	12/02/25 18:10:39	43.2	906	13/02/25 02:10:39	37.4	1386	13/02/25 10:10:39	46.5
427	12/02/25 18:11:39	30.5	907	13/02/25 02:11:39	35.4	1387	13/02/25 10:11:39	42.3
428	12/02/25 18:12:39	43.4	908	13/02/25 02:12:39	35.1	1388	13/02/25 10:12:39	48.4
429	12/02/25 18:13:39	38.4	909	13/02/25 02:13:39	35.8	1389	13/02/25 10:13:39	49.5
430	12/02/25 18:14:39	40.2	910	13/02/25 02:14:39	39.3	1390	13/02/25 10:14:39	48.8
431	12/02/25 18:15:39	37.6	911	13/02/25 02:15:39	35.4	1391	13/02/25 10:15:39	44.1
432	12/02/25 18:16:39	33.1	912	13/02/25 02:16:39	36.8	1392	13/02/25 10:16:39	42.9
433	12/02/25 18:17:39	43.2	913	13/02/25 02:17:39	39.6	1393	13/02/25 10:17:39	38.5
434	12/02/25 18:18:39	42.9	914	13/02/25 02:18:39	36.1	1394	13/02/25 10:18:39	45.6
435	12/02/25 18:19:39	31.2	915	13/02/25 02:19:39	38.2	1395	13/02/25 10:19:39	48.8
436	12/02/25 18:20:39	31.9	916	13/02/25 02:20:39	35.0	1396	13/02/25 10:20:39	39.4
437	12/02/25 18:21:39	32.3	917	13/02/25 02:21:39	35.4	1397	13/02/25 10:21:39	43.4
438	12/02/25 18:22:39	42.0	918	13/02/25 02:22:39	36.8	1398	13/02/25 10:22:39	37.5
439	12/02/25 18:23:39	37.2	919	13/02/25 02:23:39	39.4	1399	13/02/25 10:23:39	38.7
440	12/02/25 18:24:39	40.5	920	13/02/25 02:24:39	38.1	1400	13/02/25 10:24:39	42.8
441	12/02/25 18:25:39	34.6	921	13/02/25 02:25:39	35.4	1401	13/02/25 10:25:39	40.5
442	12/02/25 18:26:39	30.4	922	13/02/25 02:26:39	36.8	1402	13/02/25 10:26:39	41.0
443	12/02/25 18:27:39	40.3	923	13/02/25 02:27:39	39.4	1403	13/02/25 10:27:39	41.3
444	12/02/25 18:28:39	38.8	924	13/02/25 02:28:39	37.6	1404	13/02/25 10:28:39	49.2
445	12/02/25 18:29:39	32.6	925	13/02/25 02:29:39	36.6	1405	13/02/25 10:29:39	44.5
446	12/02/25 18:30:39	30.6	926	13/02/25 02:30:39	35.2	1406	13/02/25 10:30:39	48.0
447	12/02/25 18:31:39	42.7	927	13/02/25 02:31:39	35.8	1407	13/02/25 10:31:39	45.5
448	12/02/25 18:32:39	43.1	928	13/02/25 02:32:39	38.5	1408	13/02/25 10:32:39	49.6
449	12/02/25 18:33:39	42.3	929	13/02/25 02:33:39	35.5	1409	13/02/25 10:33:39	44.6
450	12/02/25 18:34:39	35.3	930	13/02/25 02:34:39	37.0	1410	13/02/25 10:34:39	48.0
451	12/02/25 18:35:39	40.1	931	13/02/25 02:35:39	38.9	1411	13/02/25 10:35:39	39.9
452	12/02/25 18:36:39	44.6	932	13/02/25 02:36:39	37.7	1412	13/02/25 10:36:39	44.9
453	12/02/25 18:37:39	41.1	933	13/02/25 02:37:39	38.1	1413	13/02/25 10:37:39	38.3
454	12/02/25 18:38:39	38.5	934	13/02/25 02:38:39	39.5	1414	13/02/25 10:38:39	35.7
455	12/02/25 18:39:39	42.6	935	13/02/25 02:39:39	39.3	1415	13/02/25 10:39:39	40.6
456	12/02/25 18:40:39	39.0	936	13/02/25 02:40:39	37.1	1416	13/02/25 10:40:39	38.5
457	12/02/25 18:41:39	41.8	937	13/02/25 02:41:39	35.6	1417	13/02/25 10:41:39	49.9

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458	12/02/25 18:42:39	41.2	938	13/02/25 02:42:39	39.1	1418	13/02/25 10:42:39	35.8
459	12/02/25 18:43:39	42.7	939	13/02/25 02:43:39	37.6	1419	13/02/25 10:43:39	39.8
460	12/02/25 18:44:39	44.6	940	13/02/25 02:44:39	37.8	1420	13/02/25 10:44:39	44.8
461	12/02/25 18:45:39	32.5	941	13/02/25 02:45:39	35.7	1421	13/02/25 10:45:39	45.2
462	12/02/25 18:46:39	38.6	942	13/02/25 02:46:39	39.7	1422	13/02/25 10:46:39	39.1
463	12/02/25 18:47:39	35.8	943	13/02/25 02:47:39	35.4	1423	13/02/25 10:47:39	47.4
464	12/02/25 18:48:39	42.0	944	13/02/25 02:48:39	37.3	1424	13/02/25 10:48:39	47.0
465	12/02/25 18:49:39	35.7	945	13/02/25 02:49:39	39.2	1425	13/02/25 10:49:39	45.5
466	12/02/25 18:50:39	38.1	946	13/02/25 02:50:39	36.8	1426	13/02/25 10:50:39	45.0
467	12/02/25 18:51:39	35.4	947	13/02/25 02:51:39	38.0	1427	13/02/25 10:51:39	47.5
468	12/02/25 18:52:39	39.1	948	13/02/25 02:52:39	36.6	1428	13/02/25 10:52:39	46.6
469	12/02/25 18:53:39	44.7	949	13/02/25 02:53:39	35.2	1429	13/02/25 10:53:39	42.6
470	12/02/25 18:54:39	30.8	950	13/02/25 02:54:39	35.7	1430	13/02/25 10:54:39	42.9
471	12/02/25 18:55:39	43.5	951	13/02/25 02:55:39	36.6	1431	13/02/25 10:55:39	43.4
472	12/02/25 18:56:39	35.3	952	13/02/25 02:56:39	39.5	1432	13/02/25 10:56:39	43.1
473	12/02/25 18:57:39	43.2	953	13/02/25 02:57:39	39.5	1433	13/02/25 10:57:39	38.8
474	12/02/25 18:58:39	38.1	954	13/02/25 02:58:39	39.8	1434	13/02/25 10:58:39	48.1
475	12/02/25 18:59:39	40.5	955	13/02/25 02:59:39	39.0	1435	13/02/25 10:59:39	43.6
476	12/02/25 19:00:39	37.7	956	13/02/25 03:00:39	39.2	1436	13/02/25 11:00:39	49.4
477	12/02/25 19:01:39	31.2	957	13/02/25 03:01:39	36.9	1437	13/02/25 11:01:39	45.4
478	12/02/25 19:02:39	33.1	958	13/02/25 03:02:39	36.6	1438	13/02/25 11:02:39	37.9
479	12/02/25 19:03:39	39.3	959	13/02/25 03:03:39	35.3	1439	13/02/25 11:03:39	45.5
480	12/02/25 19:04:39	31.5	960	13/02/25 03:04:39	37.6	1440	13/02/25 11:04:39	35.3

HH ANNEX: DANISH EPA STANDARD FOR SOIL QUALITY MONITORING

- ***Quality criteria for soil***

340. The Danish EPA has prepared toxicological quality criteria for soil for a large number of selected chemical substances.

341. Criteria are always based on the assumption that it should be possible to use the site for very sensitive purposes (e.g. private gardens or day-care centers). As a starting point, soil-quality criteria should be complied with from the surface to a depth of 1 m. In addition to health considerations, the criteria are also based on aesthetic and hygiene considerations (smell/appearance/taste).

342. As a supplement to, or instead of, soil-quality criteria, quality criteria for evaporation apply for several substances. In most cases where contamination is to be assessed, ecotoxicological considerations are not taken into account. The current ecotoxicological quality criteria are listed in the following table

343. For most of the substances reviewed, quality criteria for the top soil are based on acceptable/tolerable daily exposures. If it is known that exposure to contamination components occurs from other sources (e.g. food or air), the criteria will take account of this and ensure that total exposure does not exceed the ADI/TDI values (acceptable daily intake / tolerable daily intake).

344. The following table lists quality criteria for soil in connection with very sensitive land use. To aid risk analysis, the table also shows whether the reason for setting the quality criteria is the acute or the chronic effect of the substance. If individual values significantly exceed the soil quality criteria (+100%), the need for mapping the extent of the high value/hot spot should be assessed.

345. The statements of acute and chronic effects in the table do not mean that a threshold criterion can be derived for a substance where the level is based on the chronic effect.

346. The following table also states zero values for selected organic components. Zero values are defined as calculated pore-water concentrations for clay and sand which do not exceed the quality criteria for the groundwater.

Table 110: Quality criteria for soil

Quality criteria for soil in areas with very sensitive land use, ecotoxicological quality criteria and background levels. The methods of analysis for individual substances appear in the guidelines on sample-taking and analyses. All units are in mg/kg dry weight (DW)

Substance	Soil quality criteria	Eco-toxicological soil quality criteria[4]	Background level
Acetone	8		
Arsenic	20[1(2)]	10	2-6
Benzene	1.5[*2]		
BTEX, total	10[*2]		
Cadmium	0.5[2]	0.3	0.03 – 0.5
Chloroform	50[*2]		

Substance	**Soil quality criteria**	**Eco-toxicological soil quality criteria[4]**	**Background level**
Substance	Soil quality criteria	Eco-toxicological soil quality criteria[4]	Background level
Chlorophenols, total Pentachlorophenol	3[*2] 0.15[*]	0.01 0.005	
Chromium, total Chromium (VI)	500 20	50 2	1.3 – 23
Copper	500[1]	30	13
Cyanide, total Cyanide, acid volatile	500 10[*2]		
DDT	1		
Detergents, anionic	1,500[2]	5	
1,2-dibromomethane	0.02[2]		
1,2-dichloroethane	1.4[2]		
1,1-dichloroethylene	5[2]		
1,2-dichloroethylene	85[2]		
Dichloromethane	8[2]		
Fluorides, inorganic	20[1]		
Gas oil Total hydrocarbons (C_5 – C_{35})[5]	100		
Lead	40[2]	50	10 – 40
Mercury	1	0.1	0.04 – 0.12
Molybdenum	5	2.0	
MTBE	500[2]		
Nickel	30[1]	10	0.1 - 50
Nitrophenols Mono- Di- Tri-	 125[2] 10[2] 30[2]		
PAH, total Benzo(a)pyrene Dibenzo(a,h) anthracene	1.5[2,3] 0.1[2] 0.1[2]	 1.0 0.1	
Petrol (C_5-C_{10})	25[*]		
Petrol (C_9-C_{16})	25[*]		
Phenols, total	70[*1]		
Phthalates, total DEHP	250[2] 25[2]	1.0	
Styrene	40[*2]		
Turpentine, mineral (C_7 – C_{12})	25[*]		
Tetrachloroethylene	5[*2]		
Tetrachloromethane	5[*2]		
1,1,1-trichloroethane	200[2]		

Substance	Soil quality criteria	Eco-toxicological soil quality criteria[4]	Background level
Trichloroethylene	5[*2]		
Substance	Soil quality criteria	Eco-toxicological soil quality criteria[4]	Background level
Vinyl chloride	0.4[*2]		
Zinc	500	100	10 - 300

*Note: For several substances (marked *), criteria for evaporation are stated*

1	*Based on acute effect.*
2	*Based on chronic effect.*
3	*PAH, total defined as the sum of individual components: fluoranthene, benzyl(b+j+k) fluoranthene, benzyl(a)pyrene, dibenzyl(a,h)anthracene, and ideno(1,2,3-cd) pyrene.*
4	*Based on Working Report from the Danish EPA, no. 83, 1997.*
5	*For hydrocarbons greater than C_{35}, see Draft Guidelines, 1997, Danish Environmental Protection Agency.*

- ***Cut-off criteria for soil***

347. In the guidelines from the Danish EPA on 'Advice to Residents in Slightly Contaminated Areas', cut-off criteria for soil contamination in the upper soil stratum have been set for ten selected substances

348. The cut-off criteria state the level of soil contamination at which it is necessary to completely cut off all contact with the soil, for example by remediation or excavation, if the area is to use for very sensitive purposes.

349. The Guidelines include a number of rules which aim at reducing exposure to the same level as for areas where the soil-quality criteria are not exceeded. The cut-off criteria for soil are listed in the following Table.

Table 111: Criteria for necessary contamination cut off, mg/kg dry weight (DW).

Substance	Level where contamination cut off is necessary
Arsenic	20[1]
Cadmium	5[2]
Chromium	1,000
Copper	500[1]
Lead	400[2]
Mercury	3
Nickel	30[1]
Zinc	1,000
PAHs	15[2]
Benzo(a)pyrene	1[2]

Substance	**Level where contamination cut off is necessary**
Dibenzo(a,h)anthracene	1[2]

[1]Based on acute harmful effects
[2]Based on chronic harmful effects

350. If contamination in the upper soil stratum is not more than the cut-off criteria, and there are no clumps or hot spots with high concentrations of contamination, then the completed surveys (the initial (historical) survey and analyses of soil samples) provide evidence that the criteria described in these guidelines have been complied with

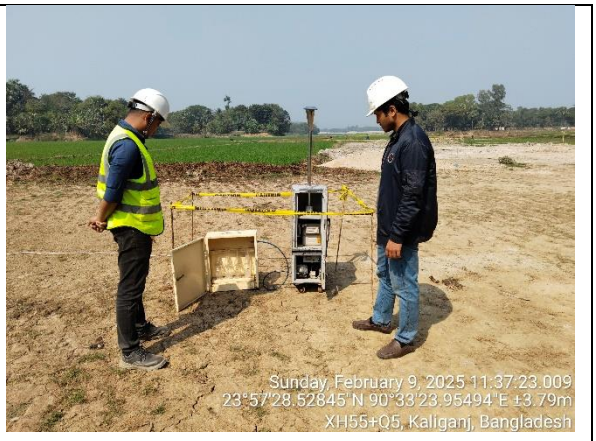
351. If a larger area is slightly contaminated, i.e. concentrations are less than the cut-off level, situations may arise where remediation is carried out at lower concentrations, for example the soil-quality criteria. For example, this may occur in situations where an enforcement notice has been issued or where limitations on land use following remediation, are undesirable (corresponding to de-listing a contaminated site).

II ANNEX: SAMPLE QUESTIONNARIES FOR FIELD SURVEY ASSESSMENT

Sl. No.	Checklist Questions	Remarks/Comments
1	Are bird diversion devices installed on transmission lines to reduce collision risk?	
2	Has a bird movement survey been conducted to identify high-risk areas for bird collision?	
3	Are the selected species for the compensatory planting suitable for local biodiversity?	
4	Are migratory bird habitats protected during construction and operation phases?	
5	Is there a protocol for removing invasive species that may harm bird habitats?	
6	Are regular training sessions provided for workers on bird protection protocols?	
7	Are safety barriers and warning signs installed around high-risk areas like tower construction sites?	
8	Have emergency evacuation plans been created for workers in case of fire, electrical hazards, or accidents?	
9	Are workers provided with appropriate PPE (helmets, gloves, boots, eye protection, etc.)?	
10	Is there a system in place for regular health checks and risk assessments for workers?	
11	Are regular toolbox talks conducted to address specific site risks?	
12	Are all workers trained on electrical hazard prevention and fall safety protocols?	
13	Are medical supplies and a first aid kit readily available at all work locations?	
14	Is there a system for reporting and investigating workplace accidents and near misses?	
15	Are ecological surveys conducted to assess the presence of protected species before construction begins?	
16	Are protective buffer zones maintained around sensitive ecological areas (e.g., wetlands, forests)?	
17	Is there a plan in place for replanting native vegetation post-construction, especially in impacted areas?	
18	Are invasive species being monitored and controlled around the construction sites?	
19	Are local stakeholders consulted regarding the protection of natural habitats and biodiversity?	
20	Is the project ensuring no significant habitat destruction or fragmentation for local wildlife?	
21	Are construction vehicles limited to designated transport routes to minimize environmental disturbance?	
22	Are all transport routes regularly maintained to avoid erosion, dust, and water runoff?	
23	Is there a traffic management plan in place to minimize disruptions to local communities and wildlife corridors?	
24	Are there regular inspections to ensure that vehicles and machinery are not causing excessive noise or emissions?	
25	Are there measures in place to control dust during transportation, especially during dry weather?	
26	Is there signage in place to inform local communities about construction activities and potential hazards?	

JJ ANNEX: SAMPLING IMAGES OF BASELINE SURVEY











Ambient Air Quality Sampling











Ambient Noise Level Monitoring (During Daytime)











Ambient Noise Level Monitoring (During Night Time)











Surface Water Sampe Collection











Groundwater Sample Collection






Sample Images of sealing of Samples onsite[20]

[20] During the project implementation, required water collection for testing purposes will be done by sealing of the samples (Sealed samples are given for example_











Soil Sample Collection

KK ANNEX: TRAINING & SAFEGUARD DOCUMENTS



Pictorial Evidence of Hanbaek Worker Training Sessions

Hanbaek Co., Ltd.
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Training Attendance Record

Topics Of The Training : Environmental Management
Trainer : Md. Mohsin-ul-Haque **Date** 23.12.2024
Training Place : Work Place **Trainees** Site Workers

Sl No	Name Of The Trainee	Designation	Department	Signature
1.	Firuz Ahmed	Site Worker	Civil	
2.	Mokhlesur Rahman	Site Worker	Civil	
3.	Hossain Ali	Site Worker	Civil	
4.	Sajedul Islam	Site Worker	Civil	
5.	Tanveer Ahmed	Site Worker	Civil	
6.	Iqbal Hossain	Site Worker	Civil	
7.	Basit Ali	Site Worker	Civil	
8.	Azizul Islam	Site Worker	Civil	

Training Coordinator
Hanbaek Co. Ltd.

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Hanbaek Co., Ltd.
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Training Attendance Record

Topics Of The Training : Solid Waste Management
Trainer : Rubel Sheikh **Date** 25.02.2025
Training Place : Work Place **Trainees** Site Workers

Sl No	Name Of The Trainee	Designation	Department	Signature
1	Abdul Latif	Site Worker	Civil	
2	Rasheduel Islam	Site Worker	Civil	
3	Kabir Ahmed	Site Worker	Civil	
4	Aminul Islam	Site Worker	Civil	
5	Shafiqul Islam	Site Worker	Civil	
6	Salahuddin	Site Worker	Civil	
7.	Mofizul Islam	Site Worker	Civil	

Training Coordinator
Hanbaek Co. Ltd.

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Hanbaek Co., Ltd.
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Training Attendance Record

Topics Of The Training : Use of PPE
Trainer : Md. Mohsin-ul-Haque **Date** 15.01.2025
Training Place : Work Place **Trainees** Site Workers

Sl No	Name Of The Trainee	Designation	Department	Signature
1.	Shariful Islam	Site Worker	Civil	
2.	Rafiqur Rahman	Site Worker	Civil	
3.	Abdul Majid	Site Worker	Civil	
4.	Saddam Hossain	Site Worker	Civil	
5.	Asad uzzaman	Site Worker	Civil	
6.	Shamsul Haque	Site Worker	Civil	
7.	Md. Kalim Uddin	Site Worker	Civil	
8.	Aktar Hossain	Site Worker	Civil	
9.	Jasim Uddin	Site Worker	Civil	

Training Coordinator
Hanbaek Co. Ltd.

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Hanbaek Co., Ltd.
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Training Attendance Record

Topics Of The Training : Health and Safety Practices
Trainer : Md. Monirul Islam **Date** 04.02.2025
Training Place : Work Place **Trainees** Site Workers

Sl No	Name Of The Trainee	Designation	Department	Signature
1.	Abdur kadir	Site Worker	Civil	
2.	Jahangir Alam	Site Worker	Civil	Jahangir
3.	Shahinur Rahman	Site Worker	Civil	
4.	Mehedi Hasan	Site Worker	Civil	
5.	Monir Hossain	Site worker	Civil	Monir
6.	Rashidul Islam	Site Worker	Civil	
7.	Abu Bakar Siddique	Site Worker	Civil	

Training Coordinator
Hanbaek Co. Ltd.

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Attendance Sheet of conducted Trainings

Hanbaek Co., Ltd. P.O. Box 62241
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Grievance Log Format

Grievance Log No.	Date of Grievance	Worker's Name	Department / Work Area	Nature of Grievance	Description of Grievance	Action Taken	Date of Resolution	Resolved By	Follow-Up Required	Remarks

Subir Singha
General Manager
Hanbaek Co.Ltd., Korea

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Format of GRM Register

Hanbaek Co., Ltd. P.O. Box 62241
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Incident Reporting Sheet

Incident Report No.	Date of Incident	Time of Incident	Location/ Area	Type of Incident (Accident/ Near Miss)	Description of Incident	Persons Involved	Cause of Incident	Immediate Action Taken	Injuries (if any)

Subir Singha
General Manager
Hanbaek Co.Ltd., Korea

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

Format of Incident Reporting Sheet

Hanbaek Co., Ltd. P.O. Box 62241
23, Bia-ro, Gwangsan-gu, Gwangju -si, KOREA
PH: 82-62-954-1122, FAX: 82-62-953-2117, E-mail: global@hanbaek.co

Injury Register

Injury Log No.	Date of Injury	Worker' s Name	Age	Job Title/Role	Department/Work Area	Nature of Injury	Description of Injury	Part of Body Affected	Cause of Injury	First Aid Given

Subir Singha
General Manager
Hanbaek Co.Ltd., Korea

Branch Office : Gulshan Villa , Flat # 6B, House # 3/C, Road # 23/C, Gulshan-1, Dhaka-1212, Bangladesh.
PH: 8802-2222-90514, 8802-2222-94293

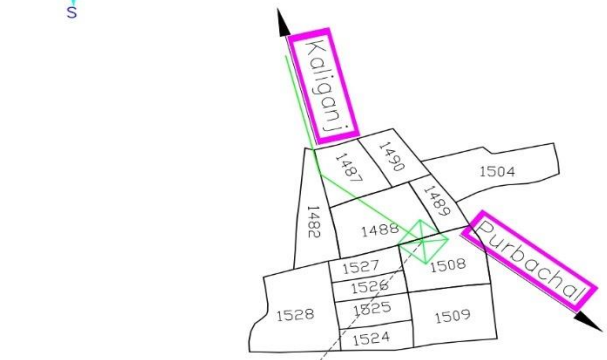
Format of Injury Register Sheet

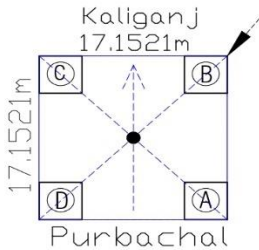
LL ANNEX: TOWER WISE MOUZA MAPS

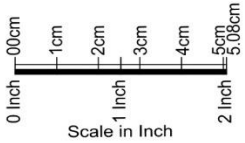
Tower No: T-1A/0 (2DT6+6.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile







Mouza Name:	Bangal Haola	Upazila :	Kaliganj
JL No: 67	Sheet: 01	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		1488		1349.1509	33.3382	2.5970
2		1508		1172.0181	28.9612	4.6727
3	Total Tower Area (Decimal)					7.2697

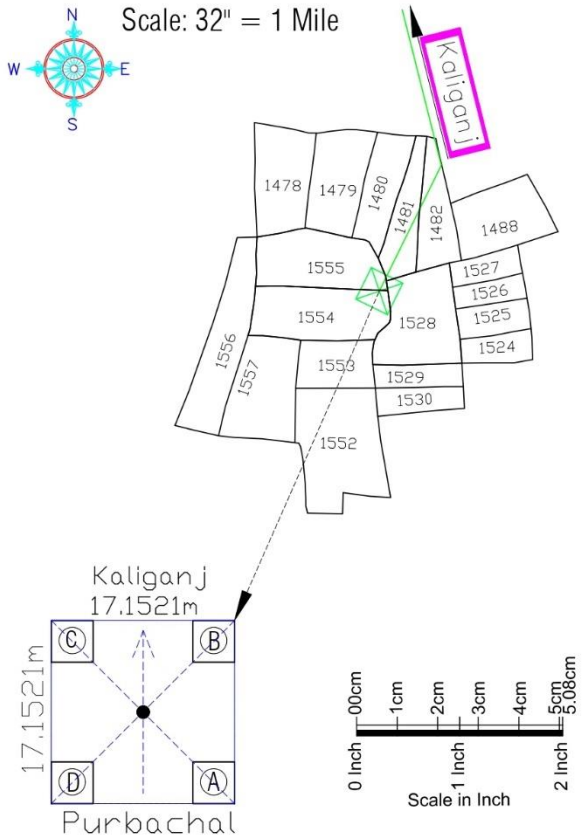
SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251666.634	2649571.828
2	Diagonal Distance	24.2567 Meter	
3	Back to Back Plinth Level	17.1521 x 17.1521 Meter	

NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-1B/0 (2DT6+6.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023



Mouza Name:	Bangal Haola	Upazila :	Kaliganj
JL No: 67	Sheet: 01	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		1481		833.9899	20.6083	0.1509
2		1528		1632.9830	40.3518	1.4723
3		1554		1641.1057	40.5526	3.2367
4		1555		1578.6821	39.0100	2.4098
5	Total Tower Area (Decimal)					7.2697

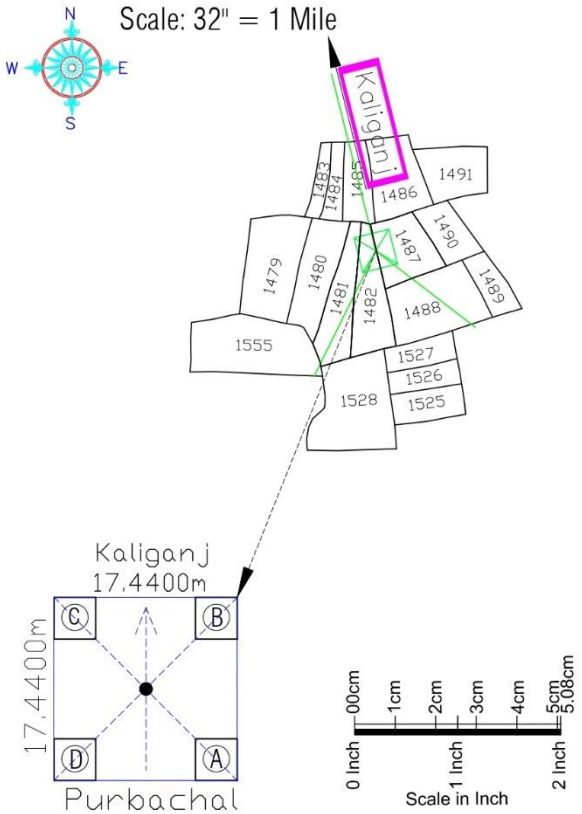
SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251587.878	2649547.701
2	Diagonal Distance	24.2567 Meter	
3	Back to Back Plinth Level	17.1521 x 17.1521 Meter	

NB: 1) All dimension are in meter

LEGEND:
Plot Boundary .....
Transmission Line .....
Tower Location .....

Tower No: T-2/0 (2QT6+3.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023



Mouza Name:	Bangal Haola	Upazila :	Kaliganj
JL No: 67	Sheet: 01	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		1481		833.9899	20.6083	0.3113
2		1482		884.3148	21.8519	3.5517
3		1487		833.8980	20.6060	3.6527
4	Total Tower Area (Decimal)					7.5157

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251618.098	2649609.159
2	Diagonal Distance	24.6639 Meter	
3	Back to Back Plinth Level	17.4400 x 17.4400 Meter	

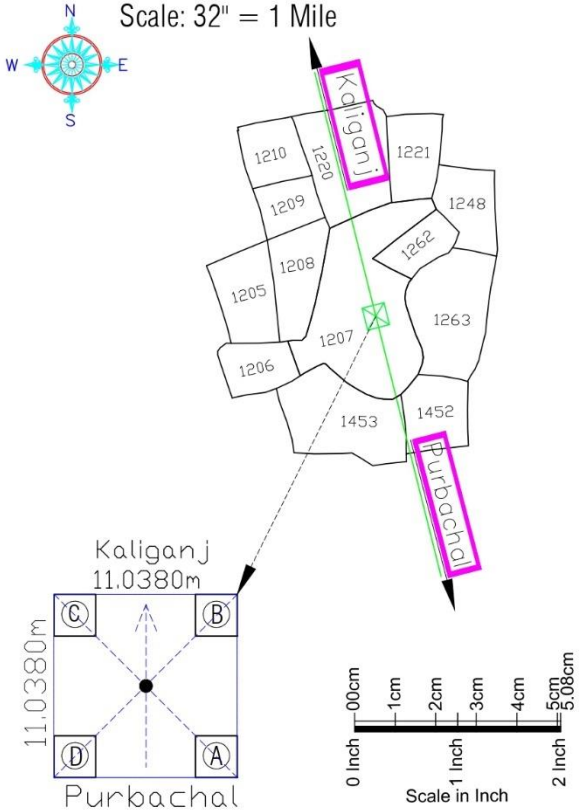
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-2/1 (2QL+3.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Bangal Haola	Upazila :	Kaliganj
JL No: 67	Sheet: 01	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		1207		3949.1381	97.5852	3.0107
2	Total Tower Area (Decimal)					3.0107

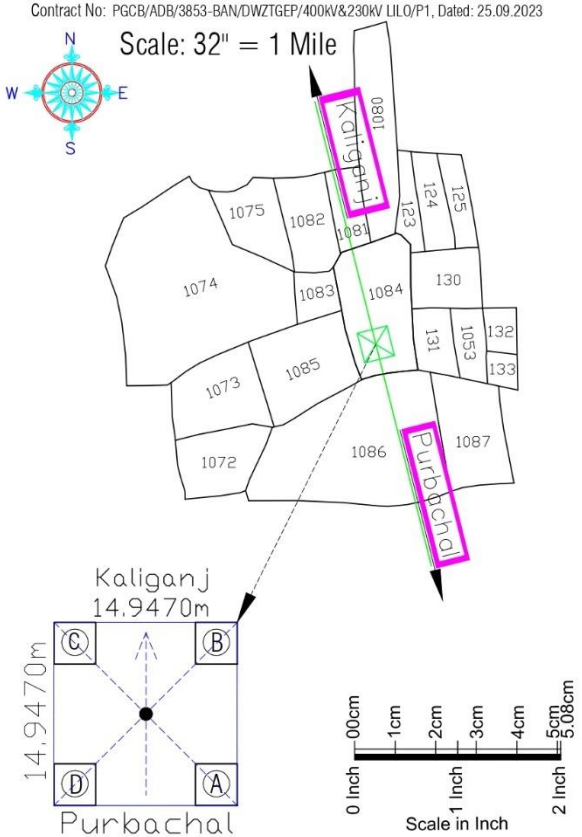
SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251533.129	2649947.929
2	Diagonal Distance	15.6101 Meter	
3	Back to Back Plinth Level	11.0380 x 11.0380 Meter	

NB: 1) All dimension are in meter

LEGEND:
Plot Boundary .....
Transmission Line .....
Tower Location .....

Tower No: T-2/2 (2Q1+21.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023



Mouza Name:	Poilanpur	Upazila :	Kaliganj
JL No: 66	Sheet:	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		1084		2173.1042	53.6985	5.5206
2	Total Tower Area (Decimal)					5.5206

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251444.924	2650299.602
2	Diagonal Distance	21.1383 Meter	
3	Back to Back Plinth Level	14.9470 x 14.9470 Meter	

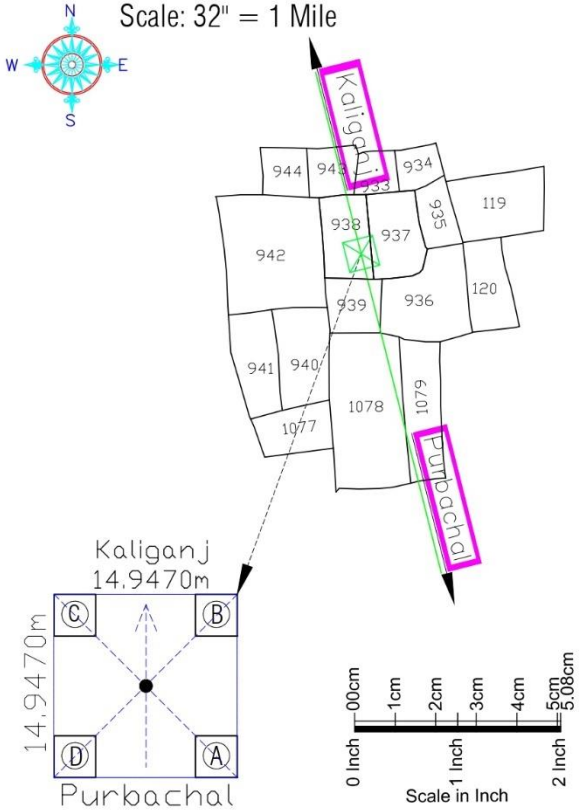
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-2/3 (2Q1+21.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Poilanpur	Upazila :	Kaliganj
JL No: 66	Sheet:	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		937		1040.5516	25.7126	0.8999
1		938		942.9923	23.3018	4.6207
2	Total Tower Area (Decimal)					5.5206

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251395.745	2650495.68
2	Diagonal Distance	21.1383 Meter	
3	Back to Back Plinth Level	14.9470 x 14.9470 Meter	

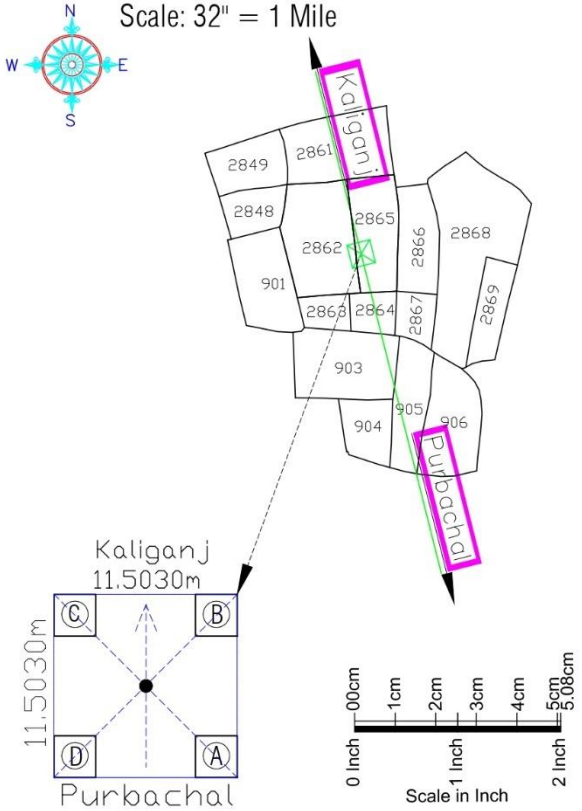
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-2/4 (2QL+6.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Baktarpur	Upazila :	Kaliganj
JL No: 65	Sheet: 02	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		2862		1805.8781	44.6242	0.8803
2		2865		1210.5154	29.9125	2.3894
3	Total Tower Area (Decimal)					3.2697

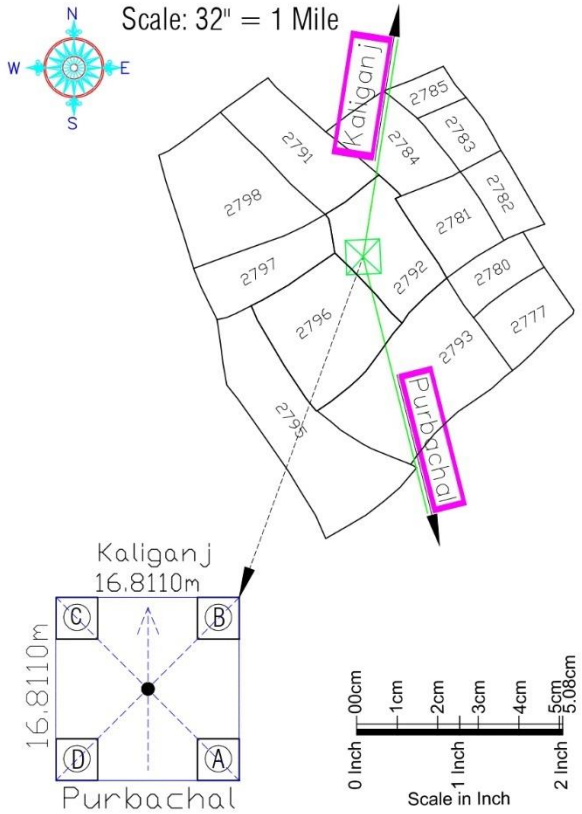
SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251307.005	2650849.489
2	Diagonal Distance	16.2678 Meter	
3	Back to Back Plinth Level	11.5030 x 11.5030 Meter	

NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-3/0 (2Q30+9.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023



Mouza Name:	Baktarpur	Upazila :	Kaliganj
JL No: 65	Sheet: 02	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		2792		2180.0159	53.8693	6.6503
2		2796		3057.9496	75.5635	0.3331
3	Total Tower Area (Decimal)					6.9834

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251236.799	2651129.402
2	Diagonal Distance	23.7743 Meter	
3	Back to Back Plinth Level	16.8110 x 16.8110 Meter	

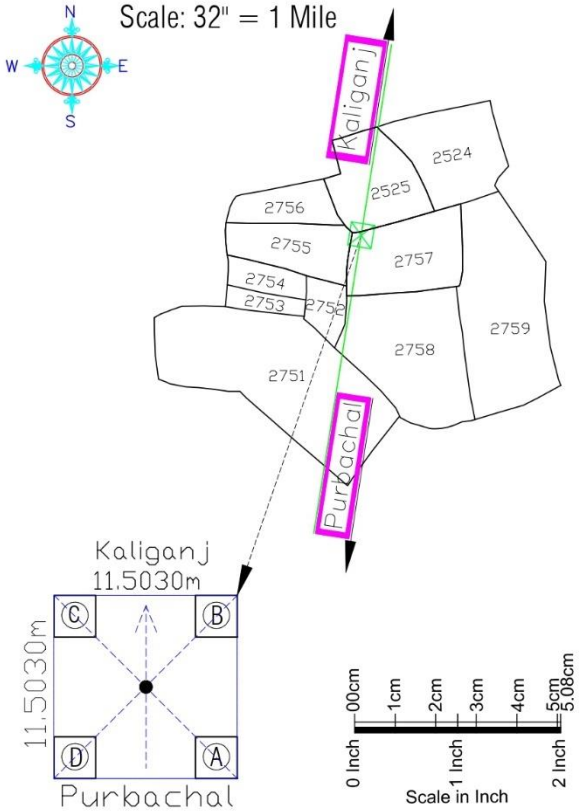
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-3/1 (2QL+6.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Baktarpur	Upazila :	Kaliganj
JL No: 65	Sheet: 02	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		2525		1789.2778	44.2140	1.0286
2		2755		1352.1691	33.4128	0.2074
3		2757		1962.3462	48.4906	2.0337
4	Total Tower Area (Decimal)					3.2697

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251289.76	2651462.43
2	Diagonal Distance	16.2678 Meter	
3	Back to Back Plinth Level	11.5030 x 11.5030 Meter	

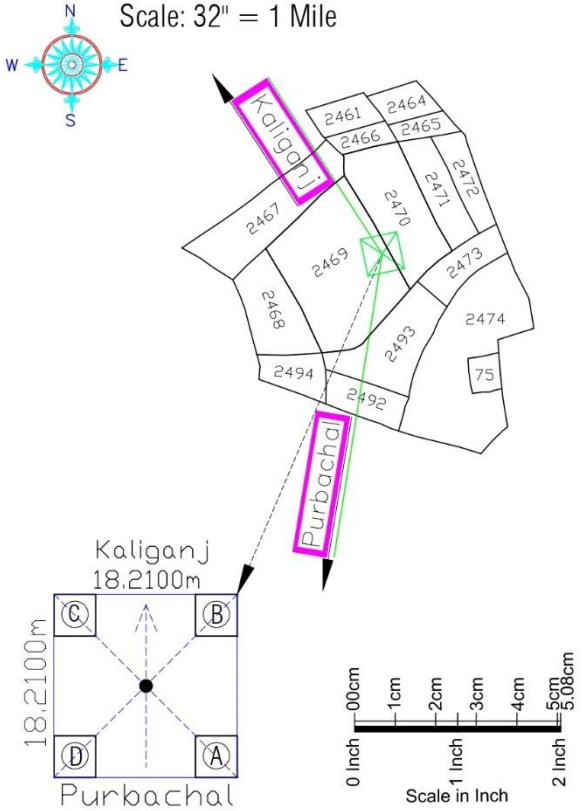
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary .....
Transmission Line .....
Tower Location .....

Tower No: T-4/0 (2QT6+6.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Baktarpur	Upazila :	Kaliganj
JL No: 65	Sheet: 02	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		2469		3387.0421	83.6956	5.7290
2		2470		1860.6124	45.9767	2.4651
3	Total Tower Area (Decimal)					8.1941

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251336.47	2651756.157
2	Diagonal Distance	25.7528 Meter	
3	Back to Back Plinth Level	18.2100 x 18.2100 Meter	

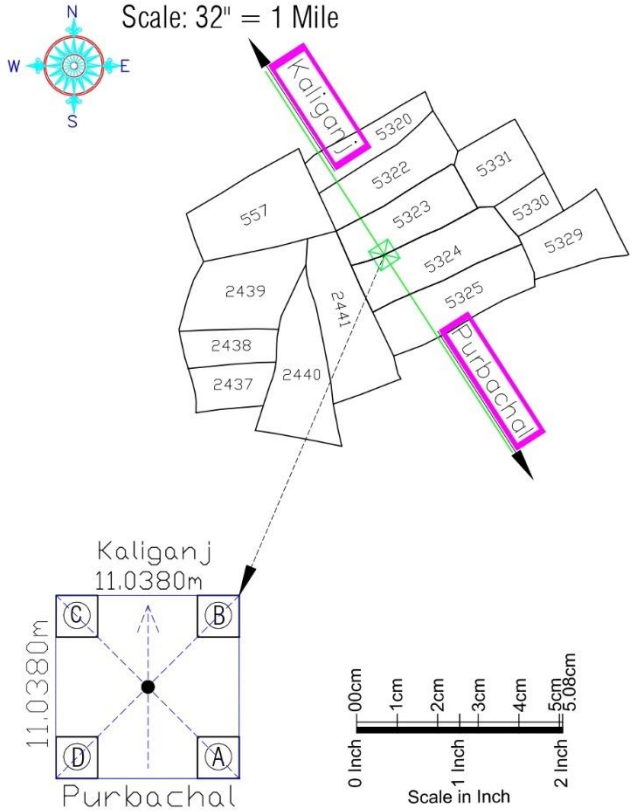
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-4/1 (2QL+3.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Phuldi	Upazila :	Kaliganj
JL No: 63	Sheet: 03	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		5323		1500.6710	37.0824	1.4663
2		5324		1832.8146	45.2898	1.5443
3	Total Tower Area (Decimal)					3.0106

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	251162.918	2652024.108
2	Diagonal Distance	15.6101 Meter	
3	Back to Back Plinth Level	11.0380 x 11.0380 Meter	

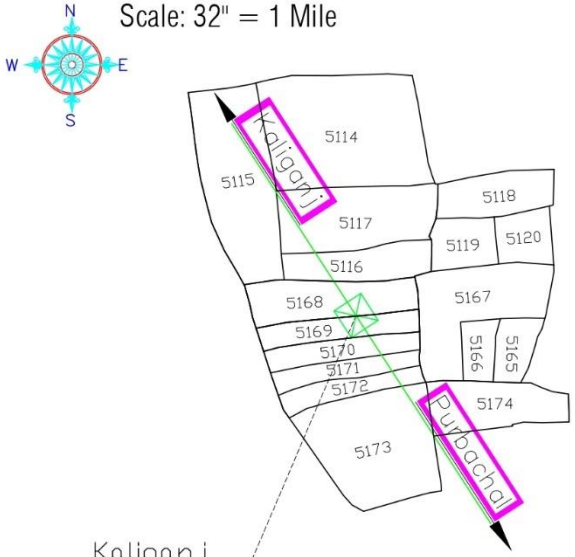
NB: 1) All dimension are in meter

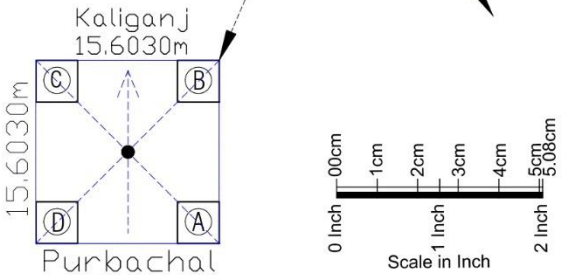
LEGEND:
Plot Boundary
Transmission Line
Tower Location

Tower No: T-4/2 (2Q1+25.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile





Mouza Name:	Phuldi	Upazila :	Kaliganj
JL No: 63	Sheet: 03	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		5168		1507.1010	37.2412	3.1321
2		5169		843.0625	20.8325	2.8837
3	Total Tower Area (Decimal)					6.0158

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	250930.89	2652382.342
2	Diagonal Distance	22.0660 Meter	
3	Back to Back Plinth Level	15.6030 x 15.6030 Meter	

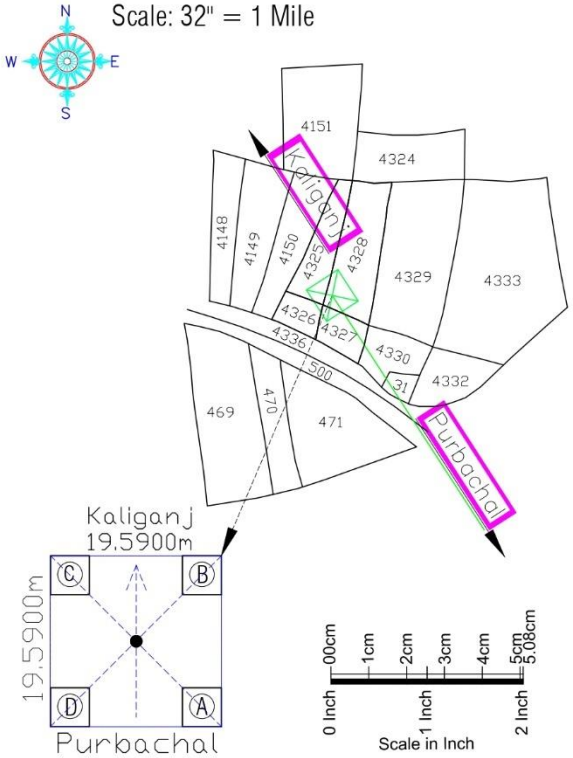
NB: 1) All dimension are in meter

LEGEND:
Plot Boundary .....
Transmission Line .....
Tower Location .....

Tower No: TT-1/0 (2QT6+18.0M)

Project: Design, Supply, Installation, Testing & Commissioning of 400kV and 230kV Transmission Lines' LILO at Kaliganj and Purbachal Substation on Turnkey Basis (Package-1)
Line Name: Four Circuit LILO of Existing Tongi - Ghorashal 230kV Double Circuit Transmission Line to Proposed Kaliganj 400/230kV GIS Substation
Contract No: PGCB/ADB/3853-BAN/DWZTGEP/400kV&230kV LILO/P1, Dated: 25.09.2023

Scale: 32" = 1 Mile



Mouza Name:	Phuldi	Upazila :	Kaliganj
JL No: 63	Sheet: 02	District :	Dhaka

SL	Khatian No (R.S)	Dag No (R.S)	Class	Total Dag/Plot Area (Sqm)	Total Dag/Plot Area (Decimal)	Tower Area Occupied (Decimal)
1		4325		919.7913	22.7285	2.4478
2		4326		394.8811	9.7577	0.2591
3		4327		504.8198	12.4744	1.0915
4		4328		1606.3589	39.6940	5.6847
5	Total Tower Area (Decimal)					9.4831

SL	Point	Co-Ordinates (E,N)	
		Easting	Northing
1	Tower Center	250758.764	2652648.091
2	Diagonal Distance	27.7044 Meter	
3	Back to Back Plinth Level	19.5900 x 19.5900 Meter	

NB: 1) All dimension are in meter

LEGEND:
Plot Boundary
Transmission Line
Tower Location

MM ANNEX: SAMPLE FOR LABELING WASTAGE







