ENVIRONMENTAL IMPACT ASSESSMENT OF TWENTY-THREE SILICA SAND QUARRIES IN THE HABIGANJ DISTRICT



August 2026

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I do hereby declare that the Environmental Management Plan and Monitoring program has been developed with my concern. I shall be responsible for the proper implementation of all activities/steps/plans and monitoring programs mentioned in the Environmental Management Plan.

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Stockpile Locations Management Plan	Section 8.7.2, Page: 8-27
Transportation System and Routes Management Plan	Section 8.7.3, Page: 8-29
Tender Management Plan for Silica Sand Extraction	Section 8.6, Page: 8-22

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31 August, 2026

ENVIRONMENTAL IMPACT ASSESSMENT OF TWENTY-THREE SILICA SAND QUARRIES IN THE HABIGANJ DISTRICT

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ACRONYMS AND ABBREVIATIONS

AAQ	Ambient Air Quality
AOI	Area of Influence
AEZ	Agro-Ecological Zone
BBS	Bangladesh Bureau of Statistics
BIWTA	Bangladesh Inland Water Transport Authority
BMD	Bangladesh Meteorological Department
BMD	Bureau of Mineral Development
BOD	Biological Oxygen Demand
BRRI	Bangladesh Rice Research Institute
BWDB	Bangladesh Water Development Board
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
DAE	Department of Agricultural Extension
DC	Deputy Commissioner
DEM	Digital Elevation Model
DG	Director General
GPS	Global Positioning System
DO	Dissolve Oxygen
DOE	Department of Environment
DOF	Department of Fisheries
DPHE	Department of Public Health Engineering
ECA	Environment Conservation Act /Ecological Critical Area
ECC	Environmental Clearance Certificate
ECR	Environmental Conservation Rules
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
GHG	Green House Gas
GIIP	Good International Industry Practice
GIS	Global Information System
HAZMAT	Hazardous Material
IEE	Initial Environmental Examination
IESCs	Important Environmental and Social Components
IUCN	International Union for Conservation of Nature
KII	Key Informants Interview
KWh	Kilo Watt hour
LGED	Local Government Engineering Department

MOA	Ministry of Agriculture
MOEFCC	Ministry of Environment, Forest and Climate Change
MOFL	Ministry of Fisheries and Livestock
MOPEMR	Ministry of Power, Energy and Mineral Resources
MOWR	Ministry of Water Resources
NGO	Non-Government Organization
NOC	No Objection Certificate
NOx	Oxides of Nitrogen
PAP	Project Affected Person
PCM	Public Consultation Meeting
PPE	Personal Protective Equipment
PPM	Parts Per Million
RS	Remote Sensing
SCC	Site Clearance Certificate
SOx	Oxides of Sulfur
SPM	Suspended Particulate Matter
SRDI	Soil Resource Development Institute
TDS	Total Dissolved Solid
TOR	Terms of Reference
UFO	Upazila Fisheries Office
UNO	Upazila Nirbahi Officer
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

E-1 Introduction

The Bureau of Mineral Development (BMD) is a key government agency in Bangladesh, operating under the Energy and Mineral Resources Division of the Ministry of Power, Energy, and Mineral Resources. It is tasked with managing, regulating, and promoting the exploration, extraction, and utilization of the country's mineral resources, including natural gas, coal, limestone, hard rock, and clay. Established to support sustainable development, the Bureau oversees licensing, compliance monitoring, and the implementation of government policies to ensure environmentally responsible and economically beneficial sand extraction practices.

The Bureau of Mineral Development (BMD) is set to finalize the demarcation of 23 (twenty-three) silica sand quarries under 3 upazila in Habiganj District (Madhabpur-08, Chunarughat-07, and Bahubal-08), an area renowned for its high-quality silica deposits. This initiative aims to ensure the sustainable extraction of this vital resource while adhering to environmental and geological considerations. The move aligns with the government's strategy to manage natural resources responsibly, support industrial growth, and bolster local economic activities.

E-2 EIA Process, Approach, and Methodology

Environmental Impact Assessment (EIA) is a systematic process that identifies and evaluates the potential impacts (positive and negative) that a proposed project may have on the physical, biological, and socio-economic environment. It identifies mitigation measures that need to be implemented in order to avoid, minimize, or reduce the negative impacts, and identifies measures to enhance positive impacts. The EIA is not fully a linear process, but one where several stages are carried out in parallel and where the assumptions and conclusions are revisited and modified as the project progresses. Section 1.5 provided additional detail regarding the key stages in this EIA process.

E-3 Project Legal Aspects

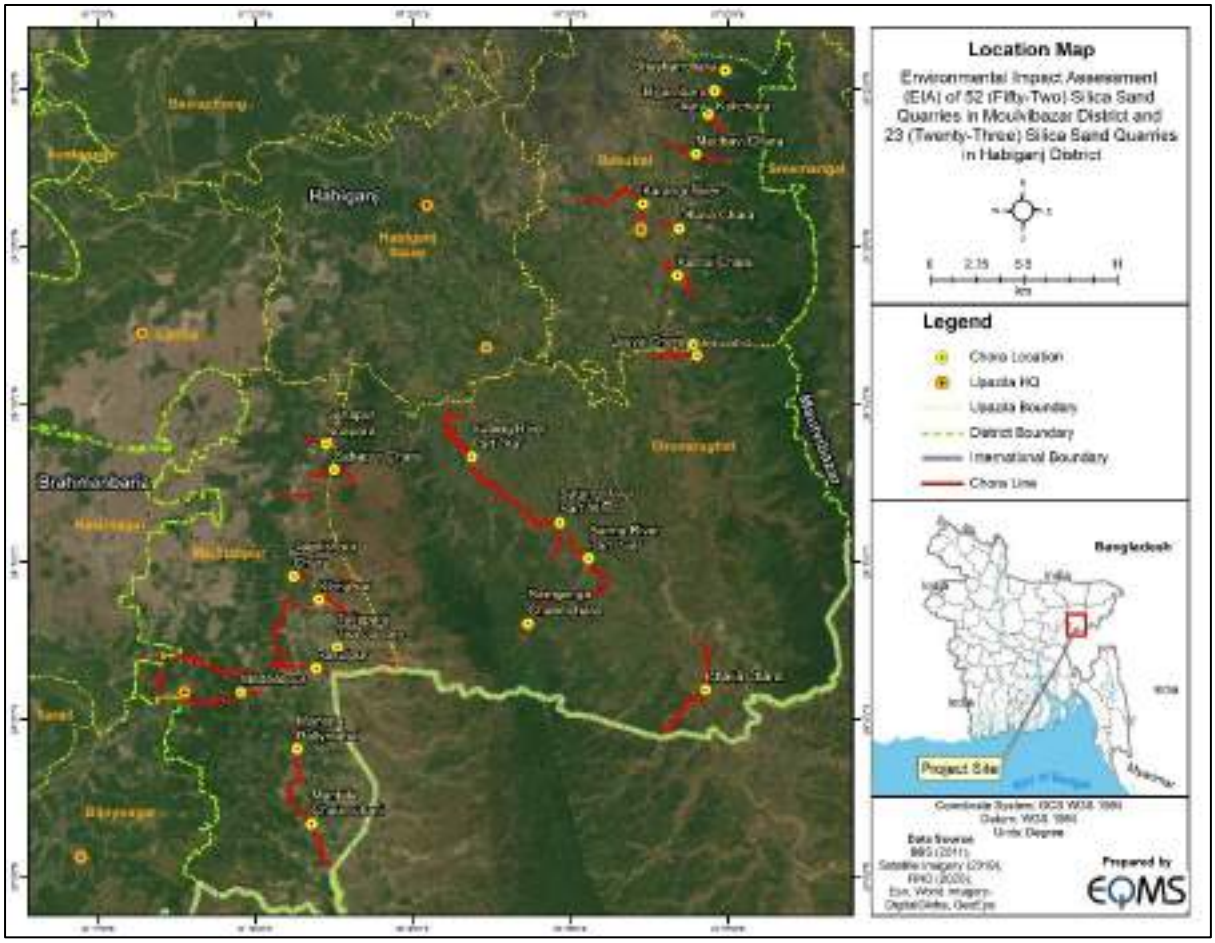
Relevant legislation, policies, and guidelines of Bangladesh have been considered in this EIA where they apply to the proposed Project. The majority relates to aspects surrounding procedure, environmental management, and environmental performance. Analysis of the legal aspects of the Project has shown that it is a permissible activity that requires clearance by DOE. DOE has issued a ToR for conducting an EIA. This EIA report has been prepared on the basis of the terms of reference provided by DOE. Regulatory requirements are incorporated in section 2 of this report.

The activities of sand extraction fall under the “Orange" category according to the Bangladesh Environment Conservation Rules (ECR) 2023. According to ECR 2023, the project requires IEE but after the consultation with the DOE head office for this sand quarry project, DOE decided to conduct an EIA study because the High Court has issued an order for all sand quarry projects required EIA study for getting approval from DOE and BMD following the DOE guideline. All applicable national legislation has been described under Chapter 2.

E-4 Project Description

There are 23 (twenty-three) silica sand quarries that are gazetted by the Government of Bangladesh and are located in three upazila in Habiganj District (Madhabpur-08, Chunarughat-07, and Bahubal-08). Figure 0-1 shows the location map of the project.

Figure 0-1: Location Map of the Sand Quarries



Source: EQMS, 2025

E-5 Description of the Existing Environment

The description of the existing environment provides the baseline case against which any potential impacts of the project can then be assessed. A 500-meter core impact area from the sand quarry and a 2 km buffer from the sand quarry for the main focus for the assessment of the existing environment and social impact assessment. The environmental aspects of the project area are presented, covering physical environments (i.e. soil, air quality, water quality, etc.) and biological environments (i.e. flora, fauna, and ecological aspects) are presented.

The baseline information was collected from both primary and secondary sources. Monitoring of ambient air and noise quality has been done and also surface, groundwater, soil samples, and sediment samples have been collected and analyzed.

E5.1 Physical Environment

Geology: According to the Geological Survey of Bangladesh (GSB), the proposed Project area falls in "Dupi Tila, Alluvial silt, Alluvial silt and clay and Valley alluvium and colluvium formations".

Topography: Topographic features in the study area where the average elevation range is between -6m to 116 m.

Land Use/Cover: In the Study area, 2 km from both sides of the sand quarry, the predominant land use-land cover of the study area includes Aquaculture (0.44%), Brick Field (0.043%), Crop Land (39.102%), Low Land (6.485%), River (0.662%), Settlement with Homestead Vegetation (24.135%), Tea Garden (28.172%) and Waterbody (0.959%).

Soil: Soil of the study area is the "low hills, Grey Piedmont Soils, Peat Soils, and Noncalcareous Dark Grey Floodplain Soils''**.**

Hydrology and Drainage: The hydrological regime of the proposed project area is governed by the Meghna (Upper) River and the Kushiara River.

Meteorology:

Temperature: Based on the temperature recorded at Sreemangal Meteorological Station for the last 30 years (1992 to 2021), the highest average temperature reached 32.4°C in July 2018. The period from March to August is marked by continuous increases in temperatures. August is the hottest month of the year with an average maximum and minimum temperature (in August) of 32.8°C and 23.7°C, respectively. From September onwards, both the day and night temperatures decrease, and January is the coldest month with average monthly maximum and minimum temperatures of 25.1°C and 6.1°C, respectively.

Humidity: The monthly average relative humidity varies from 71.0% to 85.6% in the study area.

Rainfall: The average annual total rainfall at Chattogram Meteorological Station is about 3813 mm from 1992 to 2021.

E5.2 Environmental Quality

Air Quality: The ambient air quality monitoring was conducted at six locations (AAQ-1 to AAQ-6) under sunny conditions, with an 8-hour duration for SPM and CO, and 24-hour durations for $PM_{2.5}$, PM_{10}, SO^2, and NO_x. Results show that $PM_{2.5}$ concentrations ranged from 18.2 µg/m³ to 26.9 µg/m³, all within the limit of 65 µg/m³ as per the Air Pollution (Control) Rules, 2022. PM_{10} concentrations ranged from 34.8 µg/m³ and 42.7 µg/m³ significantly below the limit of 150 µg/m³. SO^2 and NO_x levels were also well below their respective limits of 80 µg/m³, while CO remained under 1 µg/m³, below the limit of 5 µg/m³.

Ambient Noise Levels: Ambient noise level monitoring was conducted in twelve locations. NL-1, NL-5, NL-9, NL-10, and NL-12 fall under residential areas, where the noise levels were found within the acceptable standard limits of 55 dBA (day) and 45 dBA (night). NL-7 falls under a silent zone, where the noise levels exceeded the permissible standard of 50 dBA (day) and 40 dBA (night), indicating noise pollution concerns. NL-8 is categorized as a mixed-use area, where the daytime noise level exceeded the standard limit of 60 dBA, but the nighttime level remained within the 50 dBA limit. NL-2 falls under the commercial zone, where the noise levels comply with the acceptable standards of 70 dBA (day) and 60 dBA (night). NL-3 falls under the industrial zone, where the noise levels exceeded the standard limits of 75 dBA (day) and 70 dBA (night), indicating a need for noise control measures.

Surface Water Quality: Six samples were collected and analyzed in the EQMS lab. The analysis of water quality parameters across six monitoring locations (SWQ1–SWQ6) revealed variations in physical and chemical characteristics. Overall, while most parameters complied with national standards, turbidity, pH, and nitrate levels exceeded permissible limits in certain locations, indicating potential water quality concerns that may require mitigation measures.

The water quality of the canal water and river water sample reveals that it is usable for all purposes as per ECR 2023-Schedule 2 (a).

Ground Water Quality: Six samples were collected from the study area. Overall, while most parameters complied with national standards, concerns were noted regarding high color levels and low pH values, suggesting potential groundwater quality issues that may require further assessment and treatment.

Soil Quality: Six samples were collected from the study area and analyzed. The pH values ranged from 4.01 to 4.16, indicating acidic soil conditions, which may affect nutrient availability and crop growth. Electrical conductivity (EC) values varied between 0.45 dS/cm and 0.50 dS/cm, suggesting that the soil has low salinity levels. Potassium (K) concentrations ranged from 110 mg/kg to 120 mg/kg, while phosphorus (P) levels varied from 7.2 mg/kg to 8.5 mg/kg. Zinc (Zn) concentrations were recorded

between 0.6 mg/kg and 0.8 mg/kg, and copper (Cu) levels ranged from 0.2 mg/kg to 0.3 mg/kg, both of which are within acceptable limits for soil health. Iron (Fe) content varied between 45 mg/kg and 50 mg/kg, while manganese (Mn) levels ranged from 14 mg/kg to 15 mg/kg, both within typical ranges for soil. Lead (Pb) concentrations were low, ranging from 0.04 mg/kg to 0.05 mg/kg, indicating minimal contamination. Organic matter content ranged from 2.2 mg/kg to 2.5 mg/kg, suggesting moderate fertility. The soil texture across all monitoring locations was identified as sandy loam, which generally provides good drainage but may need organic amendments to improve nutrient retention.

E5.3 Biological Environment

Bio-ecological Zone: The project site has fallen under a bio-ecological zone of 9b. Sylhet Hills, 4e. Meghna Floodplain, 5a. Haor Basin and 4d. Surma-Kushiyara Floodplain", project AOI has fallen under four bio-ecological zones.

Climate Change: According to the climatic sub-regions of Bangladesh, the project area is in the North Western Region.

Natural Disaster:

Floods: The project area is categorized into different flood-prone zones: some fall within Not Flood-prone zones, others in Moderate River Flooding zones, and some in Severe Flash Flooding zones.

Earthquake: The proposed project area falls under a seismic coefficient of 0.28 and 0.36, the seismic zone of the project sites is in Zone 3 and Zone 4.

Cyclone: The project site is in the North-Eastern part of Bangladesh which lies in the no-risk zone in terms of cyclonic events.

E-6 Socio-economic Environment

The social and economic aspects of the Project area (i.e. demographics, employment, cultural aspects, etc.) are presented. In the 2 km study area, a total number of 23,77,678 population are living in 4,57,623 households of the study area. The average household size is 5.2 and the sex ratio is 96.9. All the population will be impacted indirectly along with positive (Job opportunities, Income generation activities, etc.) and negative (dust generation from transportation vehicles, road accidents in the approach road, etc.) consequences by the implementation of the Project.

E-7 Analysis of Potential Alternatives

The project has been considered and investigated for several alternatives to reduce the environmental and social impacts. The alternatives assessed were not limited to environmental and social aspects, but the assessment also included the technical aspects of different options.

The Project has considered alternatives in terms of design, and technology options. An analysis of these alternatives has been undertaken for the proposed Project including consideration of a no-Project scenario. Details of technical alternatives are given in section 6.

E-8 Impact Identification and Analysis

The potential impacts of the proposed project on different environmental and social components are systematically identified for evaluation of significance.

Alongside the project benefits, there will be potential negative environmental impacts during sand extraction.

Impacts are classified as both positive and negative for the proposed project. Detail impacts of the proposed project for Ambient Air Quality, Ambient Noise Levels, Impact on Land Use, Impact on Agriculture, Water Quality, Soil Quality and Erosion, Waste Generation, Ecological Impacts, Impact on Traffic, Occupational Health and Safety and Community Health and Safety are given in chapter 7.

E-9 Environmental and Social Management Plan

The environment and social management plan have been developed for the proposed sand extraction project with an aim to avoid, reduce, and mitigate adverse environmental and social impacts and to propose enhancement measures. They are:

- Mitigation of possible adverse impacts;
- Monitoring of impacts (environmental and social) and mitigation measures during sand extraction of the proposed project.
- Institutional capacity building and training;

E9.1 Mitigation Measures

The environmental and social management plan (EMP) has been recommended to highlight the action procedures to avoid/minimize/control the impacts arising out of different projects. The EMP is elaborately described in Chapter-8 of this report.

E9.2 Monitoring Plan

In accordance with the EMP, an environmental and social monitoring plan has been developed and presented in Chapter 8.

E9.3 Institutional Setting and Implementation Arrangement

The contractor will monitor the implementation of these mitigation measures at the site. The DC office, BMD will monitor the EHS activities from the contractor.

E-10 Stakeholder consultation

During EIA, 5 KIIs have been conducted with the project-affected and interested stakeholders. During EIA, 11 FGDs with various groups including projected people who are going to be affected by the project directly or indirectly were conducted in different locations throughout the project's adjacent area. In the FGDs, an effort was made to invite a wide range of stakeholders including farmers, businessmen, landowners, house owners, and other affected persons.

Outcomes from this consultation showed that the community was generally supportive of the proposed Project and that the community believed that the Project would bring some benefits to them and the local area. Such perceived benefits included the potential for local employment relating to the Project and the potential that infrastructure investment in the local area may occur as a result of the Project.

E-11 Emergency Response Plan The Emergency Response Plan includes any measures that should be in place at all facilities to combat an emergency resulting from spills of flammable liquids (Oils), road accidents, flash floods due to heavy rain, landslides due to sand extraction, river bank, and canal erosion due to sand extraction.

E-12 Conclusion and Recommendation

The silica sand extraction project has been initiated by BMD at three upazila of Habiganj District. Site Clearance Certificate (SCC) and an Environmental Clearance Certificate (ECC) will be required for the sand extraction project in favor of BMD. This EIA study was conducted to get the ECC from DOE.

Based on the EIA, the government will generate revenue from sand extraction from the sand quarries. It's also assessed during EIA that the sand extraction from quarries also has positive impacts on the drainage system, agricultural lands, flash floods, employment, and biodiversity in the project area.

The EIA has identified that there are negligible to medium negative environmental and social impacts as a result of the project. However, this EIA has also determined that if comprehensive and effective management and mitigation measures are implemented as proposed, the negative impacts should be reduced to a non-significant level.

Findings and suggestions of the EIA study of the proposed project should be considered and implemented during sand extraction of the project with strong monitoring. Giving the income and employment opportunities for the local community for the project. The Environmental Management Plan (EMP) should be implemented for this project. Manual sand extraction for minimizing the environmental impacts over the excavator where applicable. Establishing Institutional arrangements with proper logistics and training for Environment, Health, and Safety during silica sand extraction.

CHAPTER 1
Introduction

1 INTRODUCTION

1.1 Background

The Bureau of Mineral Development (BMD) is a key government agency in Bangladesh, operating under the Energy and Mineral Resources Division of the Ministry of Power, Energy, and Mineral Resources. It is tasked with managing, regulating, and promoting the exploration, extraction, and utilization of the country's mineral resources, including natural gas, coal, limestone, hard rock, and clay. Established to support sustainable development, the Bureau oversees licensing, compliance monitoring, and the implementation of government policies to ensure environmentally responsible and economically beneficial mining and extraction practices.

BMD plays a vital role in conducting geological surveys, assessing resource potential, and fostering collaborations with international organizations and research institutions to adopt advanced technologies. With its efforts focused on balancing resource development and environmental sustainability, the Bureau is crucial for generating revenue, supporting industrial growth, and addressing challenges posed by climate change. It also emphasizes equitable resource sharing and community benefits while contributing to infrastructure and economic development in Bangladesh.

BMD is set to finalize the demarcation of twenty-three silica sand quarries under 3 upazila in Habiganj District an area renowned for its high-quality silica deposits. This initiative aims to ensure the sustainable extraction of this vital resource while adhering to environmental and geological considerations. The move aligns with the government's strategy to manage natural resources responsibly, support industrial growth, and bolster local economic activities.

EQMS Consulting Limited has been engaged by the BMD to conduct an Environmental Impact Assessment (EIA) for this project. This EIA has been prepared in order to fulfill the requirements and conditions of the Government of Bangladesh (GOB), including those issued by DOE in the Terms of Reference (TOR). This EIA report is intended for submission to DOE to get a Site Clearance Certificate (SCC) and an Environmental Clearance Certificate (ECC) for the Project.

1.2 Overview of the Project

The proposed project is located in the Habiganj District. The detailed areas included in sand extraction and leasing locations in Habiganj District are shown in Table 1-1.

Table 1-1: Detailed areas included in sand extraction and leasing locations in Habiganj District

Upazila	Quarry Name	Mouza Name	Area (in Acre)
Madhabpur	Mantala Chaumuhani	Kashimpur, Albuxpur, Manoharpur, Mangalpur, Gazipur, Ashrafpur	20.58
	Sahapur Noapara	Sahapur, Manikpur, Noapara, Haritala	9.07
	Mantala Ballymahal	Borhanpur, Bhavanipur, Durlabhpur, Afjalpur Bohora	26.72
	Rasulpur	Aktiyarpur, Bhandarua, Shahjahanpur, Sampadpur, Boro Daliya, Salimpur, Rasulpur North	16.76
	Teliapara Tea Garden	Teliapara Tea Estate	15.95
	Kibriabad	Surma Tea Estate	20.09
	Jagdishpur Chara	Jagdishpur	9.47

Upazila	Quarry Name	Mouza Name	Area (in Acre)
	Madhabpur	Madhabpur East, Madhabpur West, Harishyasa, Mohammadpur, Chandura, Aktiyarpur, Kutania, Sundasil, Enayetpur	33.49
Chunarughat	Sahapur Chara	Raghunandanpur Reserve Forest,	-
	Sutang River “Kha” Part	Ponchash, Fandrail, Halhalia Deundi, Phulpur, Uzailpur, Marelwara, Gazipur, Laskapur Tea Garden, Dhalijabar, Daulat Khan, Marelura Chowk	47.62
	Sutang River Part "Ka"	Lalchand Joar, Chalitar Abda, Mohimaura	51.49
	Surma River Part "Ga"	Deorgach, Chandpur Tea Garden, Chandpur Enatabad, Marulura Chowk	27.46
	Deocahra	Daragaon Tea Garden, Haji Kamalpur	11.86
	Ichalia Chara	Zarulia Tea Garden, Gobar Mala Tea Garden, Gazipur Tea Garden, Uchmanpur, Dudhpatil	39.36
	Ramganga Chandichara	Chandichara Tea Garden, Nawab Khan Tea Garden, Chandpur Tea Garden	27.86
Bahubal	Shashanchara	Sukhchar, Babanpur	4.33
	Digambara Chara	Rajsuyot, Sultanpur	3.67
	Kalichara	Mostompur, Harirampur	5.21
	Madhavi Chara	Hilalpur, Adityapur	2.10
	Dhalia Chara	Rampur Tea Garden, Mayzabad Hills	7.94
	Karangi River	Khairabad, Bhavanipur, Satpariya, Inaabad, Guhaytara, Bargaon, Abdaramcharan, Paikpara, Rashidpur, Sahapur, Kashyampur	125
	Kamai Chara	(“Ka” Part) Bhadeswara, (“Kha” Part) Rashidpur Tea Garden	5.18
	Lauya Chara	Daragaon Tea Garden	1.10

Source: Bureau of Minerals Development

1.3 Scope of EIA Study

This report fulfills the requirements of the EIA under the ECR 2023 and has been prepared in accordance with the approved TOR (Appendix B) by the DOE. The detailed scope of the EIA study is outlined below:

- Development of an integrated project description of the project components including its sub-components, which are under the purview of the Project Proponent (PP).
- Development of a regulatory, policy, and administrative framework relevant to the Project;
- Assessment of baseline conditions (Physical, Biological, and Socio-economic Condition).
- Assessment of environmental quality (Air, Water, Noise, and Soil).
- Assessment of detailed ecological conditions in and around the project site.
- Identification, prediction, quantification, and evaluation of potential aspects and impacts of the proposed project on the environment.

- Formulation of an Environmental Management Plan and associated/specific mitigation plans for identified impacts.
- Mitigation measures and monitoring plan for effective implementation of mitigation measures of the project.
- Formulation of public and stakeholder consultation for the proposed project.
- Preparation of the EIA report based on DOE-approved TOR for obtaining ECC from the DOE, Bangladesh.

1.4 Applicable Reference Framework

The main environmental regulations in Bangladesh are the Environment Conservation Act (ECA) 1995 (amended 2000, 2002, 2007 and 2010) and Environment Conservation Rules (ECR) 2023. ECA 1995 provides the requirements for environmental protection, improvement of environmental standards, and control and abatement of environmental pollution.

ECR 2023 provides for the declaration of ecologically critical areas, categorization of industries and projects, and identified types of environmental assessments needed against respective categories of industries or projects. ECA 1995 and ECR 2023 outline the regulatory mechanism to protect the environment in Bangladesh.

1.5 Approach and Methodology

The approach and methodology are outlined based on information available about the proposed project, our previous experience of understanding similar kinds of projects, regulatory requirements in Bangladesh, and the requirements to meet the DOE standards.

1.5.1 Approach to the EIA

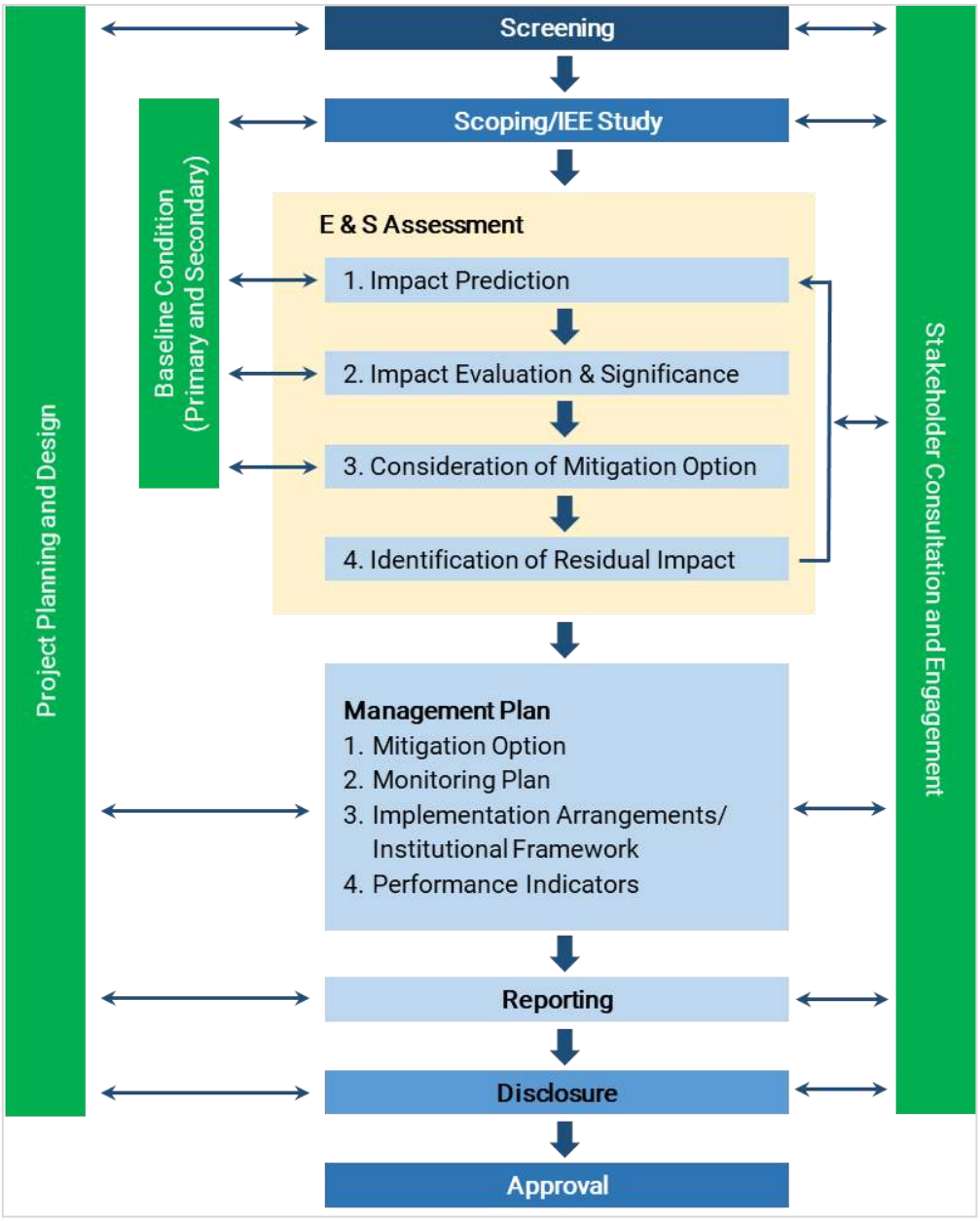
In order to attain the earlier mentioned scope of work, the studies were based on the review of the available project-related information including primary and secondary baseline environment and social data, prediction, and evaluation of impacts of significance. The following approach and methodology are proposed to complete the EIA study.

The EIA of the project will follow a systematic process of:

- **Screening Study:** The proposed project falls under the "Orange" Category as per the Environment Conservation Rules 2023, As this is an orange category project and listed 63 of the orange category in the ECR 2023, this project requires IEE. After the consultation with the DOE head office for this sand quarry project, DOE decided to conduct an EIA study because the High Court has issued an order for all sand quarry projects to require an EIA study to get approval from DOE and BMD following the DOE guidelines therefore, would require ECC from the DOE based on EIA, carried out as per the approved terms of reference for the EIA study.
- Data Collection of **environmental and social baseline conditions** against which the assessment will be undertaken.
- **Consult with stakeholder** and integrate their views into the project design and mitigation.
- Systematically **predict and evaluate the positive and negative changes** in these baseline conditions.
- All impacts and benefits of the project should be documented and fully explained within the **EIA report**.
- **Identify the mitigation measures** that the client will take to avoid, reduce, remedy offset, or compensate for adverse impacts, and to provide or enhance benefits from the project.
- Develop an **Environmental Management Plan (EMP).**

The approach proposed for conducting the EIA for the selected project is presented in Figure 1-1.

Figure 1-1: Approach to the EIA



Source: EQMS

1.5.2 Methodology for the EIA

To attain the earlier mentioned scope of work, the EIA was based on the collection of primary and secondary baseline information, impact assessment, and delineation of EMP. The methodology that was followed to complete the EIA for the selected project is divided into the following tasks as presented in Table 1-2 and elaborated in subsequent sections.

Table 1-2: Tasks Undertaken for the EIA Study

Task Number	Task
Task-1	Kick-off Meeting and Team Mobilization
Task-2	Project Description
Task 3	Review of Legislation, Policy and Regulation

Task Number	Task
Task-4	Environmental and Social Baseline Conditions
Task 5	Consultation with Stakeholder
Task 6	Analysis of alternative
Task-7	Environmental Impact Assessment
Task 8	Emergency Response Plan
Task-9	Development of EMP
Task-10	Preparation of Draft EIA Report
Task-11	Preparation of Final EIA Report

1.5.2.1 Task-1: Kick-off Meeting and Team Mobilization

Immediately following the completion of the contract negotiation and contract signing, the proponent, together with the team leader completed all logistical arrangements. In accordance with the EQMS quality requirements, the project manager formalizes team briefing notes outlining the scope of work and outputs required from each of the team members. A kick-off meeting was held on December 01, 2024, with the officials of the client for understanding and major objectives of the project, project details, activities, current status, project milestones, legal requirements, scope, etc.

1.5.2.2 Task-2: Project Description

A section on the project description was prepared. This was developed to the level of detail needed to adequately understand potentially significant project impacts. This covered project location, road connectivity, brief information about sand quarry, project activities, workflow of sand extraction, project schedule, resource, and utility demand, and maps using appropriate scales. Also, identify components of key environmental indicators in physical, biological, and social environments.

1.5.2.3 Task-3: Review of Legislation, Policy, and Regulation

The study team reviewed all the applicable national rules, regulations, policies, and guidelines applicable for the proper implementation of the project. The relevant national acts, policies, rules, and strategies/plans pertaining to the project reviewed as part of the study include, but are not limited to, the following:

- Environmental Conservation Act 1995 and Amendments
- Environmental Conservation Rules 2023
- EIA Guidelines for Industries, 2021
- Noise Pollution (Control) Rules, 2006
- Air Pollution (Control) Rules, 2022
- Mines and Minerals (Control and Development) Act (1992) and Mines and Minerals Rules (2012)
- Ecologically Critical Areas (ECAs) Management Rules, 2016
- National Environmental Policy, 2018
- The National Forest Policy, 2016
- Environment Court Act, 2010
- National Biodiversity Strategy and Action Plan, 2004
- National Occupational Health and Safety Policy, 2013
- Bangladesh Labor Act, 2006 and amendment in 2013 and Labor Rules, 2015
- National Child Labor Elimination Policy, 2010
- National Water Policy, 1999

- Bangladesh Water Act, 2013 and Bangladesh Water Rules, 2018
- National River Protection Commission Act, 2013
- Solid Waste Management Rules, 2021
- Disaster Management Act, 2012
- Road Transport Act, 2018
- Biodiversity Act, 2017
- Wildlife (Conservation and Security) Act, 2012
- National Fisheries Policy, 1999

1.5.2.4 Task-4: Environmental and Social Baseline Conditions

An expert team from EQMS Consulting Limited was engaged to carry out environmental and social baseline data collection between December 2024 and January 2025. Socio-economic data collection and consultations with the local community and other government departments were conducted at the same time. Secondary data were collected from different government departments, local bodies, and through literature review, etc. All the data were compiled and compared with applicable standards where relevant and were presented in the EIA report.

1.5.2.5 Primary Baseline Data Collection

With the assistance of the client, EQMS has identified an accredited environmental laboratory of repute which was engaged in the analysis of the collected environmental quality samples on ambient air quality, surface water quality, groundwater quality, ambient noise level, sediment quality, and soil quality as per aspects detailed in Table 1-3.

Table 1-3: Primary Baseline Data for the EIA Study

S/N	Environmental Attribute	Locations	Frequency	Remarks
1	Ambient Air Quality	6 locations	Once during the baseline survey	Ambient air quality monitoring in and around the project site
2	Ambient Noise Quality	12 locations	Once during the baseline survey	According to Noise Pollution (Control) Rules, 2006, in and around the project site
3	Surface Water Quality	6 locations	Once during the baseline survey	Surface water from the study area
4	Groundwater Quality	6 locations	Once during the baseline survey	Groundwater samples from the study area
5	Soil Quality	6 locations	Once during the baseline survey	Soil samples from the study area
6	Sediment Quality	6 locations	Once during the baseline survey	Sediment samples from the study area
7	Flora and Fauna	Project Area of Influence	Once during the baseline survey	The ecological survey has been undertaken to assess the biodiversity aspects.
8	Socio-economic	Project Area of Influence	One-time survey	Mostly assessed through FGDs and available secondary information

S/N	Environmental Attribute	Locations	Frequency	Remarks
9	Public Consultation Meeting	Project site/near project site	Once during the Baseline survey	Local community including different occupational groups
10	Stakeholder Consultations	-	Once during the Baseline survey	All the stakeholders

1.5.2.5.1 Secondary Baseline Data Collection

Secondary data were collected from the following organizations like Bangladesh Meteorological Department (BMD), Bangladesh Bureau of Statistics (BBS), Bureau of Mineral Development (BMD), Bangladesh Agricultural Research Council (BARC), Geological Survey of Bangladesh (GSB), International Union for Conservation of Nature (IUCN), Space Research and Remote Sensing Organization (SPARRSO), Department of Agricultural Extension (DAE), Bangladesh Water Development Board (BWDB), Bangladesh Inland Water Transport Authority (BIWTA), and published Journals and Books for the following aspects.

A. Physical Environment

- Regional Setting
  - Physiography, Geomorphology, Land Use, Geology, Drainage, Hydrology, and Soil.
- Climate and Meteorology
  - Climatic Pattern, Ambient Temperature, Relative Humidity, Rainfall, and Regional Wind Patterns (Wind Speed and Direction).
- Hazard and Risks
  - Natural Hazards: Floods, Seismic Activities, Seasonal Storms and Cyclones, Tidal Surges, Droughts.

B. Socio-economic Environment

- Demographic Profile
- Education and Literacy
- Economic Activities and Livelihood Pattern
- Socio-economic Infrastructure and Indicators
  - Health Care Facilities,
  - Education Facilities,
  - Drinking-Water and Sanitation,
  - Transportation Facilities, and
  - Sites of Cultural/Archaeological Importance.

C. Ecology and Biodiversity

- IUCN Red List (2015)
- Flora and Fauna
- Biodiversity Condition
- Existing Terrestrial Ecosystem
- Aquatic Fauna and Vegetation

1.5.2.6 Task-5: Consultation with Stakeholder

Extensive consultations were conducted with key stakeholders, including the local community, and government departments/agencies during the field visit. Stakeholder consultation was completed with the intent of collecting baseline information on the environmental and social conditions and sensitivities, developing a better understanding of the potential impacts, informing the public of the proposed project, and to gain an understanding of the perspectives/concerns of the stakeholders. A summary of the stakeholder engagement process and the profile of the groups and their opinions have been given in Chapter 9 of the EIA report.

1.5.2.7 Task-6: Analysis of alternative

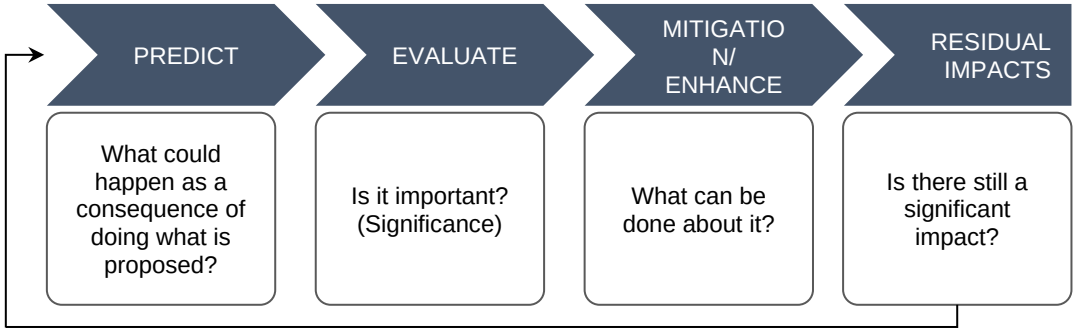
The proposed sand extraction project has been considered and investigated for several alternatives to reduce the environmental and social impacts. The alternatives assessed were not limited to environmental and social aspects, but the assessment also included the technical aspects of different sand extraction and sand transportation options and included consideration of a no-project scenario.

1.5.2.8 Task-7: Impact Assessment

The EIA evaluated potential impacts using a methodology based on the evaluation of the "significance" of identified issues and impacts on baseline parameters. Analysis of the baseline results and the incremental impacts of the project were assessed in accordance with the national standards for water as mentioned in the ECR 2023, Air Pollution (Control) Rules 2022, and Noise Pollution (Control) Rules.

The impact assessment covered the full project lifecycle, which included Quarrying phase activities. The impact assessment has involved the prediction, evaluation, and mitigation of impacts and the report on impacts including residual impacts. Impact prediction takes into account control measures that are part of the project sand extraction activities.

Figure 1-2: Impact Assessment Process for the EIA



The impacts were identified and quantified for intensity using matrix techniques and evaluated as Negligible, Low, Moderate, and High impacts on the environment and communities in the study area. Aspects that were considered in the impact assessment, during the Quarrying phase of the proposed project, land use, water quality (surface and ground), noise, ecology, waste, landscape, and visual, traffic, flood, and other natural disaster risks, sedimentation, and erosion, socio-economic, occupational and community health, and safety, etc.

The principal aim of this task was to identify and assess potential impacts on various environmental and social components due to the proposed project. Based on baseline data collected in the study area, information on the type and quantity of pollutants, and surveys of the study area, the EIA team identifies and predicts potential impacts due to the proposed project on the surrounding environment Quarrying phase of the project.

The key issue is to identify after collecting the baseline information. Each issue consists of components that on their own or in combination with each other, give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project.

1.5.2.9 Task-8: Emergency Response Plan

An Emergency Response Plan (ERP) prepared for the sand extraction project includes information such as whom to notify, who should do what, potential emergencies, emergency management, and responsibility during an emergency.

1.5.2.10 Task-9: Development of EMP

Requirements and details of the mitigation measures for minimizing identified negative impacts and enhancement measures for increasing the benefit of positive impacts are suggested in the EMP for

implementation by the client during the Quarrying phase of the project. The EMP is comprised of the following aspects based on the impacts assessed for the project:

- Introduction to the purpose of the EMP;
- Institutional mechanism - roles and responsibilities for EMP implementation;
- Tentative cost for the implementation of the EMP;
- Summary of significant adverse impacts and potential hazards;
- Mitigation measures and control technologies, safeguards, etc. to minimize adverse impacts on physical, biological, and socio-economic environment, measures to minimize associated hazards and control the emergency; and
- The project monitoring program for effective implementation of the mitigation measures and ascertain the efficacy of the environmental management and hazard control systems in place.

This sets out the mitigation and management measures required during project implementation to avoid or reduce the environmental and/or social impacts, including developing the action plan in accordance with DOE requirements. A monitoring plan is included here, covering the type of monitoring to be done, responsible parties, schedule, standards to be used, resources, and tentative cost. Plans developed at this stage for air quality, noise level, soil quality and erosion, biodiversity, waste management, traffic, occupational health and safety, community health and safety, and water resources are provided in this EMP with a monitoring plan.

1.5.2.11 Tasks-10 and 11: Reporting - Draft and Final EIA Report

A draft EIA report was prepared upon completion of the above tasks as per the prescribed TOR given by the DOE and submitted to the client for providing their comments and suggestions.

Based on one set of consolidated comments from the client, the Draft EIA was finalized by the EIA team for submission to the DOE after completing the PCM with different stakeholders to get a Site Clearance Certificate (SCC) and an Environmental Clearance Certificate (ECC).

1.6 Limitation

The following are some of the limitations of the study:

- This study is limited to investigating and managing potential impacts associated with the activities of the Project, (the scope of which is described in Chapter 3 of this report). No assessment has been made for any future projects or activities that may arise beyond the current scope of the project as stated in this report. If or when any such developments are proposed, additional environmental (and social) impact assessment should be carried out at that stage in accordance with the legal requirements of Bangladesh.
- This study has been carried out by accessing data from a wide range of primary and secondary data. This includes reviewing literature, journals, reports, and other documents, which have been supplemented with primary field data collection.
- Assessment of the Project is limited by the quantity and quality of available data. Certain provisions in this EIA report assume reliance on conceptual design and technical information.
- If the project inclusion of new information, changing motivations, or any other reason, the results of any impact assessment or possible mitigation measures provided in this report may be inconsistent.

1.7 EIA Team

The composition of the EIA team is shown in Table 1-4.

Table 1-4: The EIA Team

S/N	Name	Position Assigned
1.	Md. Golam Mawla (Peng)	Team Leader
2.	Tauhidul Hasan	Environmental Specialist
3.	Dr. AHM Mustain Billah	Social Development Specialist
4.	SK Salahuddin Ahmmad	HSE Expert
5.	Dr. K. M. Mijanur Rahman	Ecologist
6.	A.B.M Anwar Haider	Hydrologist
7.	Md. Zahidul Islam	RS & GIS Expert

1.8 Structure of the Report

The EIA report has been prepared to meet the requirement of national policies to be approved by DOE. The report is divided into eleven chapters that follow the activities stipulated in the approved TOR of the EIA study. The outline of the present EIA is as under:

0. **Executive Summary:** provides an overview of the EIA report.
1. **Introduction:** describes the background of the study, brief description, scope of the study, approach and methodology, limitations, EIA study team combination, and structure of the report.
2. **Legislative, Regulation, and Policy Consideration:** covers all the legal provisions, including environmental and social laws, applicable to the project. The chapter also covers all the national standards applicable to the project.
3. **Project Description:** provides a detailed description of the proposed project comprising project justification, location, layout, and project components.
4. **Environmental Baseline:** covers the environmental baseline parameters on the physical environment (land use, topography, geology, physiography, geomorphology, agroecology, soil conditions, soil quality, natural hazards, meteorology, ambient air quality, ambient noise level, hydrology, drainage systems, surface water quality, and groundwater quality), biological environment, and socio-economic environment within the study area.
5. **Socio-Economic Environment:** covers the social parameters of the study area that includes the population and demography, economic condition of the people, social setup, and relevant public utilities enjoyed by the population to understand the impact of the project.
6. **Analysis of Potential Alternative:** covers the alternatives that can be considered for the project based on its need and available resources.
7. **Identification and Evaluation of Potential Impacts:** covers the detailed impact of the proposed project on different environmental components during the construction and operation phase of the project.
8. **Management Plan/Procedures:** covers a comprehensive EMP including recommendations for its implementation during the pre-construction, construction, and operation phase of the project. The EMP consists of the set of mitigation, management, monitoring, and institutional measures to be taken during the implementation of the proposed project to eliminate adverse environmental impacts, offset them, or reduce them to acceptable limits.
9. **Consultation with Stakeholders:** presents information disclosure, consultation, and participation, comprises public consultations and disclosures conducted in the study area.

10. **Emergency Response Plan:** contains information on possible natural and man-made disasters in the study area of the proposed project.
11. **Conclusion and Recommendations:** presents the conclusion and recommendations of the report.

CHAPTER 2

Legislative, Regulation, and Policy Consideration

2 LEGISLATIVE, REGULATION, AND POLICY CONSIDERATION

Environmental issues in Bangladesh are legislated by different sectoral policies and laws, such as those relating to land use, water and air pollution, toxic chemicals, noise, solid wastes, wildlife protection, forest conservation, environmental health and sanitation, and industry. The sectoral laws dealing with different environmental issues in Bangladesh were enacted at different periods, with many now being outdated and not able to control and manage present development needs. Moreover, the environmental concerns and priorities of the country have changed considerably in recent years. For environmental management in particular, the need for updating legislative requirements has been identified and is currently being undertaken by the DOE.

All proposed activities of BMD should be undertaken in full compliance with the existing GOB regulatory and legislative framework. As such, this section of the EIA report provides a review of the GoB statutory requirements most relevant to the proposed Project.

2.1 Legislative Approvals Requirements

The following set of acts and rules are essential to comply with in order to obtain a clearance certificate from the DOE.

Table 2-1: National Legal Provisions Applicable to the Proposed Project for Ensuring Environmental Protection

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
Environment Conservation Act, 1995, and its amendments in 2000, 2002 and 2010	Ministry of Environment, Forest, and Climate Change	• Declaration of Ecologically Critical Areas (ECAs). • Obtaining Environmental Clearance Certificate (ECC). • Regulation for vehicles emitting smoke which is harmful to the environment. • Regulation of development activities from an environmental perspective. • Promulgation of standards for quality of air, water, noise, and soil for different areas and different purposes. • Promulgation of acceptable limits for discharging and emitting waste. • Formulating environmental guidelines relating to the control and mitigation of environmental pollution, conservation, & improvement of the environment.	**Applicable** - According to the Act, "no project shall be established or undertaken without obtaining an ECC from the DoE." Therefore, the act's provisions apply to all project intervention phases during the project life cycle.
Environment Conservation Rules, 2023	Ministry of Environment, Forest, and Climate Change	• Categorization of industries, development projects, and other activities on the basis of actual (for existing industries/development projects/activities) and anticipated (for proposed industries/development projects/activities) pollution load. The categories are green, yellow, orange, and red. • Procedure for obtaining site clearance and environmental clearance. • Standards for surface water (inland and coastal), drinking water, sewage discharge, and industrial effluents. • Setting out guidelines for the proper disposal of industrial effluents and requiring industries to have proper effluent management systems i.e., industrial effluent treatment plant, sewerage treatment plant, and mixed effluent treatment plan in place. • Requirements for undertaking initial environmental study and environmental impact assessment as well as formulating environmental management plan according to categories of industries/development projects/activities.	**Applicable** - as the proposed project falls under the "Orange" Category as per the Environment Conservation Rules 2023, As this is an orange category project and listed 63 of the orange category in the ECR 2023, this project requires IEE or EIA. After consultation with the DOE head office for this sand quarry project, DOE decided to conduct an EIA study. Additionally, the High Court has issued an order for all

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		• Procedure for damage claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life. • Establishing the Department of Environment (DOE) as the regulatory authority responsible for enforcing the regulations and overseeing environmental protection efforts in Bangladesh. • Provision of listing of environmental consultants and specialists.	sand quarry projects that require an EIA study to get approval from DOE and BMD following the DOE guidelines. Besides, it is stipulated that environmental quality standards and other relevant requirements shall comply during the project life cycle.
Environment Court Act, 2010 and its amendment in 2019	Ministry of Environment, Forest, and Climate Change. Judiciary	• Establishment of one or more environmental courts in each district and one or more special magistrate courts in each district. • Also provides the jurisdictions of the environment court, the penalty for violating the court's order, a trial procedure in a special magistrate court, power of entry and search, a procedure for investigation, procedure, and power of the environment court, the authority of the environment court to inspect, appeal procedure and formation of the environment appeal court.	**Applicable** - the court has authority, under the act's provisions, over a trial for an offense or compensation under environmental law, imposing penalties for violation, etc.
Noise Pollution (Control) Rules, 2006	Ministry of Environment, Forest, and Climate Change	• The Rules have been established to manage noise-generating activities, which have the potential to impact the health & well-being of workers and the surrounding communities. • An area up to a radius of 100 meters around hospitals, educational institutions, offices, or similar types of institutions is designated as a silent area. The acceptable sound limit in the silent areas is 50 dB(A) for daytime and 40 dB(A) for nighttime. • Dwellings primarily occupy residential areas. The acceptable sound limit in residential areas is 55 dB(A) for daytime and 45 dB(A) for nighttime.	**Applicable** - the project will create noise within the project and surroundings. Incremental noise can impact human and terrestrial and aquatic species. Therefore, it requires complying with these rules.

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		• Mixed areas with a mix of residential, commercial & industrial land use. The acceptable sound limit in the mixed areas is 60 dB(A) for daytime and 50 dB(A) for nighttime. • Businesses and officers primarily occupy commercial areas. The acceptable sound limit in commercial areas is 70 dB(A) for daytime and 60 dB(A) for nighttime. • Industrial areas are used for industry or manufacturing. The acceptable sound limit in industrial areas is 75 dB(A) for daytime and 70 dB(A) for nighttime. • An area between 500 meters from the last limit of a residential area for construction-related activity, use of brick and stone crusher machine is prohibited, and operation of mixture machine and construction-related machinery and equipment are prohibited from 7 PM to 7 AM. • The guidelines say exceeding the maximum noise level in certain areas is a punishable offense.	
Air Pollution (Control) Rules 2022	Ministry of Environment, Forest, and Climate Change	• Aiming to protect environmental health, the government has published a new rule based on section 20 of The Bangladesh Environment Conservation Act, 1995. • The main objectives of this rule are to prevent, control, and reduce air pollution. • The government will appoint a director general who will be responsible for managing and maintaining the environmental issue. • The Rule specified several types of pollution such as pollution caused by factories, vehicles, construction, garbage, etc.	**Applicable** – During the quarrying phase of the project activities will create air pollution within the project boundary and surroundings. Air pollution can impact human and terrestrial faunal species.

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		• According to the new rule, there will be a committee that will impose damages and punishment for such pollution. • As stated by the rule, the government will give rewards to those who will protest against pollution and not cause any type of pollution.	
Balumhal and Soil Management Act, 2010	Inland Water Transport Authority	• The Inland Water Transport Authority Ordinance, 1958 (EP Ord. No. LXXV of 1958), the Mines and Mineral Resources (Control and Development) Act, 1992 (Act No. 39 of 1992), or any other Act or rules made thereunder or any other order, notification or direction, the provisions of this Act shall prevail in relation to the management of sand dunes and other matters connected therewith. • In some cases, sand or soil extraction is prohibited. • Special provisions regarding extraction of sand or soil from underground or riverbeds. • Excavation of sand or soil from privately owned land • Provisions regarding the export of sand or soil • Lease of Balumahal, etc.: All sand mahals shall be leased through open tender in the manner prescribed by rules. • There shall be a committee called the District Balumahal Management Committee in each district to assist the District Commissioner in all matters relating to the granting of leases under this Act.	**Applicable** – As the project are related with Balumhal and Soil. Goal of the project is extraction of the sand from Silica Sand Quarries in different parts of the project area.
Ecologically Critical Areas (ECAs) Management Rules, 2016	Ministry of Environment, Forest, and Climate Change	• The ECA Management Rule, 2016 has enabled the government to form a “National Committee” headed by the Secretary of MoEFCC. • To implement the decision of the Directorate, the District and Upazila committees may be formed. For the conservation and development of the ecologically critical area, one or more teams may be formed. The team's	**Not Applicable** – the project area does not fall under any ecologically critical area.

Act/Rules/ Law/Ordinance	Responsible Agency- Ministry/Authority	Key Features/Remarks	Applicability
		responsibility would be to implement the decision and planning of the Government to improve the Environment for Ecology. • The Rule also prohibited many activities and processes that are detrimental to the natural condition of habitat, tranquility, biodiversity, etc.	
Biodiversity Act, 2017	Ministry of Environment, Forest, and Climate Change	• The Act has enabled the government to form a "National Committee on Biodiversity." The functions of the committee are to conserve biodiversity, genetic biodiversity, identification of biodiversity-related important areas, heritage, etc. • In consultation with local communities and bodies and in coordination with concerned ministries or departments, the government is empowered to declare any place or area significant for its biological heritage as a “Biodiversity Heritage Site.” • Prohibiting the taking of activities that may have an adverse effect on endangered animals or organisms, etc. No person shall take any such activity, viz (a) adversely affect, or may affect endangered species; (b) adversely affect or may affect the environmental characteristics of the endangered ecological community; or (c) In accordance with the Ramsar Convention, the wetland may adversely affect or affect the environment and environmental characteristics of the declared area.	**Not Applicable** – as no gazetted endangered species is present in the project influence area.
Forests Act, 1927 and its amendment in 1982, 1989, 2000 and 2018	Ministry of Environment, Forest, and Climate Change	• The government can prohibit certain activities in the declared Reserved Forest area, causing any damage by negligence in felling any tree or cutting or dragging any timber, etc. • The act makes various provisions for the conservation of forests. • It defines the procedure to be followed for declaring an area to be a Reserved Forest, a Protected Forest, or a Village Forest.	**Applicable** – Kibriabad, Sahapur Chara, Deocahra and Lauya Chara originated from a forest area. (Satchori Natural Park and Raghunandanpur Reserve Forest)

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		• It defines what a forest offense is, what acts are prohibited inside an RF, and penalties leviable on violation of the provisions of the act. • The act gives the government power to make any relevant rules to protect forests. • Guidelines for social forestry practice; and • Control and collection of timber and other forest products, and duties on those.	
Wildlife (Conservation and Security) Act, 2012	Ministry of Environment, Forest, and Climate Change	• Prohibition is related to capturing, killing, shooting, or trapping wildlife. No person shall hunt any wild animal without a license. • Determination of threatened flora and fauna in four (4) schedules. • Prohibitions, entry, and declaration procedure of protected areas (sanctuary, national park, community conservation area, safari park, eco-park, botanical garden, wild animal breeding center, landscape zone or corridor, buffer zone, core zone, special biodiversity conservation area, national heritage, memorial tree, sacred tree, and kunjaban, etc.). • No person, institution, or company shall establish or operate any industrial factory or brick field within 2 (two) kilometers from the boundary of a sanctuary.	**Not Applicable** - There are no protected areas within the project site and within AOI.
Protected Area Management Rules, 2017	Ministry of Environment, Forest, and Climate Change	• The legal basis for the management and co-management of forest-protected areas. • Structures, functions, and obligations of management of some of the protected areas, excluding safari parks, zoos, botanical gardens, private parks, and wildlife fertility centers from their application.	**Not Applicable** - The nearest PA from the Project is 5.4 km from the Mouza Boundary.

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		• The Rules have 33 sections and provide for a participatory co-management model consisting of forest-dependent communities, forest departments, civil administration, and civil society organizations. • The rules provide for financial benefits and income incentives to shareholders through participatory social forestry programs to be planted in buffer and landscape areas and eco-tourism.	
Bangladesh Water Act, 2013	Ministry of Water Resources	• Any infrastructure or landfilling activities over any natural watercourses, stopping the natural flow or creating obstacles, or diverting or attempting to divert the direction is strictly prohibited. • According to the provision of section 43, all the costs may be incurred for the removal of infrastructure or landfilling materials from the person liable for making infrastructure or carrying on landfilling activities. • Any area or any part of any land connected with water resources can be declared as a Water Stress Area. • Ensuring safe abstraction of water from aquifers & executive authority may subject to the lowest safe yield of surface and groundwater. • Any infrastructure shall not be established in the immediate premises of the flood control embankment and ensure the sustainability and protection of the control structure. • No person shall not store, preserve, or divert the water of any water source in any natural or artificial reservoir.	**Applicable** – as the project activities are involved with canals, rivers, and water bodies.
Bangladesh Water Rules, 2018	Ministry of Water Resources	• Provision of No Objection Certificate for the establishment of projects related to flood control and management project; surface water extraction, supply and use related project and part of the project; irrigation project using surface water; construction of hydraulic structures; water conservation	**Applicable** – as the project activities are involved with

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		project; flood-affected plain land and wetland development project; groundwater for industrial use; riverbank protection and river control; river excavation and dredging project; canal excavation and re-excavation project; fisheries development in surface water project; groundwater extraction, supply, & use related project & part of the project; and others project; • According to Clause-16 of the rules, a NOC should be taken from the DG of WARPO, District Committee/DC, Upazila Committee/UNO, and Union Committee/Chairman based on the total investment of the specific project.	canals, rivers, and water bodies.
National River Protection Commission Act, 2013	Ministry of Water Resources	• An act to establish a Commission for preventing illegal occupation of rivers, pollution of water and environment, pollution of rivers caused by industrial factories, illegal constructions, and various irregularities and ensuring multidimensional use of rivers for socio-economic development including restoration of the normal flow of rivers, proper maintenance thereof and making them navigable.	**Applicable** – as the project activities are involved with canals, rivers, and water bodies.
Protection and Conservation of Fish Act, 1950, and its amendment in 1982 and Rules, 1985	Ministry of Fisheries and Livestock	• The act was enacted to provide for the protection and conservation of fish. Under the Act, the Protection and Conservation of Fish Rules were adopted in 1985. • No person shall destroy or attempt to destroy any fish with explosives, gun, bow, and arrow in inland or coastal waters. During the Project intervention, it should be noted that if waste effluent is not treated, then it may cause significant damage to the local fishery and thus violate the provision of the law. • No person shall destroy or make any attempt to destroy any fish by poisoning of water or the depletion of fisheries by pollution, by trade effluents or otherwise in inland waters; and	**Not Applicable** - There is no designated fishing zone within the project study area.

Act/Rules/ Law/Ordinance	Responsible Agency- Ministry/Authority	Key Features/Remarks	Applicability
		• Protection and conservation of fish in government-owned water bodies.	
Acquisition and Requisition of Immovable Property Act (ARIPA), 2017	Ministry of Land	• Current GoB Act, relating to acquisition and requisition of land. • According to the law, the affected person will get an additional 200% of the assessed value for land and an additional 100% for structures, trees, crops, and other assets. • This law deals with the social and economic impacts of land acquisition.	**Not Applicable** -as the proposed project does not have any immovable property.
Fatal Accidents Act, 1855	Ministry of Law, Justice, and Parliamentary Affairs	• Provide compensation to families for loss occasioned by the death of a person caused by actionable wrong. It is mentioned in s.1 that whenever a wrongful act shall cause the death of a person, neglect or default, and the act, neglect or default is such as would (if death had not ensued) have entitled the party injured to maintain an action and recover damages in respect thereof, the party who would have been liable if death had not ensued shall be liable to an action or suit for damages, notwithstanding the death of the person injured, and although the death shall have been caused under such circumstances as an amount in law to a felony or other crime.	**Applicable** - as the proposed project has a provision for unlikely and accidental events that may cause fatal accidents.
The Penal Code, 1860	Ministry of Law, Justice, and Parliamentary Affairs	• Valid provisions related to pollution management, environment protection, and health and safety protection. Chapter XIV of the Penal Code provides offenses effective public health, safety, convenience, decency, and morals: • Section 277: Falling Water or Public Spring or Reservoir. • Section 278: Making Atmosphere Noxious to Health. • Section 284: Negligent Conduct concerning Poisonous Substance. • Section 285: Negligent Conduct concerning Fire or Combustible Matter; and • Section 286: Negligent Conduct concerning Explosive Substance.	**Applicable** - The proposed project has a provision for pollution impact on the surrounding environment.

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
The Factories Act, 1965, and the Factories Rules, 1979 Bangladesh Labor Act, 2006 and amendments 2009, 2010, 2013 and 2018 Bangladesh Labor Rules, 2015	Department of Labor/Department for Inspection of Factories and Establishment/ Ministry of Labor and Employment	• Pertains to the occupational rights and safety of factory workers and the provision of a comfortable work environment and reasonable working conditions. • Provides health, safety, and well-being to the workforce during the project life cycle. • Children under 18 years are not allowed to be employed during the project life cycle. • Safety precautions regarding explosive or inflammable dust/gas, protection of eyes, protection against fire, work with cranes and other lifting machinery, and lifting of excessive weight. • Safety measures like appliances of first aid, maintenance of safety record books, rooms for children, housing facilities, medical care, group insurance, etc. • No building, wall, chimney, bridge, tunnel, road, gallery, stairway, ramp, floor, platform, staging, or other structure, whether a permanent or temporary character, shall be constructed, situated, or maintained in any factory in such a manner as to cause risk of bodily injury (Rule 38) of factory rules 1979, etc.	**Applicable** - as it provides the workforce's health, safety, and well-being during the project life cycle. Besides, it also stipulated that children under 18 years are not allowed to be employed during the project life cycle; therefore, this law must be complied with.
National 3R Strategy for Waste Management, 2010	Department of Environment	• The concept of this strategy is minimizing waste impacts in terms of quantity or ill effects by reducing the number of waste products with simple treatments and recycling the waste by using them as resources to produce the same or modified products. The principle of “3R” is stated as reducing waste, reusing, and recycling resources and products. • Reducing means choosing to use items with care to reduce the amount of waste generated.	**Applicable** - This strategy is applicable for the project for the management of waste (i.e., solid waste) to minimize/reduce environmental, social, and economic problems.

Act/Rules/ Law/Ordinance	Responsible Agency-Ministry/Authority	Key Features/Remarks	Applicability
		• Reusing involves the repeated use of items or parts of items that still have usable aspects. • Recycling means the use of waste itself as a resource. • It suggests ISO 14001 or any other EMS structure which is significant for developing strategies relevant to the industry and its social and environmental setting. ISO 14001 is increasingly important in international trade.	
Solid Waste Management Rules 2021	Department of Environment	• 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 the 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. • Responsibilities of manufacturers (*not defined) and importers of products: Collect non-biodegradable products such as glass, plastic, polyethylene, multi-layered packaging, bottles, and cans from consumers and recycle or dispose of them if appropriate; Determine work plans and implementation procedures for recycling and disposal; Ensure that Extended Producer Responsibility (EPR) is properly implemented; Submit an annual report to the Department of Environment (DoE) on the amount of plastic recycled; Raise public awareness of proper waste management. • Any violation of the above provisions shall be subject to imprisonment for not more than two years or a fine not exceeding 200,000 Taka (BDT), or both. The Regulations also include provisions for the treatment of solid waste such as composting and energy recovery.	**Applicable** - This rule is applicable for the project for the management of waste (i.e., solid wastes) to minimize/reduce environmental, social, and economic problems.

Act/Rules/ Law/Ordinance	Responsible Agency- Ministry/Authority	Key Features/Remarks	Applicability
Antiquities Act, 1968 and Antiquities Preservation Rules, 1986	Department of Archaeology, Ministry of Cultural Affairs	• No person shall deal in antiquities except under and in accordance with a license granted by the Director. • No person shall remove any object of the immovable protected antiquity. • No person shall damage, alter, deface, or imperil immovable protected antiquity. • Any person preserving or storing any kind of movable antiquity without a license shall produce it to the Director on demand for verification of the source of its possession.	**Not Applicable** - No archaeological and cultural sites are on the project site.

Source: Different Laws and Regulations of GoB

2.1.1 Relevant Policies

Other relevant policies in Bangladesh and their key features and applicability to the subject project are detailed in Table 2-2.

Table 2-2: Policies and Plans Relevant to the Project

Policy/Plans	Responsible Agency- Ministry/Authority	Key Features	Applicability
National Environment Policy, 2018	Ministry of Environment, Forest, and Climate Change	• Encourage collection and promotion of low carbon emission technology in the country. • Identifying and controlling all types of environmental pollution and degradation activities. • Ensure sustainable, long-term, and environmentally friendly use of all-natural resources.	**Applicable** - as the proposed project has the likeliness of having an impact on the surrounding environment

Policy/Plans	Responsible Agency-Ministry/Authority	Key Features	Applicability
		• To take PPP for the development of the environment. • Maintain and streamline environmental policies and strategies, among other policy strategies, in the interest of sustainable development. • Ensure the EIA and SEA are in all necessary sectors. • Act to reduce poverty through environmental protection. • Strengthen observations on proper compliance with environmental laws and regulations.	
National Forest Policy, 2016	Bangladesh Forest Department/ Ministry of Environment, Forest, and Climate Change	• Manage all existing forests, wildlife, and other forestry resources, adhering to the principles of sustainable management and climate resilience. • Enrich degraded forest areas and enhance land areas under forest/ tree cover. • Produce various goods and ecosystem services to benefit Bangladesh's present and future generations.	**Applicable** - Kibriabad, Sahapur Chara, Deocahra, and Lauya Chara originated from the forest areas. (Satchori Natural Park and Raghunandanpur Reserve Forest).
Mines and Minerals (Control and Development) Act (1992) and Mines and Minerals Rules (1968)	Energy and Mineral Resources Division	• The Mines and Minerals (Control and Development) Act provides a framework for the control and development of mines and mineral resources in Bangladesh, with natural gas exploration and extraction also being included within this framework. Under the Act and in accordance with the Rules, the Bangladesh Government grants prospecting licenses, mining leases, or facilities to preserve and develop mineral resources in the country. A "prospecting license" is required to prospect on any site for minerals or mineral resources for the purpose of developing these resources through mining/extraction. The power to grant mining leases and licenses is vested in the Bangladesh Bureau of Mineral Development (BMD).	**Applicable:** As the proposed project activities will extract the sand from different gazetted locations of Habiganj.

Policy/Plans	Responsible Agency-Ministry/Authority	Key Features	Applicability
National Water Policy, 1999	Ministry of Water Resources	• Protection and prevention of the natural environment for ensuring sustainable development. • Minimize disruption to the natural aquatic environment in streams and water channels. • Water development plans will not interrupt fish movement and will make adequate provisions in control structures for allowing fish migration and breeding. • Water development projects should cause minimal disruption to navigation and, where necessary, adequate mitigation measures should be taken. • Full consideration of environmental protection, restoration, and enhancement measures consistent with NEMAP and the NWMP. • Ensure adequate upland flow in water channels to preserve the coastal estuary ecosystem threatened by the intrusion of salinity from the sea.	**Applicable** – The project proponent should minimize water pollution and minimize disruption of the aquatic environment and navigation system in the adjacent water body.
National Fisheries Policy, 1999	Ministry of Fisheries and Livestock	• Provide provisions for the protection and conservation of fish in freshwater and brackish water bodies. • Preservation, management, and exploitation of fisheries resources in inland open water. • Fish cultivation and management in inland closed water. • Prawn and fish cultivation in coastal areas. • Preservation, management, and exploitation of sea fishery resources. • Conserve fish breeding grounds and habitats, and • promote fisheries development and conservation in all water bodies.	**Not Applicable** - There is no designated fishing zone within the project study area.

Policy/Plans	Responsible Agency-Ministry/Authority	Key Features	Applicability
National Agriculture Policy, 2018	Ministry of Agriculture	• Ensure food security and socio-economic development through the productivity of crops, boosting production and raising farmers' income, diversifying crops, producing safe foods, and developing a marketing system, profitable agriculture & use of natural resources. • Increasing food availability, rights, and purchasing power by increasing crop productiveness and production. • Discourage the use of agricultural land for non-agricultural work to ensure sustainable food security. • Soil, water, flora, fauna, and overall environmental conservation and effective use initiative adoption;	**Applicable** - the project activities may affect the agricultural land.
National Land Use Policy, 2001	Ministry of Land	• Resisting the current trend of alarmingly declining, the total amount of agricultural land used to produce adequate food for a growing population for a variety of reasons. • To prevent arbitrary use of land. • To formulate guidelines for the maximum use of land according to the natural differences in different parts of the country. • In the case of land acquisition for urbanization and development projects or any other purpose, to ensure its best use by acquiring the least amount of land and to avoid the acquisition of excess land as required. • Arranging for the preservation of such lands, especially government Khas lands, which may be required in the future for various development activities. • To ensure that the use of land is compatible with the natural environment.	**Not Applicable** -

Policy/Plans	Responsible Agency-Ministry/Authority	Key Features	Applicability
		• Making the best use of land to alleviate poverty and increase employment; and • To play a helpful role in preventing the increase in the number of landless.	
National Occupational Health and Safety Policy, 2013	Department for Inspection of Factories and Establishment/ Ministry of Labor and Employment	• Necessary measures to ensure workplace safety and health protection considering international Conventions/Declarations/ Recommendations/ Instruments. • Review and updating of all laws relating to Occupational Health and Safety (OHS). • Inclusion of OHS issues in the policies and programs of all related Ministries and agencies. • Establish labor courts in the industrial zone so the workers and trade unions can have easy access to the courts for implementing the mandatory provisions of OHS. • Impose mandatory terms and conditions upon construction agencies to follow the OHS policies during govt. Run construction works; and • To ensure maximum safety standards during construction and implement all standards and regulations in an internal safety environment.	**Applicable** - as the policy pertains to the occupational rights and safety of workers and has the provision of a comfortable work environment and reasonable working conditions for all employees.

2.2 International Agreements and Obligations

Bangladesh is a signatory to a number of international conventions of environmental importance, a number of which have some relevance to the Project.

2.2.1 Agenda 21 of the Rio Convention

Under Principle 17 of the Rio Convention, developments should be subjected to an environmental impact assessment. The Project complies with this Convention by providing a detailed impact assessment for the proposed survey.

2.2.2 Convention on Biodiversity (1992)

The signatories of this convention have made a commitment to protect biodiversity through funding and appropriate management. The main objectives are the conservation of biological diversity, the sustainable use of the components of biological diversity, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Mitigation measures will be recommended to reduce any potential impacts on biodiversity as a result of the proposed survey, in line with the requirements of this convention.

2.2.3 Convention on the Conservation of Migratory Species of Wild Animals (1979)

Also known as the Bonn Convention, this agreement aims to conserve terrestrial, marine, and avian migratory species throughout their range. Bonn Parties strive towards strictly protecting these animals, conserving or restoring the places where they live, mitigating obstacles to migration, and controlling other factors that might endanger them. The detailed impact assessment will identify the presence of any migratory species and proposed mitigation strategies to reduce potential impacts, if any, on such species, as a result of the proposed works.

2.2.4 Ramsar Convention on Wetlands (1971)

This agreement is an intergovernmental treaty that certifies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance as well as to plan for the "wise use", or sustainable management, of all of the wetlands in their territories. A large wetland, listed as a Ramsar wetland under this convention – Hail Hoar. No major wetland falls within the catchment area.

2.2.5 United Nations Framework for Convention on Climate Change (1992)

Also known as the Kyoto Protocol, this convention aims for the "stabilization and reconstruction of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". Bangladesh is a signatory to the Protocol and thus the Project is being undertaken in line with the Bangladesh Government's strategies for greenhouse gas planning for the country.

2.3 Administrative Setup Related to the Environment in Bangladesh

The MOEFCC is the nodal agency in the administrative structure of the GOB, for overseeing all environmental matters relating to national environmental policy and regulatory issues in the country. The MOEFCC oversees the activities of the following technical/ implementing agencies:

- Department of Environment (DOE)
- Forest Department (FD)

2.3.1 Department of Environment (DOE)

The DOE has been placed under the MOEFCC as its technical wing and is statutorily responsible for the implementation of the ECA, 1995. The principal activities of the DoE are:

- Defining EIA procedures and issuing environmental clearance permits the latter being the legal requirement before the proposed Project can be implemented.
- Providing advice or taking direct action to prevent degradation of the environment.
- Pollution control, including the monitoring of effluent sources and ensuring mitigation of environmental pollution.
- Setting the quality standards for environmental parameters.
- Declaring ECAs, where the ecosystem has been degraded to a critical state.
- Review and evaluation of IEEs and EIAs prepared for projects in Bangladesh.

2.3.2 Procedure for obtaining ECC from DOE, Bangladesh

The applicability of environmental clearance and the process in Bangladesh is described in Figure 2-1. The EIA process consists of three stages, screening and project description, approval of TOR, and detailed EIA:

- Projects categorized as Green and Yellow require no IEE or EIA but need a project description. However, the proponent has to submit an application in a prescribed format along with specified documents.
- Projects categorized as Orange require IEE for environmental clearance and in some cases, EIA may be required. IEE to be submitted to the DOE along with an application in a prescribed format and other specified documents; and
- Red category projects require EIA. A project description is required for TOR approval. An EIA is required for location clearance and for environmental clearance.

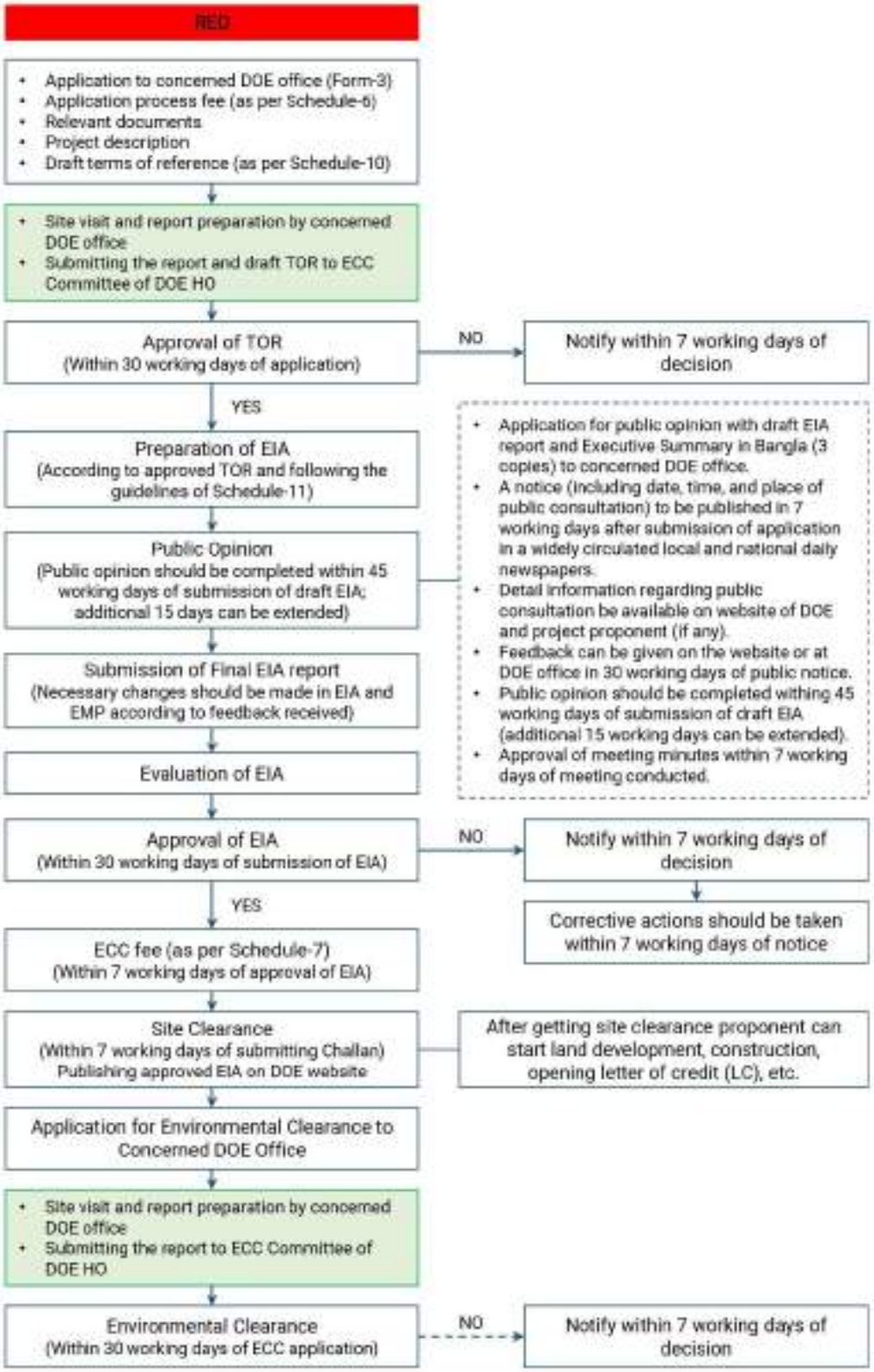
On 5 March 2023, Environment Conservation Rules, 2023 had been promulgated, and among them, specific rules relating to mandatory requirements for a certain project to obtain Environmental Clearance, which in turn requires Environmental Assessment Studies to be conducted and the report submitted along with different other papers and information for consideration of DOE to award the environmental clearance. According to the Schedule-1 of ECR 2023, the proposed Project falls under the following categories.

Table 2-3: Components of the Project with DOE Reference and Requirement

Components	Category	Reference	Requirement
All Quarry Project	Orange	Schedule -1 (Sl. 63 under orange category)	Environmental Impact Assessment (EIA); After the consultation with the DOE head office for this sand quarry project, DOE decided to conduct an EIA study because the High Court has issued an order for all sand quarry projects to require an EIA study to get approval from DOE and BMD following the DOE guideline.

The process of obtaining an Environmental Clearance Certificate for the proposed project is outlined in Figure 2-1.

Figure 2-1: DOE Environmental Clearance Procedure for Proposed Sand Quarry Project



Source: ECR 2023

CHAPTER 3
Project Description

3 PROJECT DESCRIPTION

3.1 Introduction

BMD plays a vital role in conducting geological surveys, assessing resource potential, and fostering collaborations with international organizations and research institutions to adopt advanced technologies. With its efforts focused on balancing resource development and environmental sustainability, the Bureau is crucial for generating revenue, supporting industrial growth, and addressing challenges posed by climate change. It also emphasizes equitable resource sharing and community benefits while contributing to infrastructure and economic development in Bangladesh.

The Detailed areas included in sand extraction and leasing locations in Habiganj District are shown in Appendix J:.

3.2 Objectives of the Project

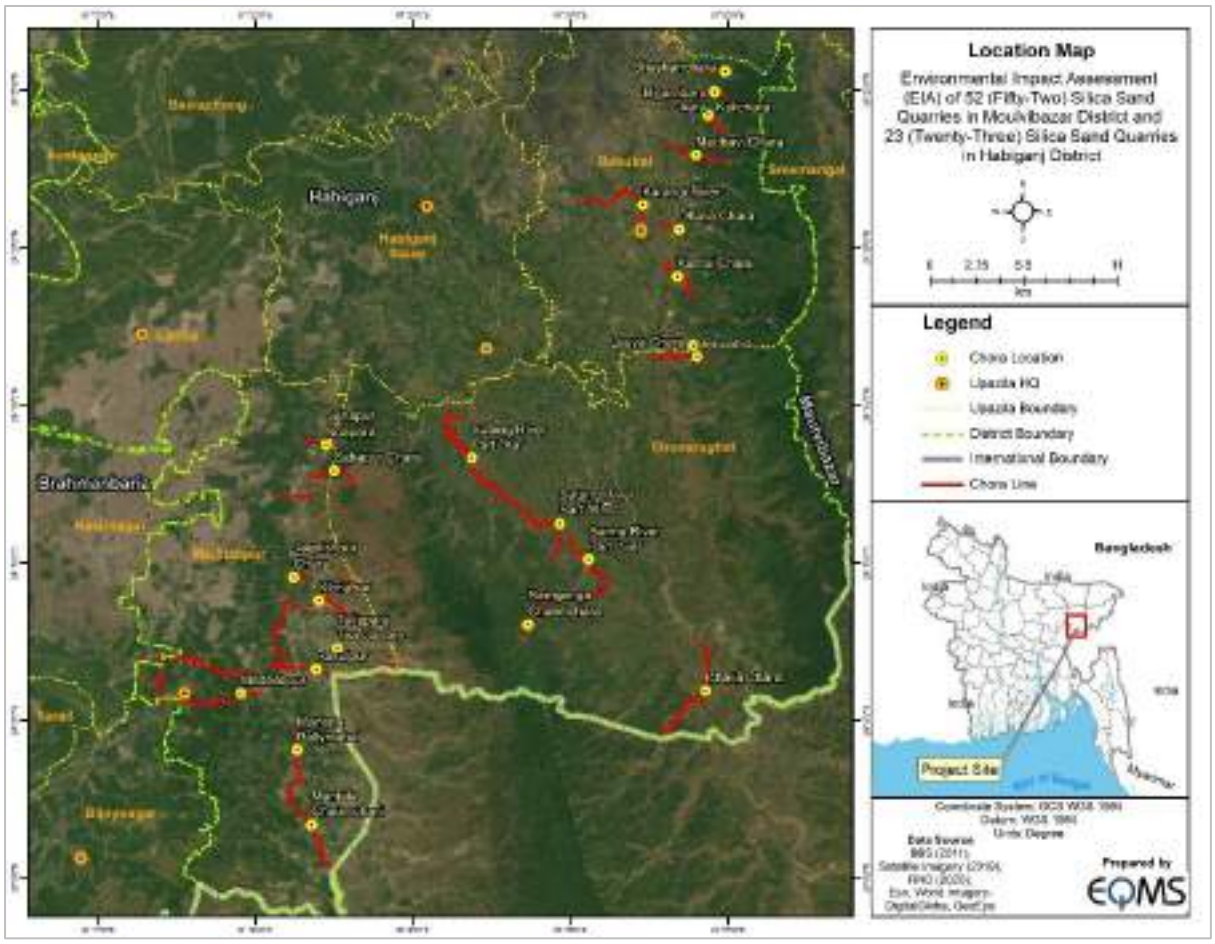
BMD initiated this sand extraction project to ensure the sustainable extraction of this vital resource while adhering to environmental and geological considerations. The move aligns with the following benefits of the project.

- The government's strategy is to manage natural resources responsibly.
- Support industrial growth, and bolster local economic activities.
- Financial Contribution to government as revenue will be generated from the project.
- The removal of primary natural sand resources from the natural environment (river, canal, and water body) for extracting valuable silica sand for subsequent processing.
- Maintaining proper navigation in the river of the project area.
- Increasing water flow in the river and canal by exacting silica sands from the river and canal bed which are deposited each year.
- Reducing the deposition of the sands on the agricultural lands beside the river and canal bank.
- Managing flash floods by increasing the water retention in the rivers, canals, and water bodies.
- If the sands are deposited regularly and not extracted those sands there is a chance of river and canal water flow diversion from the actual flow channel.
- River engineering – for flood control, navigability, and maintaining water intake points.

3.3 Location of the Project Area

The 23 silica sand quarries are located in multiple upazilas, including Madhabpur, Chunarughat, and Bahubal in the Habiganj District of Bangladesh. The region is bordered by neighboring districts such as Moulvibazar to the East, Brahmanbaria to the South, Sunamganj to the North, and Kishoreganj to the West. The area features a mix of agricultural land, tea gardens, rubber gardens, forested regions, and rural settlements, with a network of roads connecting the upazila headquarters to nearby towns and districts. Figure 3-1 shows the sand quarry locations map of the proposed project.

Figure 3-1: Location Map of the Proposed Project with Chora Location



Source: EQMS, 2024

3.4 Gazzeted Lands from the Government of Bangladesh for this Project

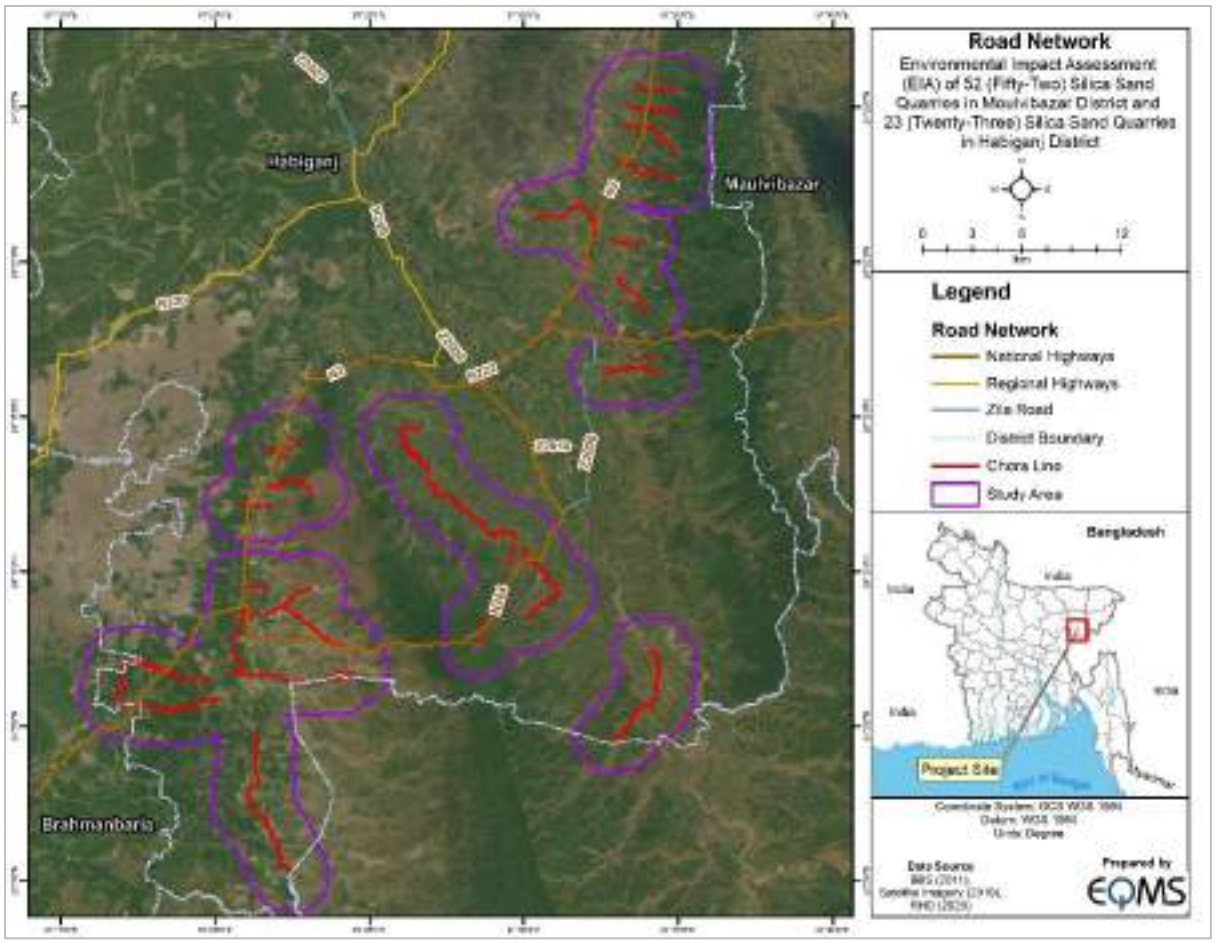
The project encompasses an approximate total area of 513 acres, distributed across 88 mouzas which are gazette by the Government of Bangladesh. All of the lands are government-owned khash lands. So, there is no accusation of lands as these lands are government-owned land.

The gazette land (sand quarry) will be used for the primary stockpile before distribution or transportation after sand extraction. So, there are no extra land requirements for the project for the stockpile.

3.5 Road Connectivity of the Proposed Project

Silica sands will be extracted from the rivers, canals, and water bodies from the twenty-three-sand quarry. After extortion of the sands, it will stockpile on the sand quarry site. From the twenty-three-sand quarry site, sand will be transported via human-driven and tractor-driven vans. The human-driven and tractor-driven van will use the earthen roads at the village level. After reaching the Union level road, the track will be used for transportation. This project will use existing union, upazila, district, and national highways for sand transportation purposes. The nearest national highways are the Dhaka - Sylhet highway (N2) and Jagadishpur-Chunarughat-Shaistaganj Road (N204). So, there is no need for road construction. Figure 3-2 shows the access road condition of the proposed project.

Figure 3-2: Access Road Condition of the Proposed Project



Source: EQMS, 2024

3.6 Sand Extraction Process

Sand extraction activities in rivers, canals, and water bodies are frequently carried out using manual and mechanical techniques. The use of manual techniques and mechanical techniques depends on the location and size of the sand quarry and the cost of the methods. Both extraction processes have positive and negative in terms of location, cost, and volume of sand in the quarry. EIA team proposed manual extraction only for this project. In the alternative analysis chapter, option was evaluated.

3.6.1 Manual Sand Extraction

This involves physically removing sand from surfaces using tools such as shovels, spades, bags, boats, trollers, and other carrying tools.

Step 1: The sand extractor will carry their sand extraction tools to the project site by using local transport, boats, and trollers.

Step 2: The sand extractor will use shovels and spade for digging or removal of sand from the river, canal, and water body bed. After digging, extracted sand will be transported by human-driven tools, boats, and trollers for pilling the sands beside the sand quarry. Figure 3-3 shows the typical sand extraction process in Bangladesh.

Figure 3-3: Typical sand extraction process in Bangladesh



Typical sand extraction process



Typical stockpile of sand



Typical stockpile of sand

Step 3: Human-driven van, tractor-driven van, boat, and troller will be used for the transportation of sand from the sand pile to the village level or union-level road for distribution. From the union level, trucks and trollers will be used for the transportation of sand to the market or national level for further use and process. Figure 3-4 shows the typical sand transportation system in Bangladesh.

Figure 3-4: Typical sand transportation system



Typical troller for sand transportation



Typical tractor-driven van for sand transportation



Typical truck for transportation to market and national level

Step 4: After the completion of sand extraction, the sand extractor will leave the sand quarry with its tools and machinery. The contractor will manage the solid waste from the quarry site before leaving the sand quarry.

3.7 Process Flow Diagram of Sand Extraction

The process flow diagram prepared for the proposed sand extraction is given in Figure 3-5.

Figure 3-5: Process flow for the proposed sand quarry project



Source: EQMS, 2024

3.8 Description of the project activities

During the quarrying of silica sand extraction, various activities will be conducted systematically to ensure efficient operation and minimal environmental disruption. The BMD, DC office, and contractors will be involved in different activities of the project.

The contractors of the sand extraction will work during the daytime 7.00 am to 6 pm to minimize the environmental and social impacts of the project for 8 hours shift.

The BMD and DC office are government bodies for maintaining the sand extraction project. Their activities are as follows.

- Assuming the total sand volume for tendering
- Preparing the tender documents for the contractor
- Selection and awarding of the contract to the contractor
- Monitoring all the sand extraction activities

Activities for Contractors:

The contractors will be involved in the following activities during sand quarries.

- Mobilization of personnel, materials, and equipment.
- Sand excavation and extraction work.
- Transportation of sand for stockpiling.
- Transportation of sand from Stockpiling to the distribution channel.
- Equipment and machinery operation in the quarry site.
- Maintenance and replacement of tools, vehicles, and equipment.
- Use of utilities like water, fuel, etc.
- Monitoring mitigation measures for environmental and social impact.
- Disposal and management of solid and liquid wastes.
- Traffic Management during sand transportation

3.9 Project Cost

The BMD and DC office are government bodies involved in the sand extraction project. Both the BMD and DC offices will work together to prepare tender documents for the contractor as the silica sand will be sold to the contractor to generate national revenue and manage environmental and social issues. The main cost of the project is preparing and managing tender documents, managing environmental and social issues, permission from different government organizations (e.g., DOE), and field visits for proper management of the projects for each year. The cost is not fixed for this project. The estimated cost of the project is about 2 crores for each year which includes all BMD and DC office expenses.

3.10 Project Schedule and timeline

Since sand quarries are natural sources where sand is regularly deposited, this project followed a yearly calendar for silica sand extraction. The BMD will annually publish a gazette for the leasing of silica sand quarries designated for sand extraction. DC office is the main authority for publishing the tender documents for yearly leasing after getting approval from BMD. Generally, the DC office publishes the tender in April of each year for giving leasing. The awarded bidder will be responsible for extracting sand as specified in the respective gazette.

3.11 Resources and Utilities Demand

3.11.1 Water

The domestic water demand for the project will be fulfilled through the nearest surface water source, most likely quarry water, while the drinking water requirements will be met by groundwater, as arranged by the contractor.

3.11.2 Electricity

Sand extraction from the quarry may require a portable energy supply due to the remote location and the variable extraction points. Consequently, the contractor will utilize a modern diesel engine to provide the required power if required.

3.11.3 Waste Management

During the bidding process, the contractor shall submit a Waste Management Plan for consideration. Upon securing the contract, the contractor shall be responsible for ensuring full compliance with the approved Waste Management Plan. The BMD authority will evaluate and monitor the implementation of the Waste Management Plan to ensure adherence to regulatory standards.

3.11.4 Manpower Requirements

For sand extraction purposes, manpower will be provided by the contractor. The number of manpower will vary for locations and availability of the silica sands. Generally, a team of 20-30 workers will be required for sand extraction in a location.

CHAPTER 4

Environmental Baseline

4 ENVIRONMENTAL BASELINE

The baseline conditions define the physical and biological conditions that prevail in the project study area. It includes information on receptors and resources that were identified during the field visit as having the potential to be affected by the project, as well as having an impact on the sustainability of the project.

This chapter provides an overview of environmental baseline conditions within the project area and its surroundings, including topography conditions, geological conditions, climate and meteorology, air, water and quality, noise, land use, and biodiversity. This information is to assess the quality of the existing environment as well as to assess potential impacts caused by the project in both construction and operation phases and to provide mitigation measures and monitoring programs to reduce adverse impacts.

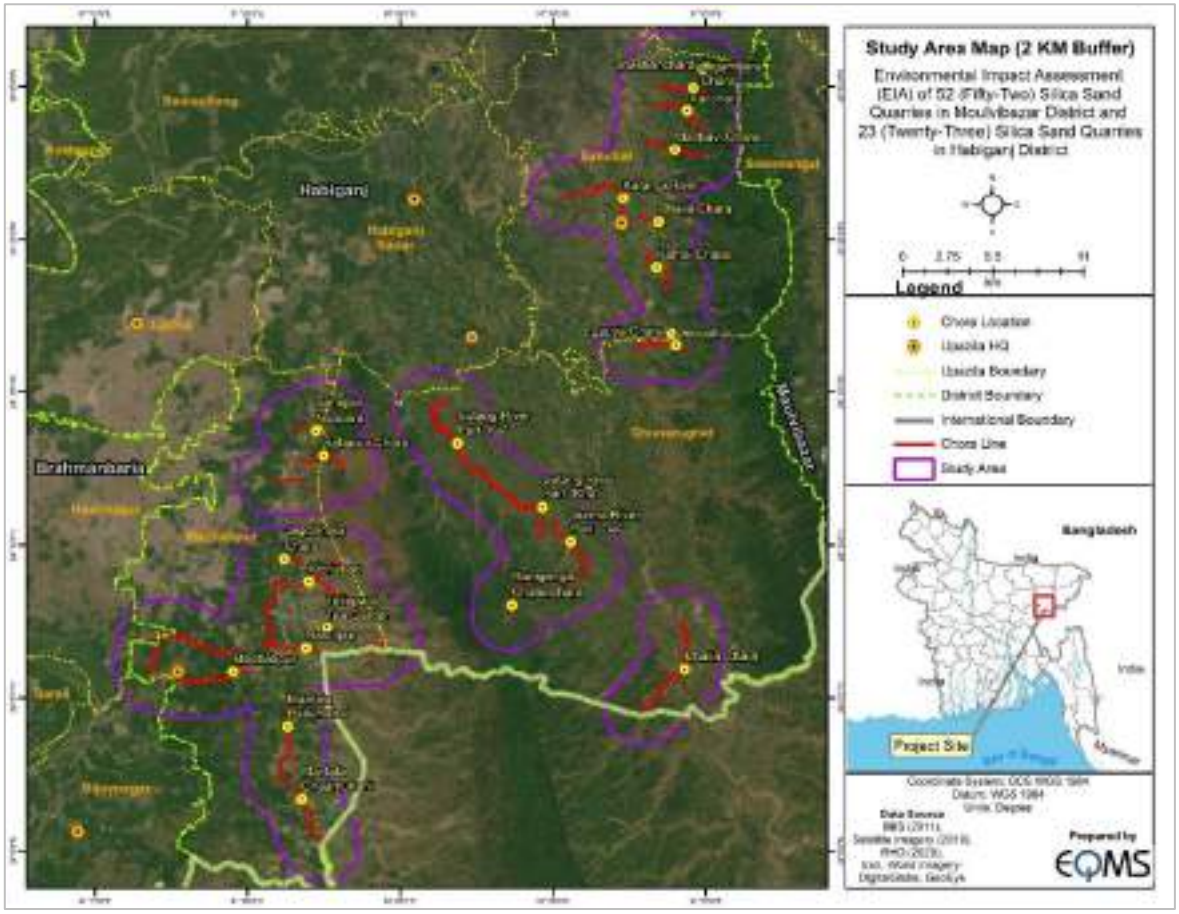
4.1 Study Area

The study area for the EIA encompasses 23 silica sand quarries located within the Habiganj District of Bangladesh. The sand quarries occupy different lengths and widths in the three upazilas of Habiganj District. The study area was selected based on the length and width of the sand quarry, project activities, and the impact of the project. The study area map is shown in Figure 4-1.

4.1.1 Area of Influence (AOI)

For the EIA study, the team considered a 500-meter core area on both sides of each quarry and a 2-kilometer buffer area considering the impacts and activities of the project. Figure 4-1 shows the Area of Influence (AOI) of the study area.

Figure 4-1: Study Area Map



Source: EQMS, 2025

4.2 Land Use

Land use inventories are an essential component in land resource evaluation and environmental studies due to the changing nature of land use patterns. The land use study for the proposed project location and its 2 km buffer area from both sides of the sand quarries were undertaken with the following objectives:

- To study the land use in the 2 km from both sides of the sand quarry of the project areas of the proposed project site and provide inputs for environmental planning of the proposed project by analyzing the existing land use scenario; and
- To establish the existing baseline scenario using a GIS database for incorporation of thematic information on the different physical features including water bodies, homestead vegetation, agricultural land, etc.

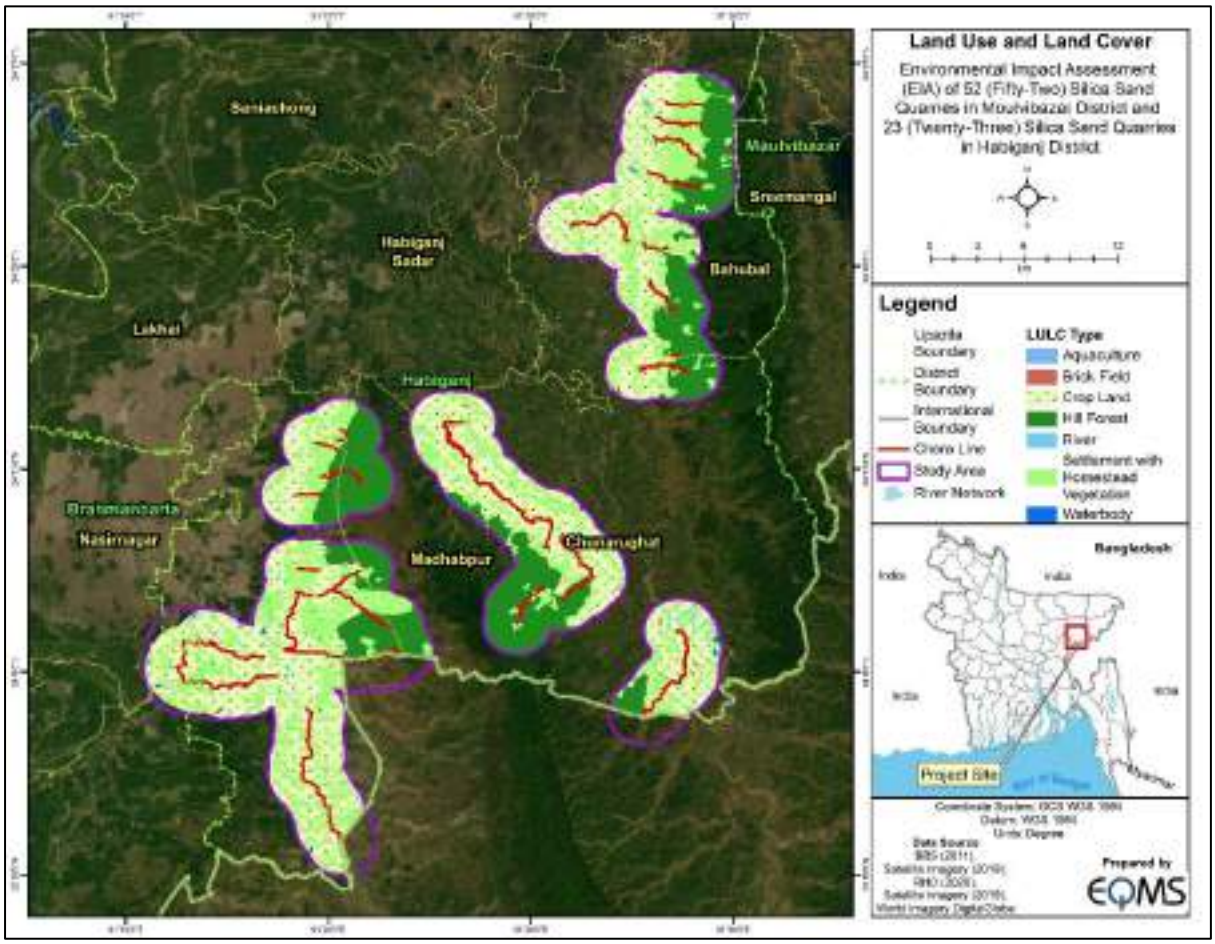
4.2.1 Land Use Interpretation of the Study Area

The predominant land use-land cover of the study area includes Aquaculture, Brick Fields, Crop Land, Low Land, Rivers, Settlement with Homestead Vegetation, Tea Garden, and Waterbody. The land use of the study area of Habiganj District is presented in Table 4-1 and Figure 4-2.

Table 4-1: Land Use Pattern of the Study Area

Type	Area (sq Km)	Percentage
Aquaculture	3.32	0.44
Brick Field	0.32	0.043
Crop Land	294.56	39.102
Low Land	48.85	6.485
River	4.99	0.662
Settlement with Homestead Vegetation	181.81	24.135
Tea Garden	212.22	28.172
Waterbody	7.22	0.959
Total	**753.33**	**100.00**

Figure 4-2: Land Use Map of the Study Area



Source: GIS Mapping and Interpretation of Satellite imagery by EQMS

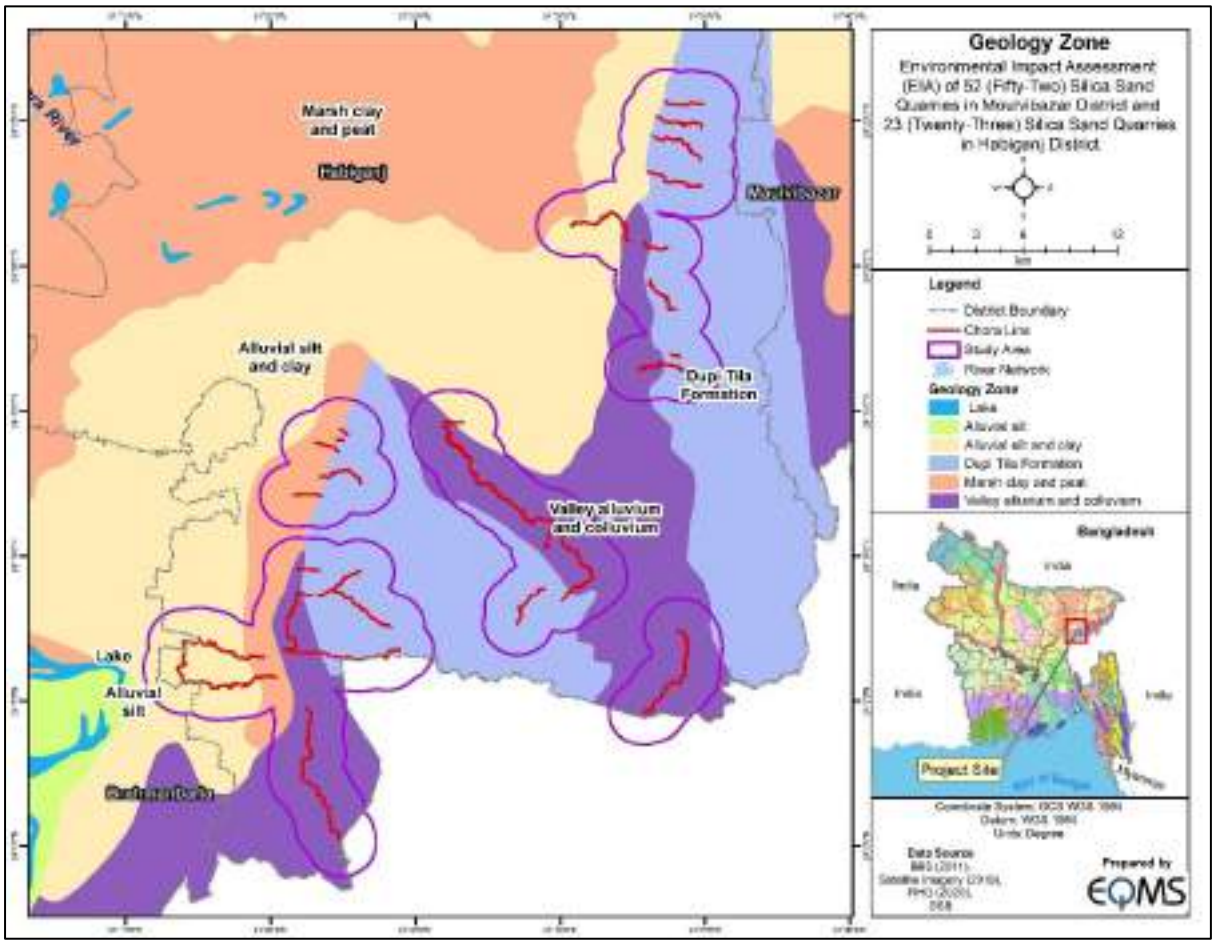
4.3 Physical Environment

4.3.1 Geology

The geology profile of Bangladesh is reflective of the country's location, as Bangladesh is a riverine country. The geological evolution of Bangladesh is related to the uplift of the Himalayan mountains and the outbuilding of deltaic landmass by major River systems having their origin in the uplifted Himalayas. This geology is mostly characterized by the rapid subsidence and filling of a basin in which a huge thickness of deltaic sediments was deposited as a mega delta built out and progressed towards the south. The floodplains of the Ganges, the Brahmaputra (Jamuna), and the Meghna Rivers cover approximately 40% of Bangladesh.

The geology of the project sites and AOIs are found to be “Dupi Tila”, “Alluvial silt”, “Alluvial silt and clay” and “Valley alluvium and colluvium” formations have been found. The geological formations of the project study area are shown in **Figure** 4-3.

Figure 4-3: Geology of the Study Area



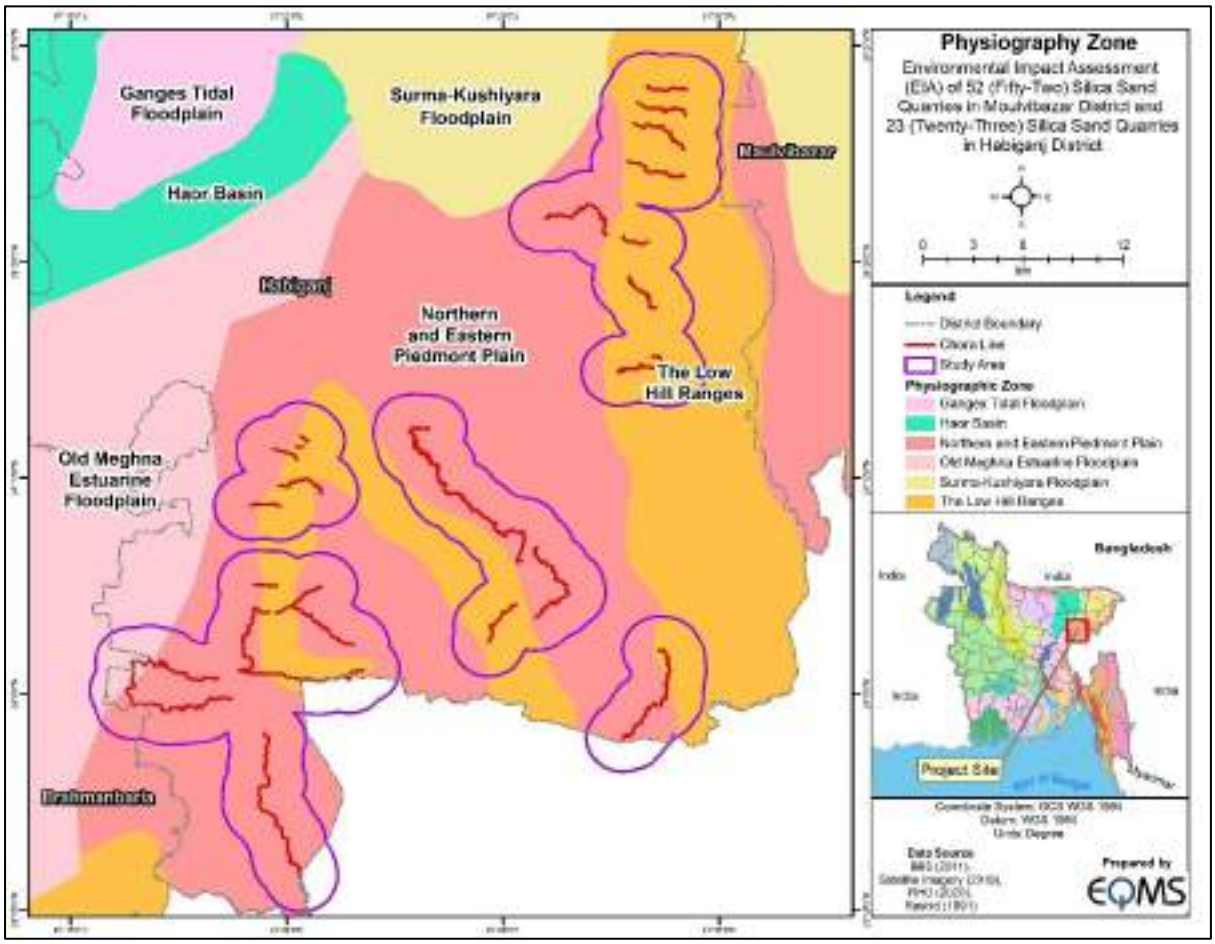
Source: GSB, 1991

4.3.2 Physiography

Physiography is the form of the earth‘s surface. In Bangladesh, this may be classified into three distinct physiographic regions (a) floodplains, (b) terraces, and (c) hills. Each physiographic region has unique distinguishing characteristics. The three main physiographic regions can be further subdivided into 24 sub-regions and 54 units.

The Project study areas occur primarily within the Low Hill Ranges and Northern and Eastern Piedmont Plains. Also, within the “Old Meghna Estuarine Floodplain” and “Surma-Kushiyara Floodplain” are covered. The physiographic sub-region is shown in Figure 4-4.

Figure 4-4: Physiography of the study area



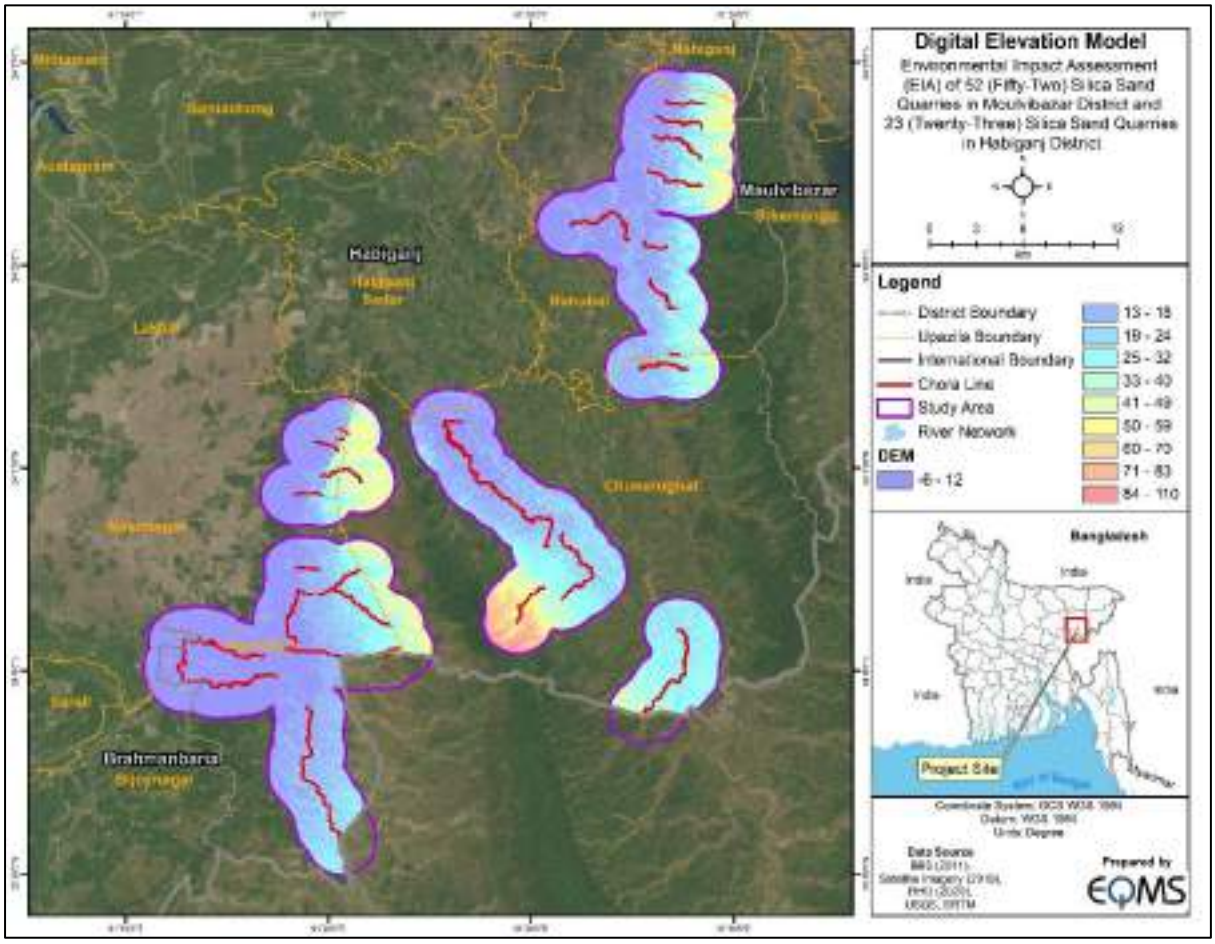
Source: Rashid, 1991

4.3.3 Topography

The overall landscape of Bangladesh can be divided into three broad categories based on topography, physical features, and geological history (Brammer 1996). These are Hills, Terraces, and Floodplain.

The study area falls in the Northeastern part of Bangladesh. Below Figure 4-5 shows the detailed topographic features in the study area where the average elevation range is between -6 to 110 m.

Figure 4-5: Topography of the study area



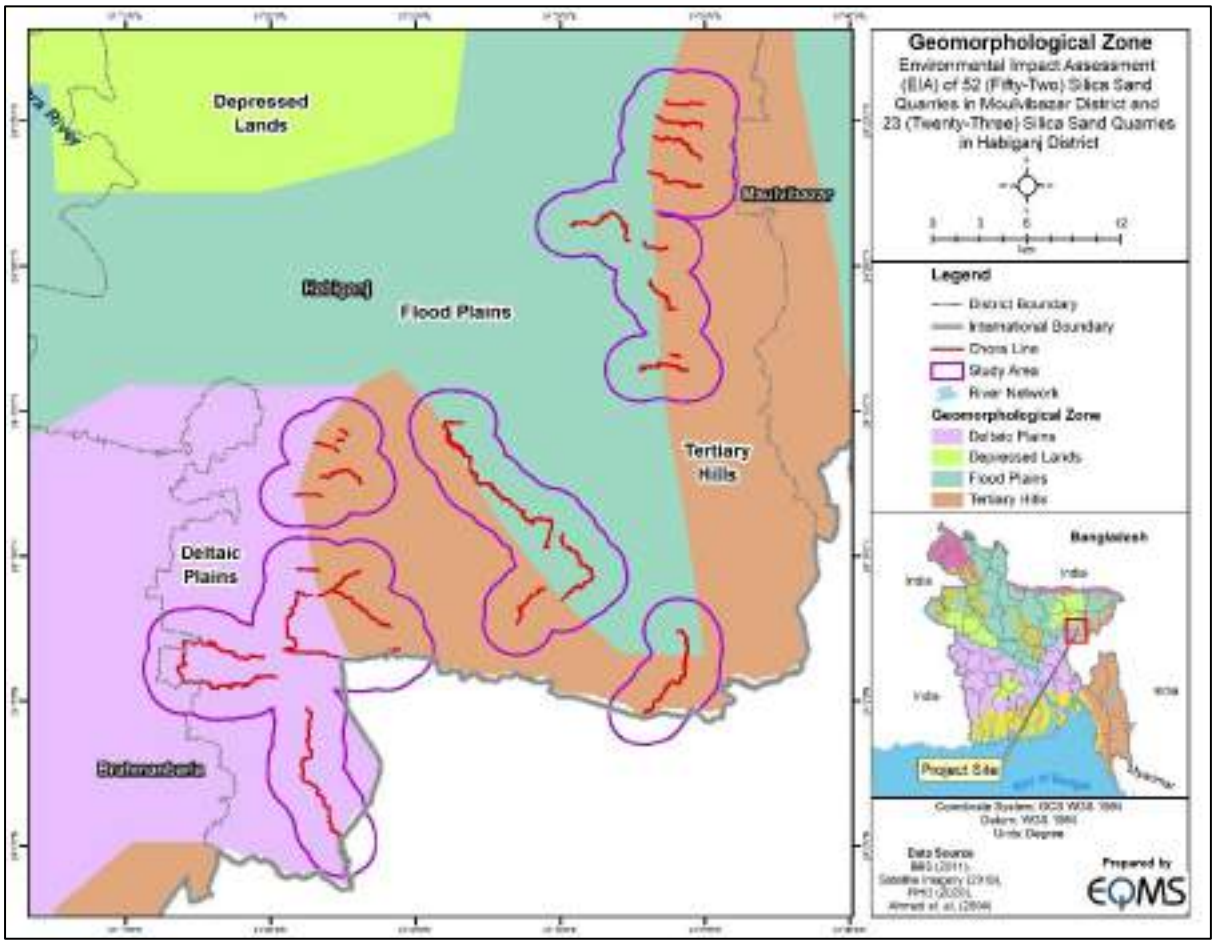
Source: USGS Earth Explorer

4.3.4 Geomorphology

There are three geomorphologic divisions of Bangladesh according to its soil formation. These are a) Tertiary Hills, b) Pleistocene Uplands, and c) Holocene Plains (Deltaic Plain).

According to the Geological Survey of Bangladesh (GSB), the study areas fall under the geomorphic units of “Tertiary Hills”, “Flood Plains”, and “Deltaic Plains”. The geomorphology of the study area is presented in Figure 4-6.

Figure 4-6: Geomorphology of the study area

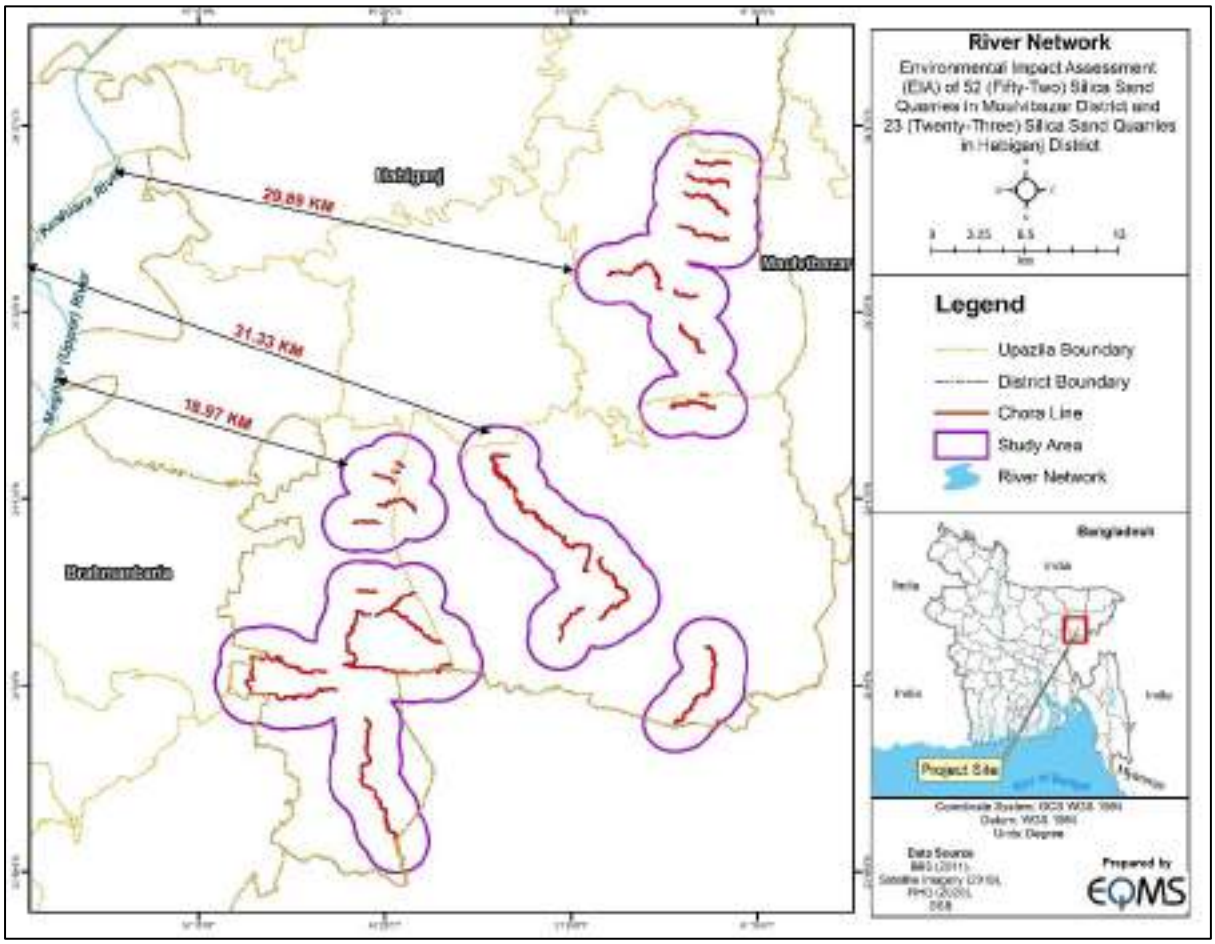


Source: Ahmed et. al., 2004

4.3.5 Hydrology and River Network

The project sites don't have major water bodies within the project study area. The study area consists of some small ponds. The closest river is the Meghna (Upper) River is located about 18.97 Km Northwest and the Kushiara River located about 29.89 Km northwest of the project location. During the monsoon, these pond areas become fulfilled by rainwater. The following Figure 4-7 shows the map of the Hydrology and Drainage of the study area.

Figure 4-7: Hydrology and River Network of the study area



Source: EQMS, 2023

In the Habiganj District, there are twenty-three Silica Sand Quarries locally called Chora. All the Choras are located within Madhabpur, Chunarughat, and Bahubal Upazilas. Hydrological baseline conditions of these Upazilas and associated Chora or Silica Quarry Rivers have been delineated in the subsequent chapters.

4.3.5.1 Hydrologic Condition in Madhabpur Upazila

There are four rivers—Sonai, Khasty, Boalia, and Matiayn—that play a crucial role in governing the hydrological conditions of Madhabpur Upazila. These rivers, particularly the silica quarry rivers, significantly influence the water dynamics of the region.

The '**Mantala Chaumuhani' Chora**, located in Madhabpur Upazila near the India-Bangladesh border, primarily forms a part of the Sonai River originating from India. This transboundary river marks the eastern boundary of Bangladesh and serves as a conduit for upstream water flow from India into Bangladesh. It has an average width ranging from 22 to 58 meters and extends approximately 8.6 kilometers in length. Two rubber dams are located within this Chora—one in Mahabbatpur Mouza and another in Bahara Mouza. Water levels vary in this Chora from 2.15-2.30m (MSL), and the flow direction has been found south-north, south-north-east. Being in a severe flash flood-prone area, the 'Mantala Chaumuhani' Chora is hydrologically connected to **'Mantala Ballymahal,'** with both channels and this chora eventually merging into the Titas River downstream near Bijoynagar in Brahmanbaria District. These watercourses play a crucial role in sediment transport and regional drainage during flash flood events.

The '**Sahapur Noapara' Chora**, is situated in Shahapur Mouza, extending approximately one kilometer in length. It contains multiple bridges and transports a significant volume of sediments. The elevation of this Chora varies from 93 to 108 meters, with steep upstream slopes accelerating floodwater and sediment transport during flash flooding. The channel width ranges from 15 to 22 meters. This Chora exhibits pronounced bank erosion and bed accretion due to the accumulation of upstream sediments and the absence of levees. It is hydrologically linked to seasonally flooded lowland areas downstream. Water levels vary in this Chora from 2.35-2.60m (MSL), and the flow direction has been found east-west direction.

The **'Rasulpur'** Chora covers a length of approximately nine kilometers. It connects with the Khasty River downstream and originates from the 'Teliapara Tea Garden' Chora upstream. The channel width varies between 9 and 30 meters. Agricultural land and residential settlements are present along the floodplain areas of this Chora. Water levels vary in this Chora from 3.2-3.70m (MSL), and the flow direction has been found North-east to South-west direction.

The **'Teliapara Tea Garden' Chora** is a transboundary river between Bangladesh and India, originating from hilly terrain in India. This Chora spans approximately five kilometers in length and is hydrologically connected to the Khasty River downstream in Bangladesh. It carries significant volumes of silica sand, leading to bed aggradation due to sediment deposition. The surrounding areas comprise tea gardens and agricultural lands. The elevation varies from 59 to 137 meters, with the upstream portion situated in hilly terrain and the downstream segment merging with the 'Rasulpur' Chora. The channel width ranges between 20 and 60 meters. Water levels vary in this Chora from 2.4-2.70m (MSL), and the flow direction has been found North-east to east-west direction.

The **'Kibriabad' Chora** extends about eight kilometers in length, with an average width between 20 and 60 meters. It originates from the hilly areas of Satchari National Park and drains into the Khasty River downstream. This Chora has a well-maintained natural drainage system, experiences seasonal flooding, and transports considerable sediment loads from upstream hills. Water levels vary in this Chora from 3.9-4.30m (MSL), and the flow direction has been found South-east to North-west and East-west direction.

The **'Jagdishpur' Chora** has a length of approximately 1.5 kilometers and a channel width ranging from 5.0 to 10.0 meters. The catchment area includes agricultural lands, settlements, buildings, and industrial infrastructure. The Chora is heavily obstructed with vegetation debris, domestic waste, and sediment deposits originating from upstream hilly regions. It experiences seasonal flooding and establishes hydrological connectivity with lowland wetlands during the monsoon season. Water levels vary in this Chora from 3.1-3.55m (MSL), and the flow direction has been found East-west direction.

The **'Madhabpur' Chora**, with a width varying between 15 and 30 meters, traverses Harishyama, Chandura, Madhabpur, and Madhabpur Bazar Mouzas. The catchment area encompasses agricultural lands, village markets, settlements, highways, industrial zones, and service areas. This Chora is susceptible to localized flooding during the monsoon season and hydrologically links to the Khasty and Sonai Rivers downstream. It transports silica-rich sediments during flash flood events, contributing to regional sediment deposition dynamics. Water levels vary in this Chora from 2.7-3.40m (MSL), and the flow direction has been found East-west direction.

4.3.5.2 Hydrologic Condition in Chunarughat Upazila

The **'Sahapur Chora'** is situated in the hilly terrain of the Raghunandan Hills reserved forest and is hydrologically linked with the 'Sahapur Noapara' Chora in Madhabpur Upazila. This Chora serves as a conduit for flash flood drainage downstream and transports a significant volume of sediments. It experiences flooding only during the heavy monsoon season. Water levels vary in this Chora from 4.5-4.90m (MSL), and the flow direction has been found in the East-west direction.

The **'Sutang River Part "Ka" Chora'** is hydrologically connected to the Sutang River and carries sediment from the western hill areas. The majority of this Chora's length traverses agricultural lands

and low-lying regions that experience seasonal flooding. Water levels vary in this Chora from 4.3-5.40m (MSL), and the flow direction has been found in the South-north direction.

The **'Sutang River Part "Kha" Chora'** is also hydrologically linked to the Sutang River and plays a crucial role in flood drainage during the heavy monsoon season. It transports a substantial amount of sediments. Along its course, agricultural lands and low-lying areas are frequently inundated during intense monsoon rains. Water levels vary in this Chora from 4.2-5.30m (MSL), and the flow direction has been found in the South-north direction.

The **'Surma River Part "Ga" Chora'** is connected to the Sutang River and annually carries sediments from the upstream hill areas. This Chora has an average width of 10-20 meters and flows through agricultural lands and tea garden areas. It functions as both a floodwater conduit and a drainage passage during the monsoon season. Water levels vary in this Chora from 4.4-5.90m (MSL), and the flow direction has been found in the South-north direction.

The **'Deocahra Chora'** originates from the hilly areas upstream and is connected to the Korangi River downstream. It runs through agricultural land and tea garden areas, contributing to local drainage. Water levels vary in this Chora from 6.02-6.10m (MSL), and the flow direction has been found in the East-west direction.

The **'Ichalia Chora'** is linked to the Khowai River at its downstream section and originates from a hilly tea garden area upstream. It carries a significant amount of sediment along its course and passes through agricultural lands and tea plantations. Water levels vary in this Chora from 18.02-18.90m (MSL), and the flow direction has been found in the South-north direction.

The **'Ramganga Chandi Chora'** originates from the hill areas and is connected to the Sutang River downstream. The primary land use along this Chora consists of tea garden areas. Water levels vary in this Chora from 9.76-9.92m (MSL), and the flow direction has been found in the West-east direction.

4.3.5.3 Hydrologic Condition in Bahubal Upazila

The **'Shashan Chora'** is not hydrologically connected to any major nearby river. It originates from the upstream hill area and flows into a low-lying area downstream, which experiences seasonal flooding. The catchment area primarily consists of agricultural land, tea gardens, and village settlements. Water levels vary in this Chora from 6.1-6.90m (MSL), and the flow direction has been found in the East-west direction.

The **'Digambara Chora'** connects to low-lying lands that undergo seasonal flooding downstream, while its upstream source is in the hilly rubber garden area. Water levels vary in this Chora from 7.6-8.50m (MSL), and the flow direction has been found in the East-west direction.

The **'Kali Chora'** silica quarry river originates in the hills and flows downstream into low-lying land areas. It transports sediments and serves as a drainage pathway during flash floods. The upper reaches contain tea gardens, while the lower sections open into low-lying agricultural lands. Water levels vary in this Chora from 7.1.-7.90m (MSL), and the flow direction has been found in the East-west direction.

The **'Madhavi Chora'** begins in the hills and flows into a low-lying wetland area downstream, which experiences seasonal flooding. Its catchment area includes agricultural land, tea gardens, and village settlements. Water levels vary in this Chora from 6.9.-7.20m (MSL), and the flow direction has been found in the East-west direction.

The **'Dhalia Chora'** originates from hilly terrain and connects to low-lying areas downstream. It encompasses agricultural lands, tea gardens, and village settlements. Water levels vary in this Chora from 6.6.-6.90m (MSL), and the flow direction has been found in the East-west direction.

The **'Karangi River'** is a silica quarrying river/Chora with an average width of 30-35 meters. It is hydrologically linked to the Satai/Barak River downstream. Its catchment area consists of agricultural lands, medium-density village settlements, and low-lying areas. It carries a substantial sediment load, leading to bed-level elevation due to upstream sedimentation during heavy monsoonal floods. Water

levels vary in this Chora from 7.1.- 7.60m (MSL), and the flow direction has been found in the East-west direction.

The **'Kamai Chora'** originates from the hills and flows into a low-lying wetland downstream, which experiences seasonal flooding. The catchment area consists of agricultural lands, tea gardens, and village settlements. Water levels vary in this Chora from 7.3.- 7.60m (MSL), and the flow direction has been found in the East-west direction.

The **'Lauya Chora'** originates from the LauChora National Hill Park. Downstream, it opens into a low-lying area with agricultural lands and tea gardens. It carries minimal sediment and serves as a natural drainage channel during monsoonal flash floods. Water levels vary in this Chora from 6.6 - 6.90m (MSL), and the flow direction has been found in the East-west direction.

4.3.6 Soils

Most of the soils within Bangladesh are alluvial (rather than colluvial) in origin and have been deposited over time by the various river networks that drain into the Bay of Bengal. However, this has not created uniformity of soil types and physio-chemical soil characteristics can vary considerably based on factors such as age, relief, biological activity, parent material, and anthropogenic influences.

In general, most of the soils within the country, particularly those found within alluvial floodplains, share the following broad characteristics (Brammer, 1996 and Rashid, 1991):

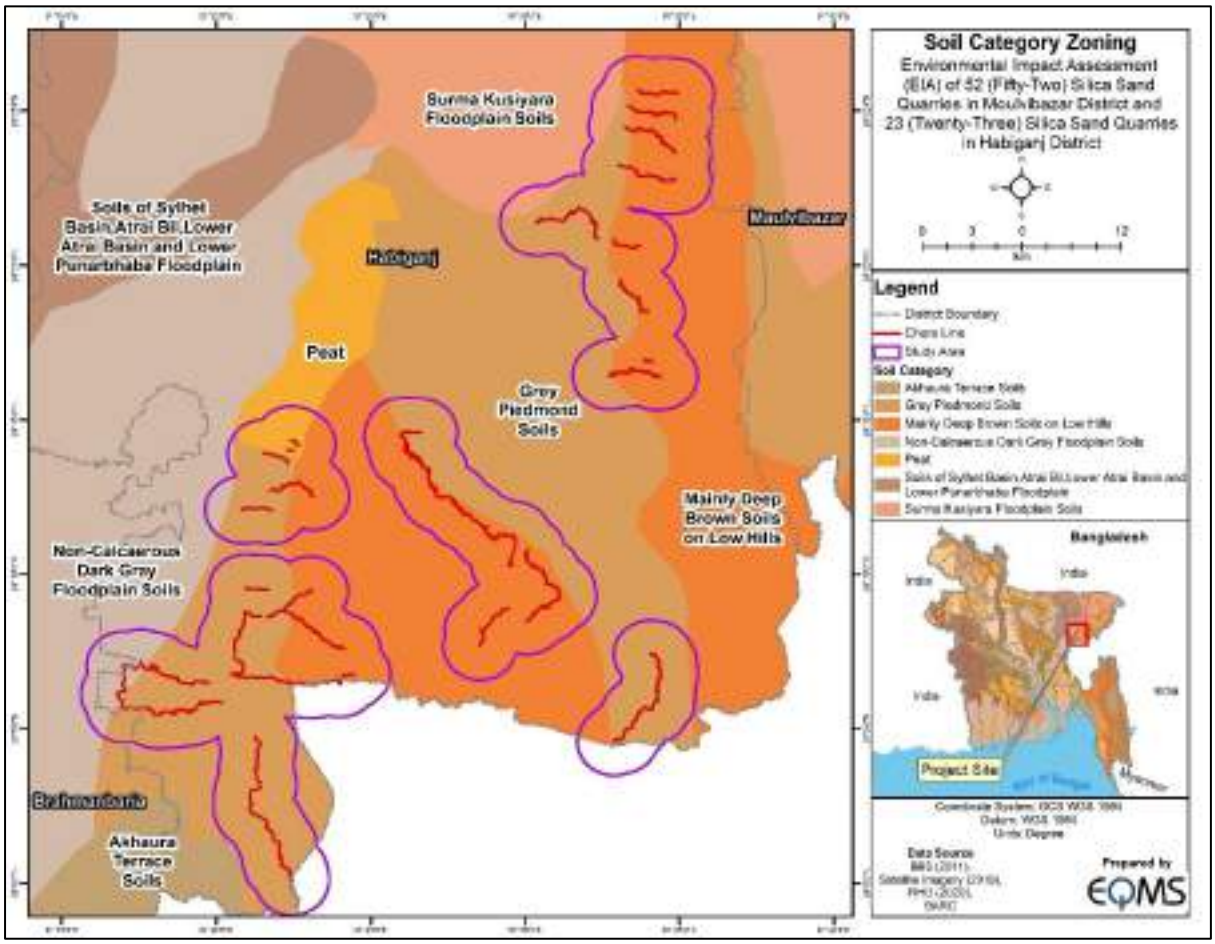
- Moderately fertile to fertile.
- Clay to loam structure (including sandy loams).
- Slightly to moderately acidic; and
- Relatively deep (often around 4 km including underlying shale/sandstone layers)

Another unique characteristic of alluvial soils in Bangladesh is their rapid rate of formation, which is primarily attributed to the significant deposition of sediments as well as the warm, humid climate.

Regarding soil formation, two distinct conditions occur in Bangladesh: alternating seasonal wet or inundated and dry conditions, as prevalent in most of the floodplain areas, and intermittently wet or moist or dry conditions, as on the upland areas of hills and terraces. This is due to the variation of agro-climatic parameters in different seasons. The soil formation process differs significantly between floodplain, hill, and uplifted terraces. The project site falls under the floodplain ranges. The SRDI has identified about 500 soil series in Bangladesh and FAO-UNDP has identified 21 different general soil types based on the diagnostic horizons and diagnostic properties of the soil (FAO-UNDP, 1998).

The project sites can be classified as Mainly deep brown soils on low hills, Grey Piedmont Soils, Peat Soils, and Noncalcareous Dark Grey Floodplain Soils which are described below and depicted in Figure 4-8.

Figure 4-8: Soil Category Map of the Study Area



Source: SRDI

4.3.7 Meteorology

Bangladesh is located in the tropical monsoon region and its climate is characterized by high temperatures, heavy rainfall, often excessive humidity, and fairly marked seasonal variations. From the climatic point of view, four distinct seasons[1] can be recognized in Bangladesh.

- Pre-Monsoon Hot Season (March to May) – Characterized by the highest temperatures of the year–up to 36°C. Certain rainfall may occur, with tropical cyclones occasionally affecting coastal areas.
- Rainy Monsoon Season (June to September) – Period of highest rainfall (up to 80% of the annual rainfall), humidity, and cloud cover. Increased rain and cloud cover generally cause a small reduction in mean daily temperatures.
- Post-Monsoon Season (October to November) – Temperature remains hot and humid, though cloud cover decreases in this season. Limited tropical thunderstorms may still, particularly in coastal areas.
- Cool Dry Winter Season (December to February) – Coolest time of the year with mean minimum temperatures falling below 10°C in some areas. Reduced humidity and cloud cover. Rainfall is scarce.

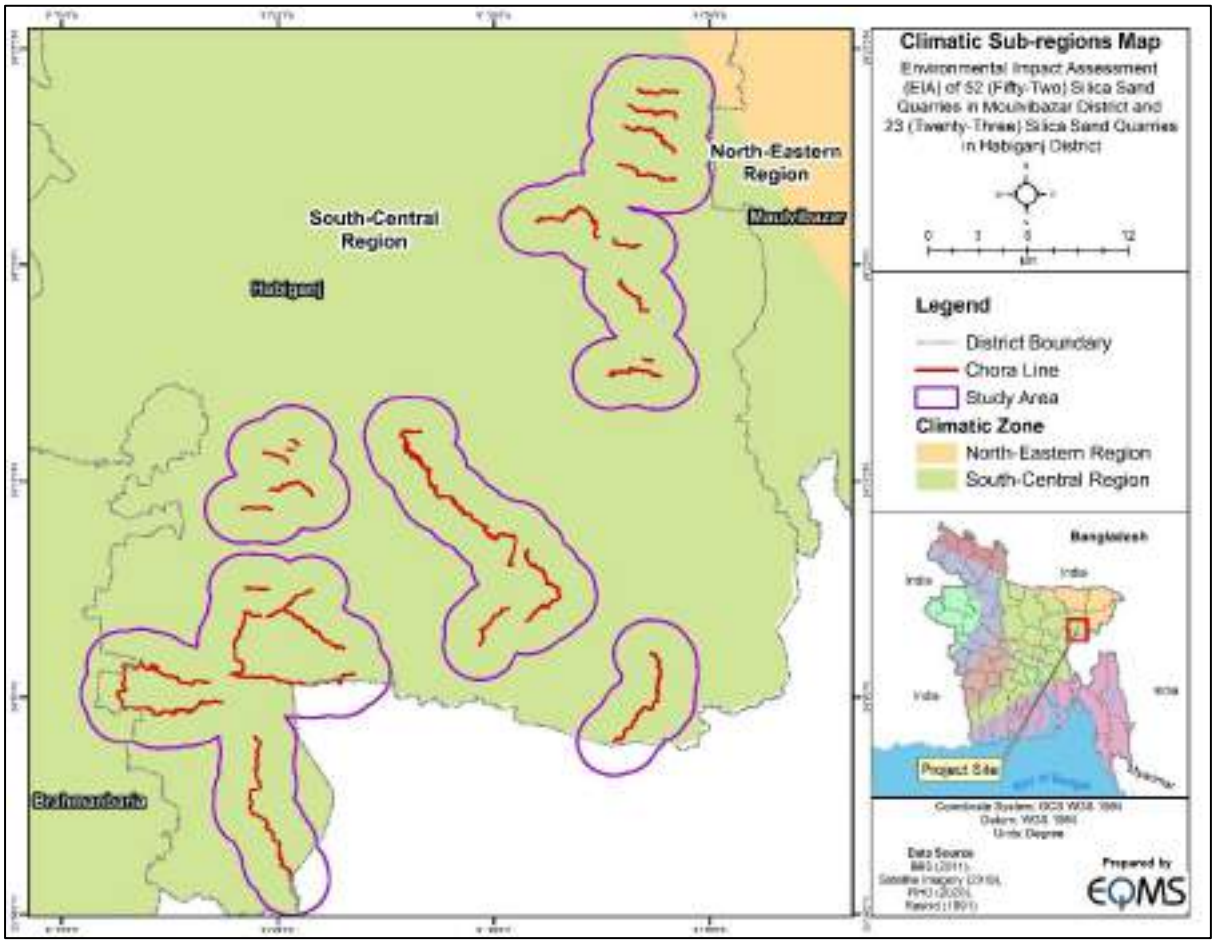
Despite the general predictability of the seasons in Bangladesh, local conditions may still vary widely across the country. As such, Bangladesh can be divided into seven climatic sub-zones based on

[1] Brammer, H. (1996). *The Geography of the Soils of Bangladesh*. University Press Limited, Dhaka, Bangladesh.

differences in a range of factors including rainfall, temperature, evapotranspiration, and local seasonality (Rashid, 1991).

According to the climatic sub-regions of Bangladesh, the proposed project area is located in the South-Central Region. The climatic sub-regions of the study area are shown in Figure 4-9. The climatic data for the study area was obtained from the Bangladesh Meteorological Department (BMD).[2]

Figure 4-9: Climatic Sub-regions of the Study Area



Source: Data from Rashid, H. E. 1991[3] and map prepared by EQMS

There is no meteorology station in Habiganj District. The nearest meteorological station to the proposed project site is at Sreemangal Meteorological Station which is located in Moulvibazar District.

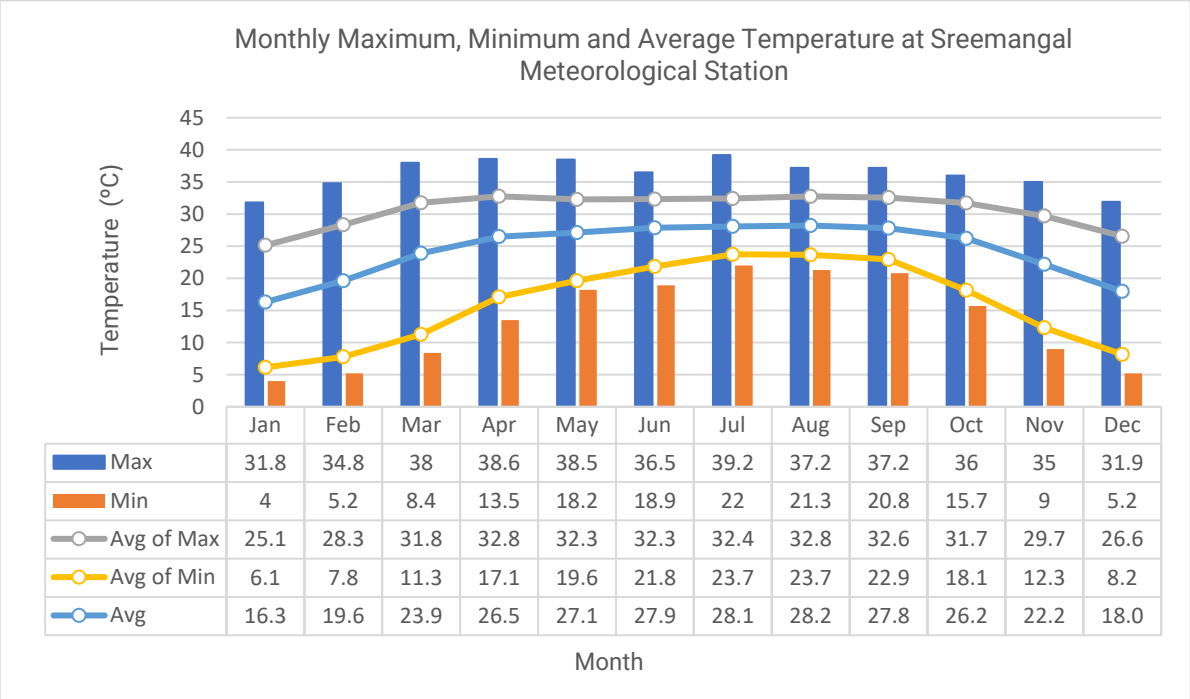
4.3.7.1 Temperature

According to Sreemangal Meteorological Station, the lowest average temperature recorded in the past 30 years, was in January 2013 (8.5°C). The highest average temperature reached 32.4°C in July 2018. The period from March to August is marked by continuous increases in temperatures. August is the hottest month of the year with an average maximum and minimum temperature (in August) of 32.8°C and 23.7°C, respectively. From September onwards, both the day and night temperatures decrease, and January is the coldest month with average monthly maximum and minimum temperatures of 25.1°C and 6.1°C, respectively. The monthly variation of the maximum, minimum, and average temperature at Sreemangal Meteorological Station (1992 to 2021) is shown in Figure 4-10.

[2] Bangladesh Meteorological Department is the authorized Government organization for all meteorological activities in Bangladesh. It maintains a network of surface and upper air observatories, radar and satellite stations, agro-meteorological observatories, geomagnetic and seismological observatories, and meteorological telecommunication system.

[3] Rashid, H. E. (1991). *Geography of Bangladesh*. University Press Limited, Dhaka.

Figure 4-10: Monthly Maximum, Minimum, and Average Temperatures



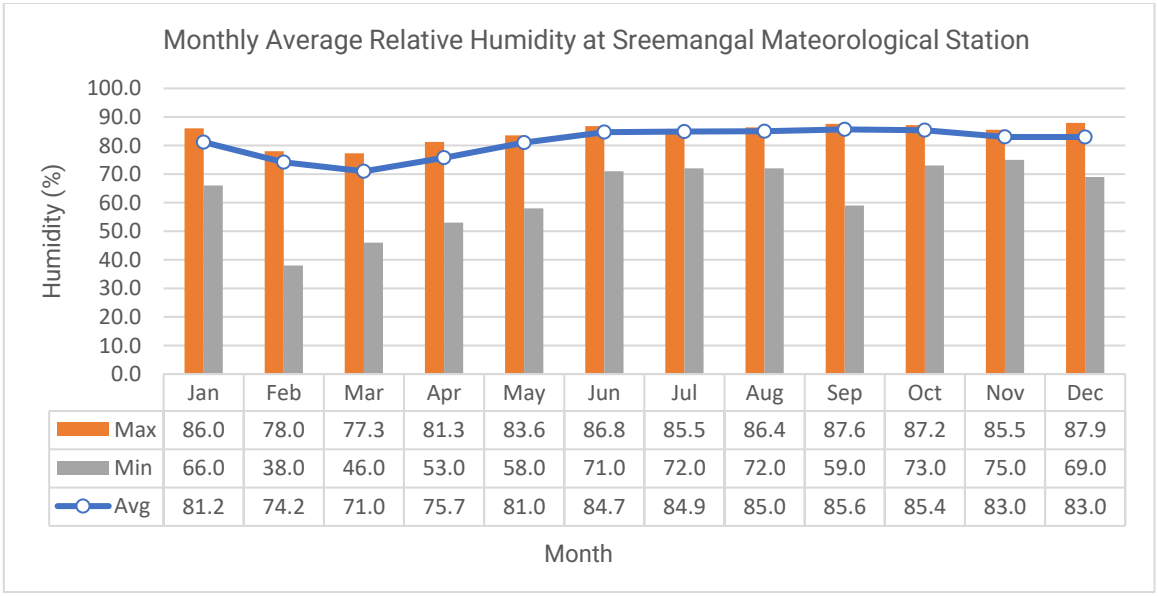
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	31.8	34.8	38	38.6	38.5	36.5	39.2	37.2	37.2	36	35	31.9
Min	4	5.2	8.4	13.5	18.2	18.9	22	21.3	20.8	15.7	9	5.2
Avg of Max	25.1	28.3	31.8	32.8	32.3	32.3	32.4	32.8	32.6	31.7	29.7	26.6
Avg of Min	6.1	7.8	11.3	17.1	19.6	21.8	23.7	23.7	22.9	18.1	12.3	8.2
Avg	16.3	19.6	23.9	26.5	27.1	27.9	28.1	28.2	27.8	26.2	22.2	18.0

Source: Bangladesh Meteorological Department (BMD)

4.3.7.2 Humidity

Due to the heavy rainfall and proximity to the Bay of Bengal, the humidity levels in Bangladesh. Relative humidity in Sreemangal Meteorological Station is generally above 75% throughout the year except in the months of February and March. The monthly average relative humidity varies from 71.0% to 85.6% with average humidity at 81.0%. Humidity remains higher in the monsoon (June to September) season and comparatively lower in the winter season. The month of March is the driest with the relative humidity around 71%. The monthly average relative humidity at the Sreemangal Meteorological Station is shown in **Figure** 4-11.

Figure 4-11: Monthly Average Relative Humidity



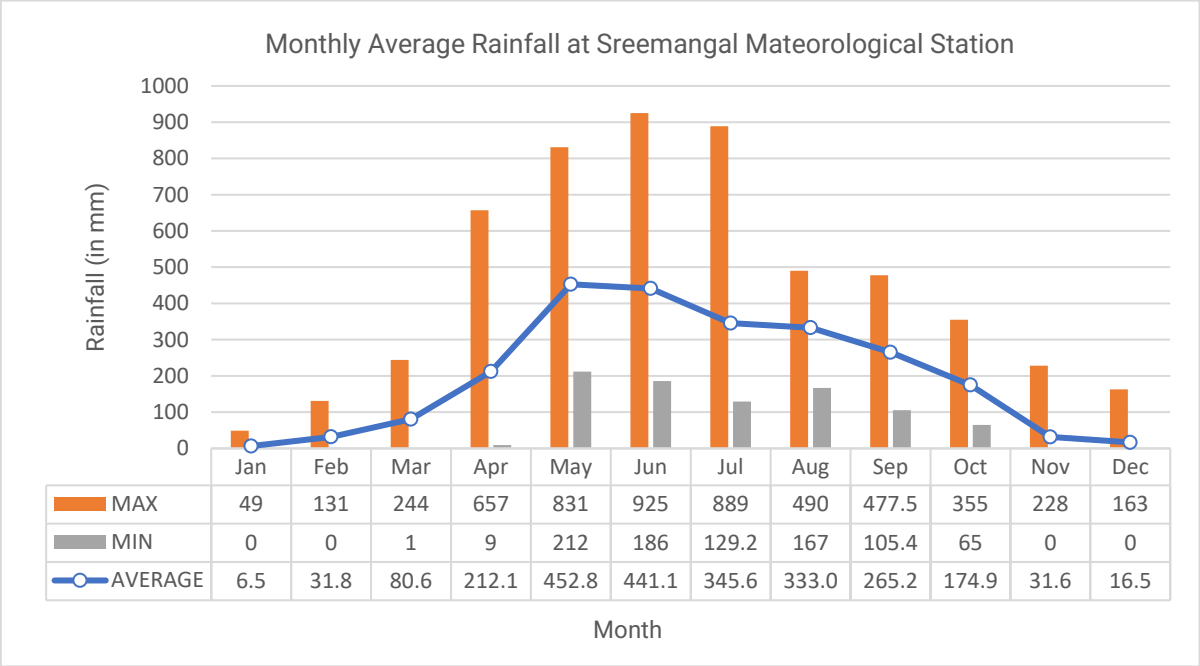
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	86.0	78.0	77.3	81.3	83.6	86.8	85.5	86.4	87.6	87.2	85.5	87.9
Min	66.0	38.0	46.0	53.0	58.0	71.0	72.0	72.0	59.0	73.0	75.0	69.0
Avg	81.2	74.2	71.0	75.7	81.0	84.7	84.9	85.0	85.6	85.4	83.0	83.0

Source: Bangladesh Meteorological Department (BMD)

4.3.7.3 Rainfall

The annual rainfall based on rainfall data recorded at Sreemangal Meteorological Station for the last 30 years (1992 to 2021) is 3813 mm. Annual rainfall shows considerable variability from year to year. The rainfall also varies considerably within a year (Figure 4-12) with 93% of rainfall occurring within the seven months from April to October. The highest rainfall is recorded in June (925.0 mm). An insignificant amount of rainfall has also been recorded in winter (November to February).

Figure 4-12: Monthly Average Rainfall



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MAX	49	131	244	657	831	925	889	490	477.5	355	228	163
MIN	0	0	1	9	212	186	129.2	167	105.4	65	0	0
AVERAGE	6.5	31.8	80.6	212.1	452.8	441.1	345.6	333.0	265.2	174.9	31.6	16.5

Source: Bangladesh Meteorological Department (BMD)

4.3.8 Natural Hazards/Disaster

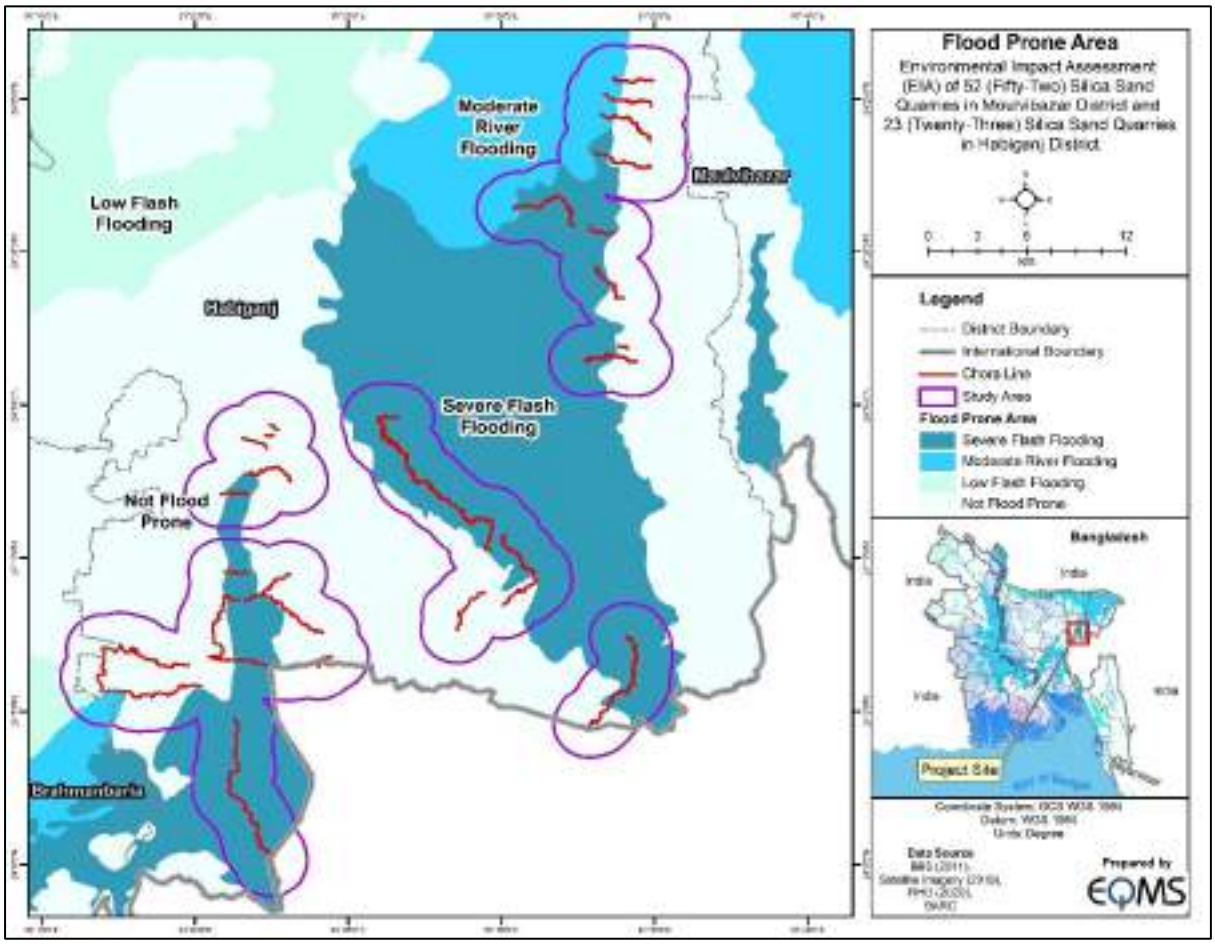
4.3.8.1 Floods

Every year about one-fifth of Bangladesh undergoes flooding during the monsoon season. A flood season in Bangladesh may start as early as May and can continue until November.

Floods in Bangladesh can be divided into three categories; (i) monsoon floods – seasonal, increase slowly and decrease slowly, inundate vast areas, and cause huge loss of life and property; (ii) flash floods from sudden torrential flows, following a brief intense rainstorm or the bursting of natural or manmade dam or level; and (iii) tidal flood – duration, is generally 3-6 m, prevents inland flood drainage.

Figure 4-13 shows the flood-affected areas of Bangladesh. According to this, the project areas are distributed across various Upazilas within the Habiganj District, encompassing a range of environmental conditions. Specifically, these areas are categorized into different flood-prone zones: some fall within Not Flood Prone zones, others in Moderate River Flooding zones, and some in Severe Flash Flooding zones. Additionally, certain areas are located in mixed zones that combine characteristics of these three categories.

Figure 4-13: Flood Map of Bangladesh showing the project study areas



Source: BARC

4.4 Environmental Quality

4.4.1 Ambient Air Quality

The objective of the ambient air quality monitoring program was to establish the baseline ambient air quality in the study area. The study area predominantly features a rural landscape, with villages interspersed among homestead plantations, agricultural lands, and forest vegetation. There are no major emission sources in the study area. The primary sources of air emissions include road dust, black smoke from diesel engine vehicles, and domestic heating and cooking.

4.4.1.1 Monitoring Location

To evaluate the current air quality in the area, Six Ambient Air Quality Monitoring (AAQ-1, AAQ-2, AAQ-3, AAQ-4, AAQ-5, and AAQ-6) Stations were established within 500m from both sides of the sand quarry. Details of the ambient air quality monitoring locations are presented in **Table** 4-2 and **Figure** 4-14. The photographs of ambient air quality monitoring are presented in Appendix E-1.

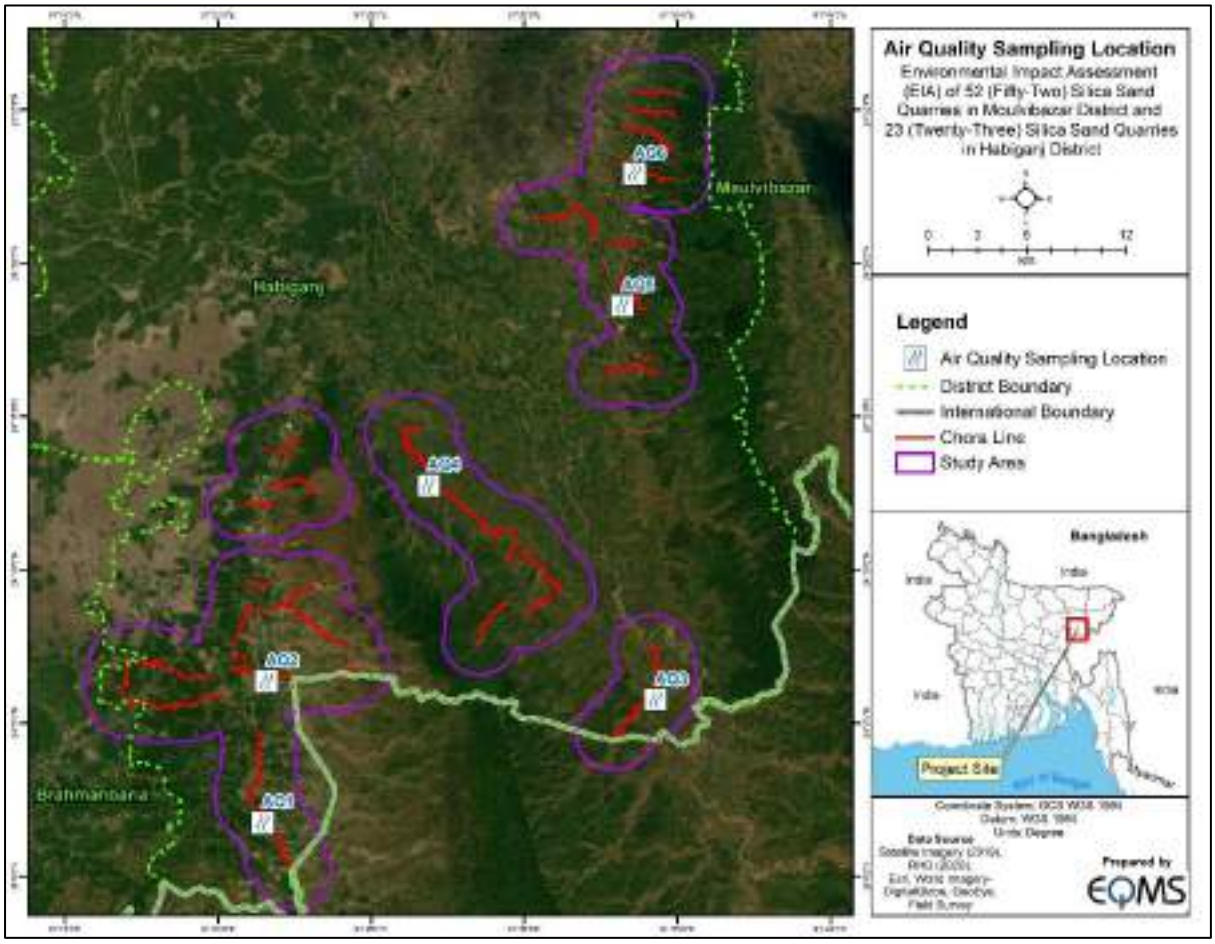
Table 4-2: Ambient Air Quality Monitoring Locations

Sample ID	Monitoring Location	GPS Coordinates	Sampling Date
AAQ 1	Toton Mia, Mangalpur, Chownmohani, Madhavpur	24°1'45"N 91°21'27"E	02.01.2025

Sample ID	Monitoring Location	GPS Coordinates	Sampling Date
AAQ 2	Sha Alam, Vendrroa, Shajahanpur, Madhavpur	24°6'22"N 91°21'35"E	02.01.2025
AAQ 3	Rofik Choudhury, Bonogram, Gazipur, Chunarughat	24°05'46"N 91°34'18"E	03.01.2025
AAQ 4	Panchash Jame Mosque, Chunarughat	24°12'46"N 91°26'52"E	03.01.2025
AAQ 5	Soden, Pukurpar, Eashidpur	24°18'38"N 91°33'13"E	04.01.2025
AAQ 6	Nasir Mia, Hilalpur, Bahubal	24°22'56"N 91°33'36"E	05.01.2025

Source: Field Survey by EQMS, Jan 2025

Figure 4-14: Ambient Air Quality Monitoring Location Map



Source: Field Survey by EQMS Team, Jan 2025

4.4.1.2 Ambient Air Quality Monitoring Results

The summary of the ambient air quality results is presented in **Table** 4-3.

Table 4-3: Summary of Ambient Air Quality Monitoring Results

Location	Ambient Air Pollutants Concentration (µg/m³)					CO (mg/m³)
	SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	
AAQ1	63.6	34.8	18.2	11.7	16.5	0.59
AAQ2	79.4	41.3	26.9	13.5	18.1	0.87
AAQ3	68.3	36.1	24.7	12.8	17.2	0.78
AAQ4	74.7	42.7	23.5	12.6	16.7	0.81
AAQ5	72.4	37.8	22.6	10.3	15.4	0.67
AAQ6	75.2	38.9	25.3	11.4	17.3	0.72
Duration (hr.)	8	24	24	24	24	8
Air Pollution (Control) Rules, 2022	-	150	65	80	80	5

Source: Field Measurement and Laboratory Analysis by EQMS, Jan 2025

4.4.1.3 Interpretation of Ambient Air Quality Results

Concentration of Suspended Particulate Matter (SPM)

The 8-hourly SPM concentration in the ambient air within the project study areas ranged from 63.6 µg/m³ to 79.4 µg/m³. The recorded SPM levels were well below national standard, indicating that the air quality in terms of SPM remains within acceptable limits.

Concentration of Particulate Matter (PM_{10})

The 24-hourly PM_{10} concentration in the ambient air was measured between 34.8 µg/m³ and 42.7 µg/m³. The levels were well below the Air Pollution (Control) Rules, 2022 standard of 150 µg/m³ in the study area.

Concentration of Particulate Matter ($PM_{2.5}$)

The 24-hourly $PM_{2.5}$ concentration in the study areas was recorded in the range of 18.2 µg/m³ to 26.9 µg/m³. The levels were below the Air Pollution (Control) Rules, 2022 standard of 65 µg/m³.

Concentration of Sulphur Dioxide (SO_2)

The 24-hourly SO_2 concentration in the ambient air was recorded between 10.3 µg/m³ and 13.5 µg/m³. The observed values were significantly lower than the Air Pollution (Control) Rules, 2022 standard of 80 µg/m³, in the study area.

Concentration of Nitrogen Dioxide (NO_2)

The 24-hourly NO_2 concentration ranged from 15.4 µg/m³ to 18.1 µg/m³. These levels were well below the Air Pollution (Control) Rules, 2022 standard of 80 µg/m³.

Concentration of Carbon Monoxide (CO)

The 8-hourly CO concentration in the project study areas was recorded between 0.59 mg/m³ and 0.87 mg/m³. These levels were below the Air Pollution (Control) Rules, 2022 standard of 5 mg/m³, indicating that CO pollution is not a significant concern in the area.

4.4.2 Ambient Noise Quality

The purpose of ambient noise level measurement was to determine sound intensity at the monitoring locations. These locations are chosen in such way that a representative data could be recorded all over the area.

4.4.2.1 Ambient Noise Monitoring Locations

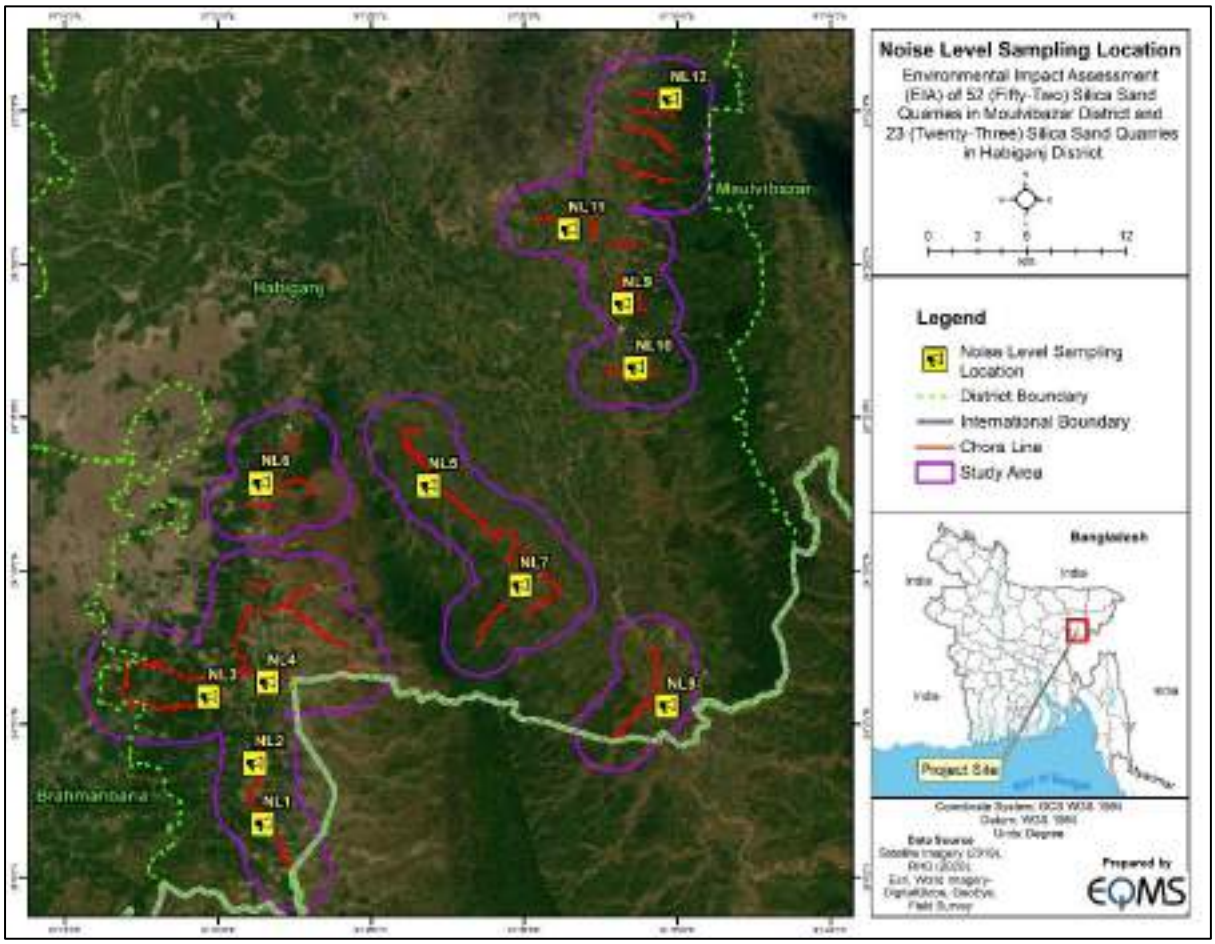
Noise levels were recorded at twelve (12) locations in the study area during the monitoring period. The details of noise monitoring locations are presented in Table 4-4 and depicted in Figure 4-15. The photographs of ambient noise monitoring are presented in Appendix E-2.

Table 4-4: Ambient Noise Monitoring Locations

Code	Monitoring Location	GPS Coordinate	Monitoring Date
NL-1	Ripon Mia, Mangalpur, Chownmohani, Madhavpur	24°1'45"N, 91°21'28"E	02.01.2025
NL-2	Almas Uddin, Chownmohani, Madhavpur	24°3'43"N, 91°21'12"E	02.01.2025
NL-3	Abul Basgar, Orissama, Madhavpur	24°5'53"N, 91°19'41"E	02.01.2025
NL-4	Sha Alam, Vendrroa, Shajahanpur, Madhavpur	24°6'22"N, 91°21'37"E	02.01.2025
NL-5	Abul Hamid, Panchash, Chunarughat	24°12'46"N, 91°26'52"E	03.01.2025
NL-6	Md. Abid Mia, Shabpur, Madhavpur	24°12'52"N, 91°21'24"E	02.01.2025
NL-7	Chandpur Gov: Primary School, Chunarughat	24°09'32"N, 91°29'52"E	03.01.2025
NL-8	Asam Para. Dhankin Bazar, Chunarughat	24°05'36"N, 91°34'40"E	03.01.2025
NL-9	Kiron, Pukurpar, Rashidpur	24°18'42"N, 91°33'13"E	04.01.2025
NL-10	Md, Shahid Mia, Daragao, Sreemangal	24°16'38"N, 91°33'38"E	03.01.2025
NL-11	Mohi Uddin, Berakhal, Bahubal	24°21'9N, 91°31'26"E	05.01.2025
NL-12	Kasu Mia, Uttor Bhavani, Bahubal	24°25'23"N, 91°34'46"E	05.01.2025

Source: Field Survey by EQMS Team, Jan 2025

Figure 4-15: Ambient Noise Monitoring Location Map



Source: Field Survey by EQMS Team, Jan 2025

4.4.2.2 Ambient Noise Monitoring Results

The recorded ambient noise levels in the study area are summarized in **Table** 4-5.

Table 4-5: Ambient Noise Level in the Study Area

Code	Noise Level (dBA)				Location Settings	*Bangladesh Standard	
	Leq_{Day}	Leq_{Night}	L_{max}	L_{min}		Day	Night
NL1	46.71	42.92	74.3	31.6	Residential Area	55	45
NL2	45.18	39.25	67.8	30.8	Residential Area	55	45
NL3	46.82	40.12	76.3	31.5	Residential Area	55	45
NL4	51.56	42.37	80.5	32.7	Residential Area	55	45
NL5	44.79	39.22	69.3	31.2	Residential Area	55	45
NL6	53.47	44.59	75.9	32.3	Residential Area	55	45
NL7	52.73	43.34	78.2	32.5	Silent Zone	50	40
NL8	58.57	48.36	82.1	33.4	Mixed Area	60	50
NL9	49.42	40.95	74.5	32.2	Residential Area	55	45
NL10	51.74	42.36	73.8	33.5	Residential Area	55	45

Code	Noise Level (dBA)				Location Settings	*Bangladesh Standard	
	Leq_{Day}	Leq_{Night}	L_{max}	L_{min}		Day	Night
NL11	45.23	38.37	66.7	30.8	Residential Area	55	45
NL12	50.35	40.28	68.5	31.7	Residential Area	55	45

Source: Field Survey by EQMS Team, Jan 2025

4.4.2.3 Interpretation of Ambient Noise Level Results

Table 4.7 presents the summary of Leq (Day) and Leq (Night) calculations for all monitoring locations. Noise levels were monitored continuously for 24 hours at each location. As per the Noise Pollution (Control) Rules, 2006, daytime is defined as 06:00 AM to 09:00 PM, while nighttime extends from 09:00 PM to 06:00 AM. The monitoring locations were classified into silent zones, residential zones, mixed zones, commercial zones, and industrial zones based on these regulations.

NL-1, NL-5, NL-9, NL-10, and NL-12 fall under residential areas, where the noise levels were found within the acceptable standard limits of 55 dBA (day) and 45 dBA (night). NL-7 falls under a silent zone, where the noise levels exceeded the permissible standard of 50 dBA (day) and 40 dBA (night), indicating noise pollution concerns. NL-8 is categorized as a mixed-use area, where the daytime noise level exceeded the standard limit of 60 dBA, but the nighttime level remained within the 50 dBA limit. NL-2 falls under the commercial zone, where the noise levels comply with the acceptable standards of 70 dBA (day) and 60 dBA (night). NL-3 falls under the industrial zone, where the noise levels exceeded the standard limits of 75 dBA (day) and 70 dBA (night), indicating a need for noise control measures.

4.4.3 Water Quality

Water sampling and analysis were undertaken to understand the overall baseline water quality characteristics of the surface and groundwater in the study areas. Samples were taken from representative selected surface water bodies and groundwater sources representing the study area.

4.4.3.1 Surface Water Sampling Locations

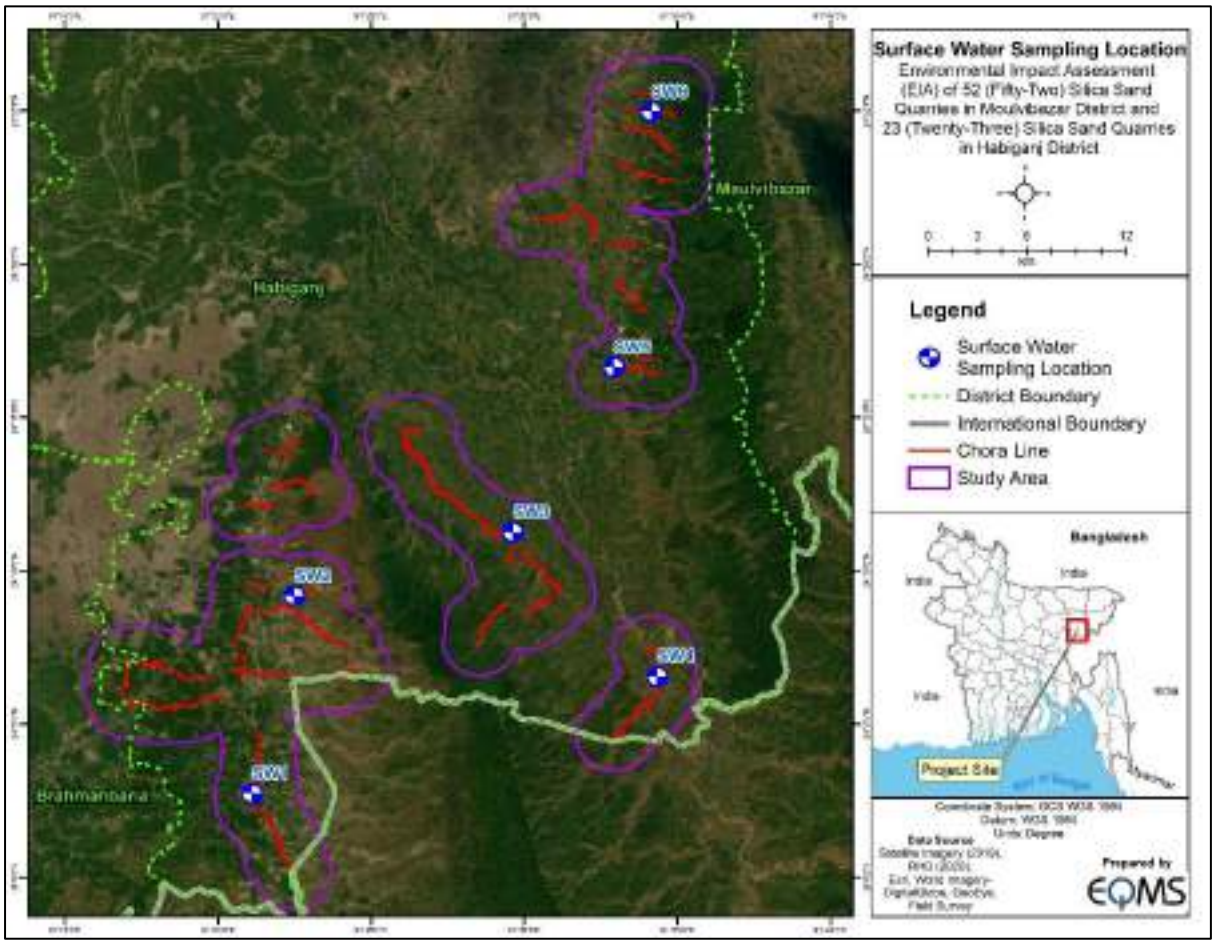
The surface water sample was collected from the nearby canal, pond, and river. Six surface water samples were collected during the monitoring period. Details of the surface water monitoring location is presented in **Table** 4-6 and **Figure** 4-16**.** The photographs of the sampling are presented in Appendix E-3.

Table 4-6: Details of Surface Water Sampling Location

Code	Monitoring Location	GPS Coordinate	Sampling Date
SWQ-1	Sunai River, Mangalpur, Chownmohani, Madhavpur	24°2'44"N 91°21'07"E	02.01.2025
SWQ-2	Sunai River, Jagadishpur, Tea Garden, Madhavpur	24°9'11"N 91°22'30"E	02.01.2025
SWQ-3	Sutang River, Novagram, 4 no Pippara,Chunarughat	24°11'16"N 91°29'38"E	03.01.2025
SWQ-4	Khowa River, Konagao, Gazipur, Chunarughat	24°06'33"N 91°34'21"E	03.01.2025
SWQ-5	Kayaki River, Kazipur, Sreemangal	24°16'38"N 91°32'56"E	04.01.2025
SWQ-6	Dikambor Chara, Hazi Bazar, Bahubal	24°24'59"N 91°34'09"E	05.01.2025

Source: Field Survey by EQMS Team, Jan 2025

Figure 4-16: Surface Water Sampling Location



Source: Field Survey by EQMS Team, Jan 2025

4.4.3.2 Surface Water Results

The analyzed results for surface water were compared to Bangladesh Standards (ECR, 2023). Results of inland surface water analysis are presented in Table 4-7.

Table 4-7: Surface Water Results

Parameter	Unit	SWQ1	SWQ2	SWQ3	SWQ4	SWQ5	SWQ6	Bangladesh Standards*
Temperature	oC	23.7	23.8	24.7	24.0	24.7	24.0	--
Electric Conductivity	µS/cm	110	90	130	60	210	100	--
Turbidity	NTU	17.8	15.6	14	21	32	34	--
pH		6.27	5.84	5.66	5.54	6.32	5.68	6 - 9
DO	mg/L	7.4	7.3	6.7	6.7	7.3	6.9	≥5
BOD5 (at 20°C)	mg/L	2.1	2.76	2.52	1.89	1.62	1.26	≤6
COD	mg/L	7.0	9.2	8.4	6.3	5.4	4.2	50
Iron	mg/L	2.1	1.2	1.0	1.7	1.8	2.2	--
Chloride	mg/L	9.0	11.2	12	6.0	3	3.2	250
Nitrate	mg/L	1.9	1.8	2.1	2.7	1.7	1.8	10
Salinity	ppt	0.05	0.03	0.05	0.02	0.08	0.04	--
TDS	mg/L	60	45	70	30	110	50	1000
Total Suspended Solid (TSS)	mg/L	64	68	65	71	69	70	100

Source: Laboratory Analysis by EQMS laboratory

* Bangladesh Environment Conservation Rules (ECR), 2023, Schedule-2 (Standards for Inland Surface Water)

4.4.3.3 Interpretation of Surface Water Results

The analysis of water quality parameters across six monitoring locations (SWQ1–SWQ6) revealed variations in physical and chemical characteristics. Temperature ranged from 23.7°C to 24.7°C, aligning with Bangladesh standards of 6°C or more. Electric conductivity values varied between 60 mg/L and 210 mg/L, remaining well below the standard limit of 1000 mg/L. Turbidity levels were recorded between 14 NTU and 34 NTU, surpassing the acceptable range of 6.5–8.5 NTU. The pH values fluctuated between 5.54 and 6.32, with some locations falling below the recommended minimum of 5. DO levels ranged from 6.7 mg/L to 7.4 mg/L, remaining within the standard range of 20–30 mg/L. BOD5 levels varied from 1.26 mg/L to 2.76 mg/L, while COD values ranged between 4.2 mg/L and 9.2 mg/L, both of which lack specific standard limits. Iron concentrations were detected between 1.0 mg/L and 2.2 mg/L, significantly lower than the permissible limit of 250 mg/L. Chloride levels were recorded between 3 mg/L and 12 mg/L, remaining well below the 45 mg/L standard. Nitrate concentrations ranged from 1.7 mg/L to 2.7 mg/L, exceeding the acceptable limit of 0.3–1.0 mg/L. Salinity levels varied between 0.02 mg/L and 0.08 mg/L, staying within the permissible limit of 2 mg/L or less. TDS concentrations ranged from 30 mg/L to 110 mg/L, significantly below the 25 mg/L standard. Total Suspended Solids (TSS) values ranged from 64 mg/L to 71 mg/L, for which no standard limit is specified. Overall, while most parameters complied with national standards, turbidity, pH, and nitrate levels exceeded permissible limits in certain locations, indicating potential water quality concerns that may require mitigation measures.

The water quality of the canal water and river water sample reveals that it is usable for all purposes as per ECR 2023-Schedule 2 (a).

4.4.3.4 Groundwater Sampling Locations

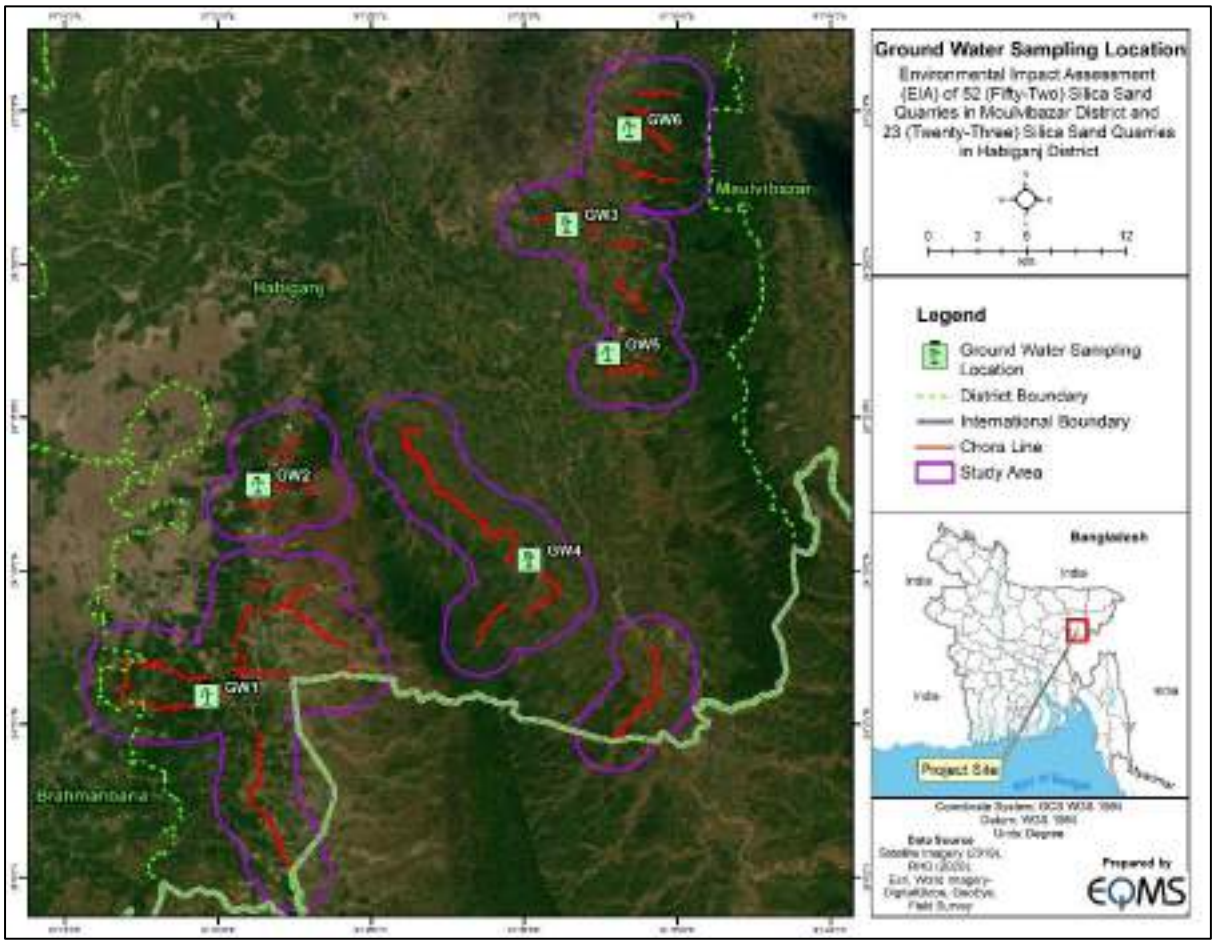
Groundwater samples were collected from six (6) representatives of selected groundwater sources close to the project site during the monitoring period (July 2024). Details of the groundwater quality monitoring location is depicted in **Table** 4-8 and **Figure** 4-17**.** The photographs of groundwater quality monitoring are presented in Appendix E-4.

Table 4-8: Details of Groundwater Sampling Location

Code	Sampling Location	GPS Coordinate	Sampling Date
GWQ-1	Horiman Das, Orissama, Madhavpur	24°5'54"N 91°19'38"E	02.01.2025
GWQ-2	Md, Youns Mia, Shabpur, Madhavpur	24°12'49"N 91°21'19"E	02.01.2025
GWQ-3	Md, Manik Mia,Berakhal,Bahubal	24°21'18"N 91°31'23"E	05.01.2025
GWQ-4	Sha alam, Deorgach 3 no Union, Chunarughat	24°10'22"N 91°30'10"E	03.01.2025
GWQ-5	Modusodan, Chirchirkot, Sreemangal	24°17'5"N 91°32'44"E	04.01.2025
GWQ-6	Ahmedpur Jame Mosque, Ahmedpur, Bahubal	24°24'25"N 91°33'26"E	05.01.2025

Source: Field Survey by EQMS Team, Jan 2025

Figure 4-17: Groundwater Sampling Location Map



Source: Field Survey by EQMS Team, Jan 2025

4.4.3.5 Groundwater Results

The analyzed results for groundwater were compared to Bangladesh Standards (ECR, 2023). Results of groundwater analysis are presented in Table 4-9

Table 4-9: Ground Water Results

Parameter	Unit	GWQ1	GWQ2	GWQ3	GWQ4	GWQ5	GWQ5	Bangladesh Standards*
Temperature	oC	24.1	24.1	24.8	23.9	24.1	24.1	20-30
EC	µS/cm	220	170	400	60	190	120	--
Color	PCU	18	25	18	31	25	21	15
pH		5.49	5.43	5.88	4.83	5.40	4.96	6.5 – 8.5
DO	mg/L	6.5	6.9	6.2	6.7	6.6	6.3	--
Arsenic	ppm	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
Alkalinity	mg/L	4.7	7.8	8.2	5.3	6.2	11	--
Iron	mg/L	0.9	0.6	0.7	0.9	0.7	0.8	0.3 – 1.0
Potassium	mg/L	4.2	3.7	4.1	2.8	3.4	3.8	
Sulfate	mg/L	4.2	3.2	3.7	4.8	4.1	2.9	
Chloride	mg/L	18	10	13.2	15	16	14.2	150 – 600
Chromium	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
T. Hardness	°C	12	12	14	16	18	16	
TDS	mg/L	110	90	200	30	100	60	1000

Source: EQMS laboratory

** According to Schedule-2, Rule 31 (Kha) of Environmental Conservation Rules, Amendment 2023, Government of Bangladesh.*

4.4.3.6 Interpretation of Ground Water Results

The analysis of groundwater quality across six monitoring locations (GWQ1–GWQ6) showed variations in physical and chemical parameters. Temperature ranged from 23.9°C to 24.8°C, staying within the Bangladesh standard range of 20–30°C. Electrical conductivity (EC) values varied between 60 µS/cm and 400 µS/cm, with no specified standard limit. Color levels ranged from 18 PCU to 31 PCU, exceeding the permissible limit of 15 PCU in some locations. The pH values fluctuated between 4.83 and 5.88, falling below the acceptable range of 6.5–8.5, indicating acidity in groundwater. Dissolved oxygen (DO) concentrations ranged from 6.2 mg/L to 6.9 mg/L, though no standard limit was defined. Arsenic levels remained below 0.01 ppm across all locations, complying with the permissible limit of 0.05 ppm. Alkalinity values ranged between 4.7 mg/L and 11 mg/L, with no specific standard limit. Iron concentrations varied from 0.6 mg/L to 0.9 mg/L, remaining within the acceptable range of 0.3–1.0 mg/L. Potassium concentrations ranged between 2.8 mg/L and 4.2 mg/L, while sulfate levels varied from 2.9 mg/L to 4.8 mg/L, both of which lack standard limits. Chloride levels ranged from 10 mg/L to 18 mg/L, staying well below the standard range of 150–600 mg/L. Chromium concentrations were consistently below 0.01 mg/L, meeting the Bangladesh standard of 0.05 mg/L. Total hardness values ranged between 12°C and 18°C, with no specified limit. Total dissolved solids (TDS) levels varied from 30 mg/L to 200 mg/L, remaining significantly below the permissible limit of 1000 mg/L. Overall, while most parameters complied with national standards, concerns were noted regarding high color levels and low pH values, suggesting potential groundwater quality issues that may require further assessment and treatment.

The water quality of the groundwater samples reveals that it is usable for all purposes as per ECR 2023-Schedule 2.

4.4.4 Soil Quality

Soil quality is the ability of soil to perform functions that are essential to people and the environment. Soils support plant growth, recycle dead material, regulate, and filter water flows, support buildings and roads, and provide habitat for many plants and animals. Depending on the land use, many of these functions occur simultaneously. Soil quality assessments go beyond measuring degradation (erosion, compaction, or contamination) to focus on these soil functions and the processes that create them.

The SRDI has identified about 500 soil series in Bangladesh and FAO-UNDP has identified 21 different general soil types based on the diagnostic horizons and diagnostic properties of the soil (FAO-UNDP, 1998). According to the classification, four types of soil classes; Mainly deep brown soils on low hills, Grey Piedmont Soils, Peat Soils, and Noncalcareous Dark Grey Floodplain Soils are found within the buffer area of the project site.

4.4.4.1 Soil Sampling Location

Six (6) representative samples were collected from near the project site areas. The details of the soil monitoring are presented in Table 4-10 and Figure 4-18. The photographs of groundwater quality monitoring are presented in Appendix E-5.

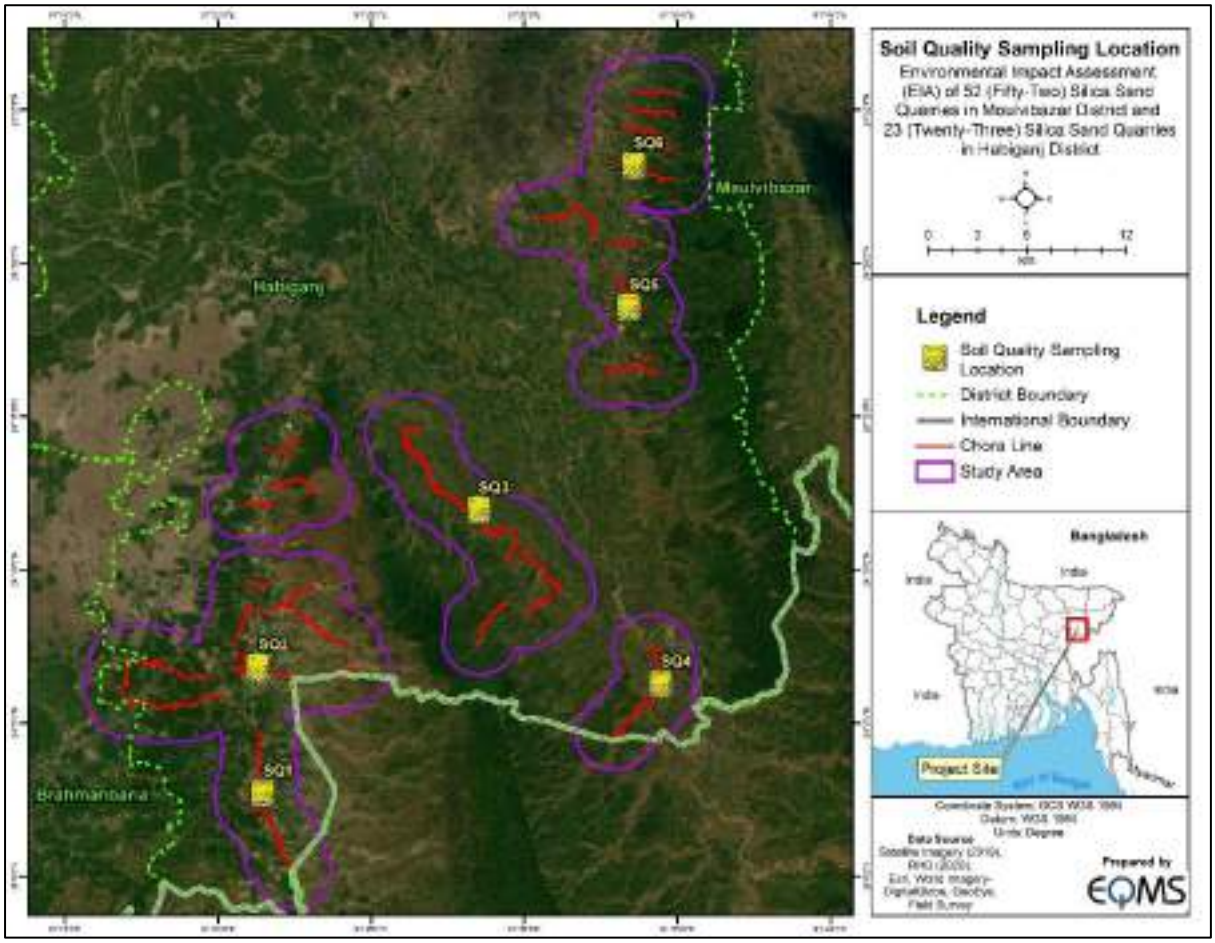
Table 4-10: Soil Sampling Locations

Code	Sampling Location	GPS Coordinates	Sampling Date
SQ-1	Samol Das, Monoherpur, Chownmohani, Madhavpur	24°2'42"N 91°21'28"E	02.01.2025
SQ-2	Shipma Bala khal, Shajahanpur, Madhavpur	24°6'49"N 91°21'19"E	02.01.2025
SQ-3	Ujjilpur,4 no Pippara, Chunarughat	24°11'57"N 91°28'31"E	03.01.2025
SQ-4	Abadgao, Gazipur, Chunarughat	24°06'16"N 91°34'28"E	03.01.2025

Code	Sampling Location	GPS Coordinates	Sampling Date
SQ-5	Rashidpur Boroled, Rashidpur	24°18'34"N 91°33'25"E	04.01.2025
SQ-6	Dobai Potijori, Bahubal	24°23'12"N 91°33'34"E	05.01.2025

Source: Field Survey by EQMS Team, Jan 2025

Figure 4-18: Soil Sampling Location Map



Source: Field Survey by EQMS Team, June 2024

4.4.4.2 Soil Quality Results

The following Table 4-11 shows the analysis result of the soil sample.

Table 4-11: Result of Soil Sample

Parameter	Unit	Test Results						Dutch Soil Standards 2000
		SQ-1	SQ-2	SQ-3	SQ4	SQ5	SQ6	
pH	--	4.16	4.08	4.01	3.99	4.4	3.98	5
EC	dS/cm	0.45	0.5	0.48	0.42	0.48	0.41	--
Potassium (K)	mg/Kg	120	115	110	110	125	108	--
Phosphorous (P)	mg/Kg	8.5	7.9	7.2	6.5	9	6	--
Zinc (Zn)	mg/Kg	0.8	0.7	0.6	0.6	0.8	0.5	140

Parameter	Unit	Test Results						Dutch Soil Standards 2000
		SQ-1	SQ-2	SQ-3	SQ4	SQ5	SQ6	
Copper (Cu)	mg/Kg	0.3	0.25	0.2	0.2	0.3	0.15	36
Iron (Fe)	mg/Kg	50	48	45	50	45	55	--
Manganese (Mn)	mg/Kg	15	14.5	14	15.5	14	16	--
Lead (Pb)	mg/Kg	0.05	0.04	0.05	0.05	0.04	0.05	85
Organic Matter	mg/Kg	2.5	2.3	2.2	2.1	2.5	2	--
Texture	--	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	--

Source: Laboratory Analysis by EQMS Laboratory, July 2024

4.4.4.3 Interpretation of Soil Quality Results

The analysis of soil quality across three monitoring locations (SQ-1 to SQ-3) revealed variations in physical and chemical properties. The pH values ranged from 4.01 to 4.16, indicating acidic soil conditions, which may affect nutrient availability and crop growth. Electrical conductivity (EC) values varied between 0.45 dS/cm and 0.50 dS/cm, suggesting that the soil has low salinity levels. Potassium (K) concentrations ranged from 110 mg/kg to 120 mg/kg, while phosphorus (P) levels varied from 7.2 mg/kg to 8.5 mg/kg. Zinc (Zn) concentrations were recorded between 0.6 mg/kg and 0.8 mg/kg, and copper (Cu) levels ranged from 0.2 mg/kg to 0.3 mg/kg, both of which are within acceptable limits for soil health. Iron (Fe) content varied between 45 mg/kg and 50 mg/kg, while manganese (Mn) levels ranged from 14 mg/kg to 15 mg/kg, both within typical ranges for soil. Lead (Pb) concentrations were low, ranging from 0.04 mg/kg to 0.05 mg/kg, indicating minimal contamination. Organic matter content ranged from 2.2 mg/kg to 2.5 mg/kg, suggesting moderate fertility. The soil texture across all monitoring locations was identified as sandy loam, which generally provides good drainage but may need organic amendments to improve nutrient retention. Overall, while the soil quality showed moderate levels of nutrients, the acidic pH suggests potential challenges for agricultural productivity, which may require pH adjustment and additional soil management practices.

4.4.5 Sediment Quality

Sediment quality refers to the ability of sediment to support ecological functions and maintain environmental health. Sediments play a crucial role in aquatic ecosystems by providing a habitat for organisms, acting as a reservoir for nutrients and contaminants, and influencing water quality through chemical and biological interactions. The composition and characteristics of sediment affect its ability to support aquatic life, regulate water flow, and influence the transport and fate of pollutants in aquatic environments.

Sediment quality assessments go beyond measuring sediment accumulation and erosion; they also consider chemical, physical, and biological properties that determine its impact on the surrounding environment. Key factors in sediment quality evaluation include grain size distribution, organic matter content, heavy metal concentration, and nutrient levels. In Bangladesh, sediment characteristics vary significantly based on geographical and hydrological conditions. The country's river systems, including the Ganges, Brahmaputra, and Meghna, transport and deposit vast amounts of sediment annually, shaping floodplains and deltaic regions. According to geological and environmental classifications, sediments in the 2 km buffer area of the project site primarily consist of fine alluvial deposits and organic-rich silts, which influence soil fertility, water retention, and aquatic biodiversity.

4.4.5.1 Sediment Sampling Locations

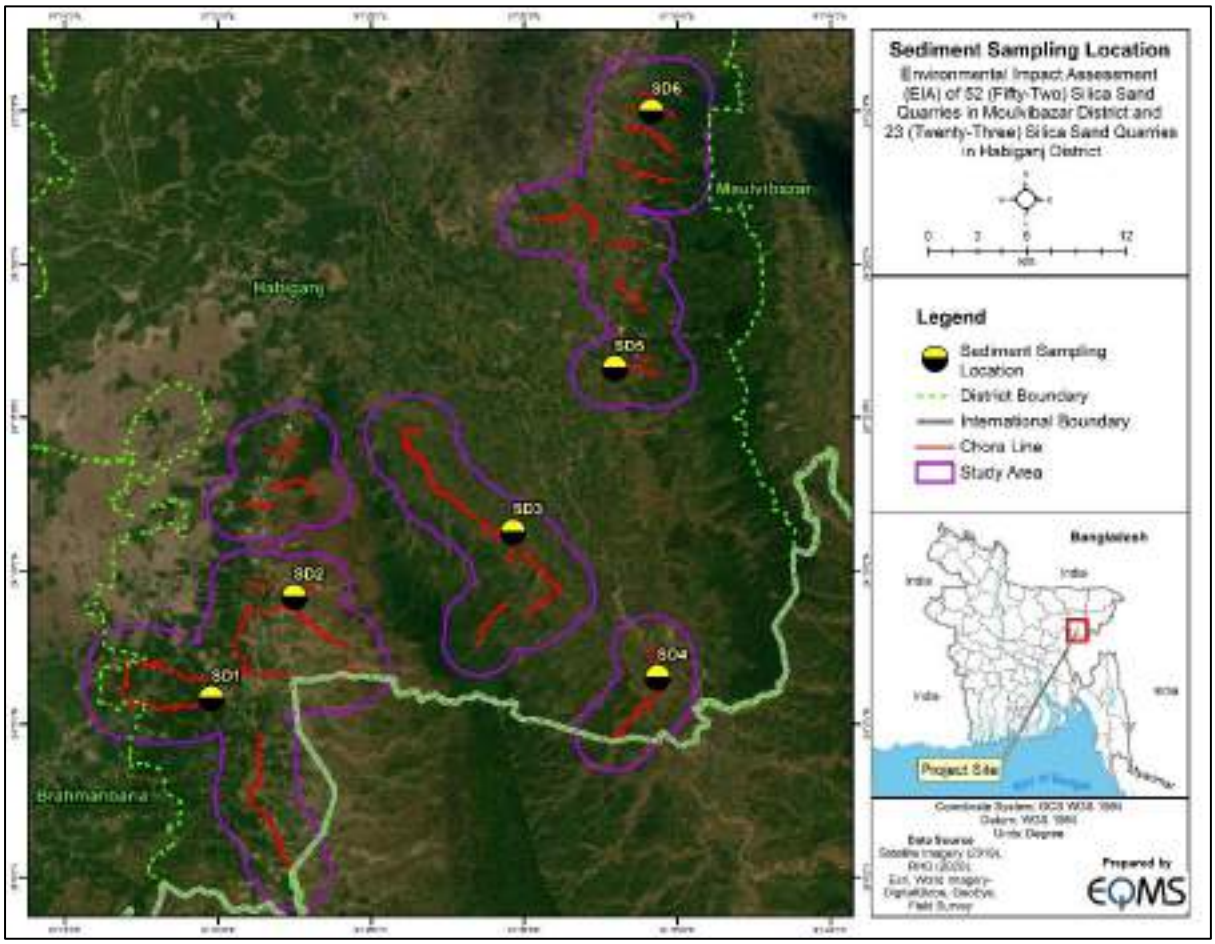
The detail of the sediment sampling location is presented in **Table** 4-12 and the sampling location map is shown in **Figure** 4-19. The photograph of the sediment sample collection is shown in Appendix E-6**.**

Table 4-12: Sediment Sampling Location

Code	Sampling Location	GPS Coordinates	Sampling Date
SD-1	Sunai River, Orissama, Madhavpur	24°5'50"N 91°19'47"E	02.01.2025
SD-2	Sunai River,Jagadishpur, Tea Garden, Madhavpur	24°9'9"N 91°22'29"E	02.01.2025
SD-3	Sutang River,Novagram, 4 no Pippara,Chunarughat	24°11'16"N 91°29'38"E	03.01.2025
SD-4	Khowa River, Konagao, Gazipur, Chunarughat	24° 6'31"N 91°34'21"E	03.01.2025
SD-5	Kayaki River, Kazipur, Sreemangal	24°16'36"N 91°32'57"E	04.01.2025
SD-6	Dikambor Chara, Hazi Bazar, Bahubal	24°24'60"N 91°34'09"E	05.01.2025

Source: Field Survey by EQMS Team, Jan 2025

Figure 4-19: Sediment sampling location map



Source: Field Survey by EQMS Team, 2025

4.4.5.2 Sediment Quality Results

The analysis result of the sediment sample is given in Table 4-13.

Table 4-13: Result of Sediment Sample

Parameter	Unit	Test Results						land application of contaminated soil, USEPA, 2001
		SD-1	SD-2	SD-3	SD-4	SD-5	SD-6	
pH	--	6.2	6.2	6.21	5.41	5.99	5.85	--
EC	dS/cm	0.75	0.76	0.74	0.65	0.68	0.66	--
Potassium (K)	mg/L	200	205	198	180	210	200	--
Phosphorous (P)	mg/L	15	15.2	14.8	10.5	12.5	11.8	--
Zinc (Zn)	mg/L	1.0	1.1	0.8	0.8	1	0.9	400
Copper (Cu)	mg/L	0.5	0.55	0.5	0.3	0.35	0.32	175
Iron (Fe)	mg/L	45	46	44	50	48	49	--
Manganese (Mn)	mg/L	12	13	11.5	14.5	13	13.8	--
Lead (Pb)	mg/L	0.07	0.07	0.06	0.05	0.04	0.04	120
Organic Matter	mg/L	3.5	3.6	3.4	2.5	3	2.8	--

Source: Laboratory Analysis by EQMS Laboratory, 2025

4.4.5.3 Interpretation of Sediment Quality Results

The analysis of sediment quality across six monitoring locations (SD-1 to SD-6) revealed variations in physical and chemical properties. The pH values ranged from 5.41 to 6.21, indicating slightly acidic to near-neutral conditions, which are generally suitable for maintaining nutrient availability and aquatic ecosystem stability. Electrical conductivity (EC) values varied between 0.65 dS/cm and 0.76 dS/cm, suggesting that the sediment has low to moderate salinity levels. Potassium (K) concentrations ranged from 180 mg/L to 210 mg/L, while phosphorus (P) levels varied from 10.5 mg/L to 15.2 mg/L. Zinc (Zn) concentrations were recorded between 0.8 mg/L and 1.1 mg/L, and copper (Cu) levels ranged from 0.3 mg/L to 0.55 mg/L, both of which are within acceptable limits for sediment health. Iron (Fe) content varied between 44 mg/L and 50 mg/L, while manganese (Mn) levels ranged from 11.5 mg/L to 14.5 mg/L, both within typical ranges for sediment. Lead (Pb) concentrations were low, ranging from 0.04 mg/L to 0.07 mg/L, indicating minimal contamination. Organic matter content ranged from 2.5 mg/L to 3.6 mg/L, suggesting moderate fertility. Overall, the sediment quality showed adequate levels of essential nutrients, with pH conditions that may slightly limit nutrient availability in some locations. Proper monitoring and sediment management practices may be required to maintain optimal ecological balance.

4.5 Biological Environment

4.5.1 Bio-ecological Zones of the Study Area

Bangladesh, located in the Oriental Region, lies in the transition between the Indo-Himalayan and Indo-Chinese sub-regions. IUCN classifies it into 25 Bio-Ecological Zones[4]. The study area falls under Zone 9b. Sylhet Hills, 4e.Meghna Floodplain, 5a.Haor Basin, and 4d.Surma-Kushiyara Floodplain (Appenxix G-6).

4.5.1.1 9b. Sylhet Hills

The Sylhet Hills, located in northeastern Bangladesh (23°40'-24°57' N, 91°10'-92°20' E), feature brown hill soils, 2790-5330 mm annual rainfall, and temperatures ranging from 12°C to 33°C.

- **Flora:**
  - **Trees:** Ban Chalta, Garjan, Chapalish, Kanak
  - **Shrubs & Herbs:** Bankunch, Hastikarma, Datranga, Kanchan, Shothi
- **Fauna:**
  - **Mammals:** Hoolock gibbon, Assamese macaque, Leopard cat, Barking deer
  - **Birds:** Kalij pheasant, Oriental pied hornbill, Common green magpie
  - **Reptiles:** Reticulated python, Assam roofed turtle, Green rat snake
  - **Amphibians:** Leaf frog, Balloon frog, Ornate microhylid

4.5.1.2 4e. Meghna Floodplain

The area (22°50'-24°25' N, 90°40'-91°37' E) spans Feni, Lakshmipur, Chandpur, Comilla, and Brahmanbaria, covering the Middle and Lower Meghna floodplains. It has noncalcareous and calcareous gray floodplain soils, 2030-2290 mm annual rainfall, and temperatures ranging from 10°C to 33°C.

- **Flora:**
  - **Trees:** Kanthal, Narikel, Supari
  - **Near Water**: Debdaru, Rain tree, Mandar, Barun, Pitali
  - **Aquatic Plants:** Kachuripana, Shada shapla, Bara nukha
- **Fauna:**
  - **Mammals:** Thick-eared bat, Rhesus macaque, Small Indian civet
  - **Birds:** Red-headed vulture, White-rumped vulture, Crested serpent eagle
  - **Reptiles:** Brahminy river turtle, Dark-bellied marsh snake, Slender worm snake

4.5.1.3 5a. Haor Basin

The Haor Basin (23°45'-25°20' N, 90°45'-91°35' E) in Sunamganj includes the Surma-Kushiyara floodplain, with 4320–5840 mm annual rainfall and temperatures ranging from 12°C to 33°C. Its agriculture follows a Boro-Fallow-Fallow cycle.

- **Flora:**
  - **Wetland Trees:** Hijal, Barun, Koroj, Pitali
  - **Shrubs & Herbs:** Pani golap, Khagra, Bara nol, Urusia, Kash
  - **Aquatic Plants**: Binna ghash, Ghagra, Ban palang
- **Fauna:**
  - **Mammals:** Ganges river dolphin, Fishing cat, Common otter
  - **Birds:** Pallas's fish eagle, Darter, Spot-billed duck
  - **Reptiles:** Green rat snake, Indian roofed turtle, Spotted pond turtle

[4] Nishat, A., S.M.I. Huq, S.P. Barua, A.H.M.A. Reza and A.S.M. Khan. 2002. Bio-ecological Zones of Bangladesh. The World Conservation Union (IUCN), Dhaka, Bangladesh. 141 pp.

- **Amphibians:** Red microhylid, Taipeh frog, Maculated tree frog

4.5.1.4 4d. Surma-Kushiyara Floodplain

The Surma-Kushiyara Floodplain (24°15'-25°10' N, 91°30'-92°36' E) spans ~2.2 million hectares in northeastern Bangladesh, with fertile noncalcareous gray floodplain soils, 4320–5840 mm annual rainfall, and temperatures from 12°C to 33°C.

- **Flora:**
  - **Trees:** Kanthal, Aam, Pitraj
  - **Shrubs & Herbs:** Assar, Keya kanta, Kurchi
  - **Aquatic Plants:** Binna ghash, Shada shapla, Jhanji, Makhna
- **Fauna:**
  - **Mammals:** Fishing cat, Capped langur, Large Indian civet
  - **Birds:** Swamp francolin, Comb duck, Black-necked stork
  - **Reptiles:** Painted bronzeback tree snake, Assam roofed turtle, Green cat snake
  - **Amphibians:** Maculated tree frog, Skipper frog

4.5.2 Terrestrial Ecosystem

4.5.2.1 Habitat

Terrestrial Habitats (Appendix G-7:Appendix G-7:). in the study area (The core area is defined as 500 meters on all sides of each chara, with a 2 km zone designated as the buffer area) are modified by human activities but retain some ecological functions.

Homestead Vegetation: Diverse with fruit and timber trees like Coconut (*Cocos nucifera*), Jackfruit (*Artocarpus heterophyllus*), Mango (*Mangifera indica*), Guava (*Psidium guajava*), and Rain tree (*Samanea saman*), supporting urban wildlife.

Agricultural Lands: Dominant habitat, mainly Boro paddy with crops like chili, onion, and pumpkin. Roadside trees include Mango (*Mangifera indica*), Mahogany (*Swietenia mahagoni*), and Eucalyptus (*Eucalyptus citriodora*).

Roadside Vegetation: Provides microclimates for various species; common trees include Areca palm (*Areca catechu*), Mango (Mangifera indica), and Rain tree (Samanea saman) mainly used for wood and aesthetics.

Tea Gardens: Tea gardens in Madhabpur, Chunarughat, and Bahubal provide crucial green cover, support soil conservation, and serve as habitats for diverse flora and fauna, including birds and pollinators.

4.5.2.2 Terrestrial Flora

A total of forty (40) terrestrial floral species from twenty-two (22) families were recorded, with Fabaceae, Myrtaceae, and Arecaceae being the most abundant (4 species each). A checklist and photos of the observed species are provided in (Appendix G-1: and Appendix G-8:).

4.5.2.3 Terrestrial Fauna

4.5.2.3.1 Herpetofauna

Six (06) amphibian species from four (04) families and ten (10) reptile species from seven (07) families were recorded in the study area through Visual Encounter Surveys (VES), local consultations, and literature reviews (Appendix G-2:Appendix G-2:).

All amphibians are protected under the Bangladesh Wildlife (Conservation and Security) Act, 2012, and classified as Least Concern (LC). The Bengal Monitor (*Varanus bengalensis*) was the only Near Threatened (NT) reptile species documented (IUCN Red List 2015, 2024-2).

4.5.2.3.2 Avifauna

Forty-eight (48) bird species from twenty-nine (29) families were recorded, with the Ardeidae family having the highest number (5 species). All species are classified as Least Concern (LC) according to the IUCN Red List (2015, 2024-2). A checklist and photos of the observed species are provided in (Appendix G-3: and Appendix G-9:).

4.5.2.3.3 Terrestrial Mammal

A Visual Encounter Survey was conducted in the study area, supplemented by a literature review and local consultations. Fifteen (15) terrestrial mammal species (Appendix G-4:) from nine (09) families were recorded. Most are Least Concern (LC) on both the Bangladesh (2015) and Global IUCN Red Lists (2024-2). However, Phayre's Langur (CR-Nationally, EN-Globally), Capped Langur (EN-Nationally, VU-Globally), and Rhesus Macaque (VU- Nationally, LC-Globally) were found in Rema-Kalenga Reserved Forest, with possible movement into the project AOI, approximately 2.5 km from Ichalia Chara. A checklist and photos of the observed species are provided in (Appendix G-4: and Appendix G-10:).

KIIs, FGDs, and Consultations in the Study area are shown in (Appendix F-1: and Appendix F-2:)

4.5.3 Aquatic Ecosystem

The aquatic ecosystem within the study area includes stagnant waterbodies, small streams, and lentic waterbodies (ponds). These ecosystems play key roles in nutrient recycling, water purification, flood attenuation, groundwater recharge, and wildlife habitat provision.

4.5.3.1 Habitat

Stagnant Waterbodies: During the rainy season, lowlands turn into beel-type ecosystems, while in the dry season, they are used for agriculture. Local communities engage in fishing in these waterbodies during the monsoon.

Streams (Chara): Natural drainage streams connect to stagnant waterbodies, supporting aquatic macrophytes, insects, birds, and small fish.

Lentic Waterbodies (Ponds): Mostly found near roads and settlements, ponds are used for fish culture. Some abandoned ponds exist, while others support extensive aquaculture.

Aquatic habitat types are presented in Appendix G-11:

4.5.3.2 Fisheries Resources (Ichthyofauna)

The study assessed fisheries status in the study area through local consultations and discussions with Upazila Fisheries Officers (Appendix F:).

4.5.3.2.1 Captured Fish and Crustacean Species in the stream beside the project AOI

Fishing activity was minimal during the survey, with the aquatic ecosystem comprising ponds, small streams, and seasonal waterbodies. Many ponds are used for fish farming.

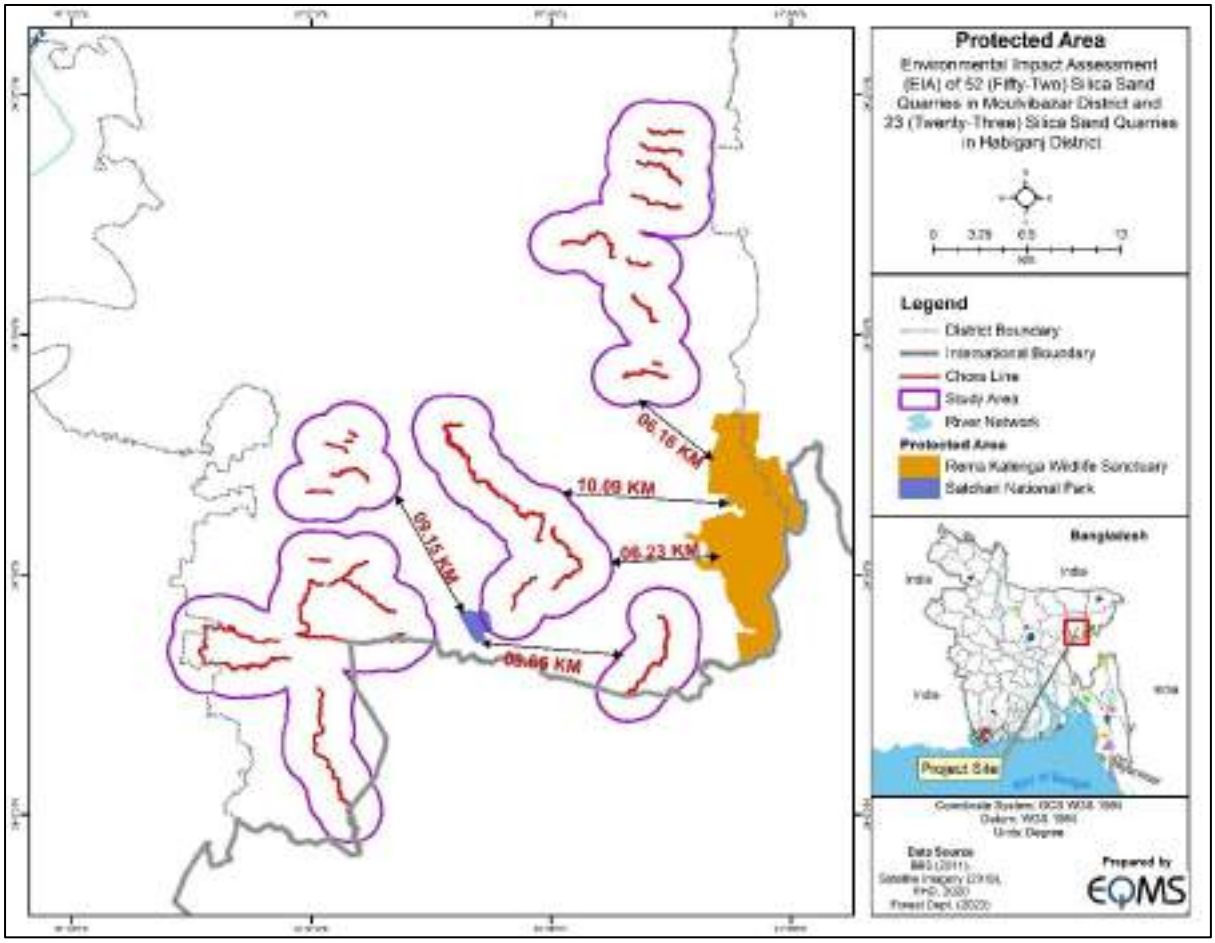
A total of twelve (12) captured fish species eight (8) families and four (4) crustacean species one (1) family were recorded (Appendix G-5:). Most are categorized as Least Concern (LC), except Gonia (*Labeo gonius*), Bheda (*Nandus nandus*), and Tara Baim (*Macrognathus aculeatus*), which are Near Threatened (NT) per the Bangladesh IUCN Red List (2015). The highest number of species belonged to the Cyprinidae (4 species) and Bagridae (2 species) families.

4.6 Ecological Sensitive Areas

4.6.1 Protected Areas (PAs)

The different categories of PAs in Bangladesh defined by the Wildlife (Conservation and Security) Act, 2012 are Wildlife Sanctuaries, National Park, Safari Park, Eco Park, Botanical Garden, Wild Animal Breeding Center, Special Biodiversity Conservation Area, National Heritage, Memorial Tree, Sacred, Tree, and Kunjaban. There are fifty-three (53) PAs in total according to the Forest Department Website (January 2025) in Bangladesh which are managed by the Bangladesh Forest Department. However, the proposed Project AOI does not hold any protected areas as per Bangladesh regulations. The closest Protected Area is Satchari National Park which touched the 2 km buffer area boundary from the sand quarry. The distance from the sand quarry is about 2 km from the Satchari National Park. The Rema-Kalenga Wildlife Sanctuary is situated at a distance of about 6.16 km from the sand quarries. These Protected Areas and their respective aerial distances from the project area are illustrated in Figure 4-20.

Figure 4-20: Map of nearest Protected Areas of the Project Area

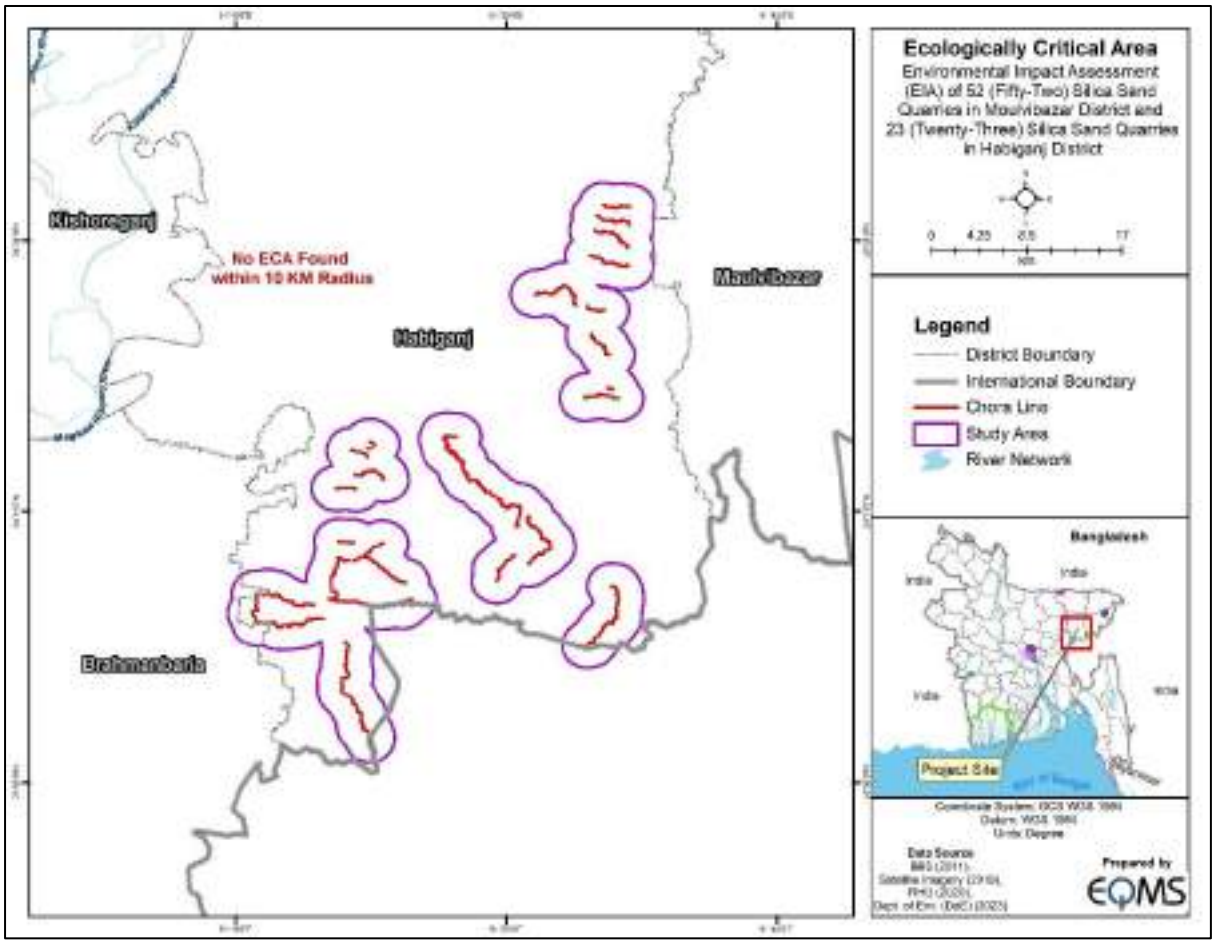


Source: GIS and RS Department, EQMS, January 2024

4.6.2 Ecologically Critical Areas (ECAs)

The Ministry of Environment, Forest and Climate Change (MOEFCC) has designated thirteen (13) areas as Ecologically Critical Areas (ECAs). There is no ECA from the 2 km of the study area boundary. Figure 4-20 shows the ECA map of the proposed project.

Figure 4-21: Location Map of ECA from Project AOI

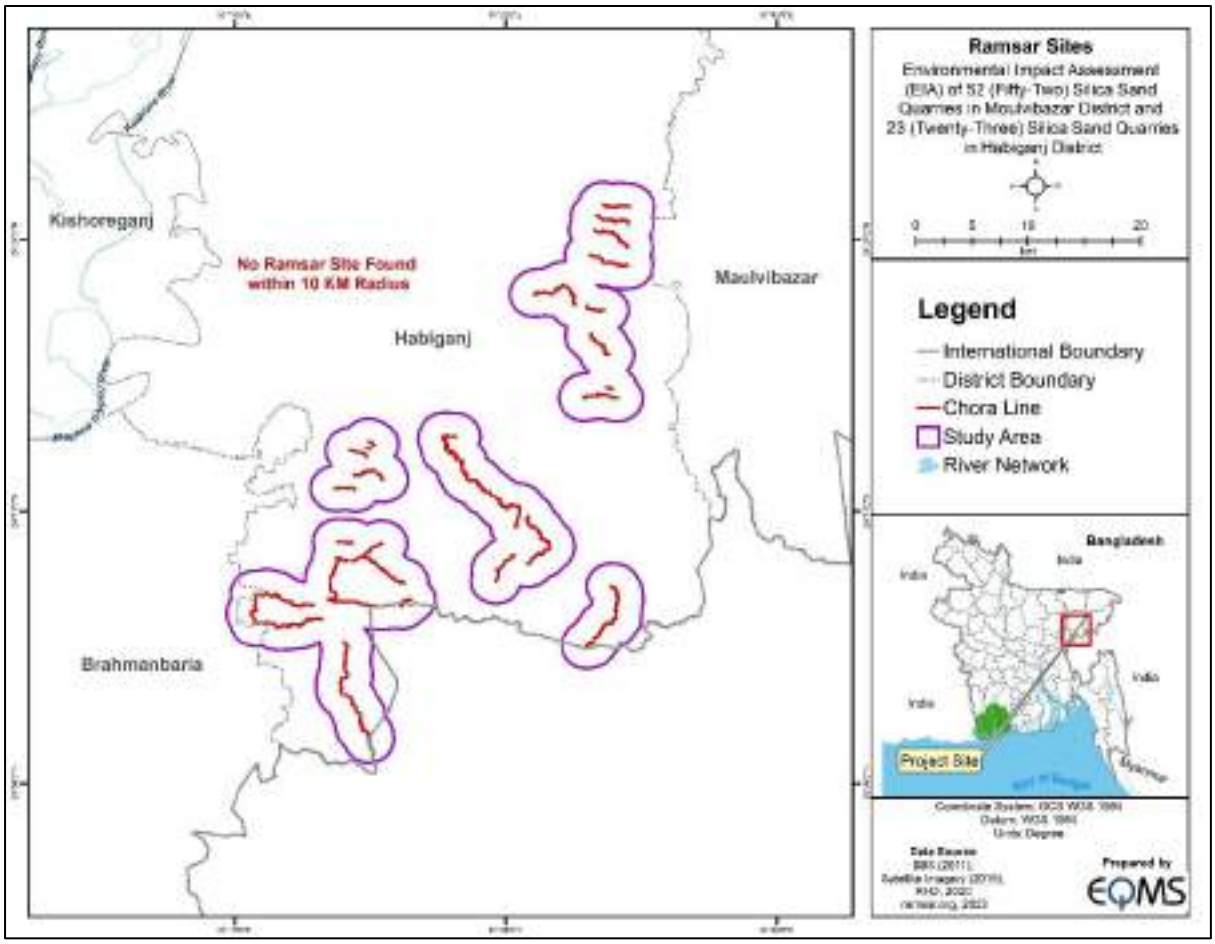


Source: GIS and RS Department, EQMS, January 2024

4.6.3 Ramsar Sites

A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention. Bangladesh currently has two (2) sites designated as Wetlands of International Importance (Ramsar Sites) with a combined surface area of 611,200 hectares: the Sundarbans Reserved Forest and Tanguar Haor. However, there is no Ramsar site within the study area. Figure 4-22 shows the location of Ramsar Sites.

Figure 4-22: Location Map of Ramsar Sites from Project AOI



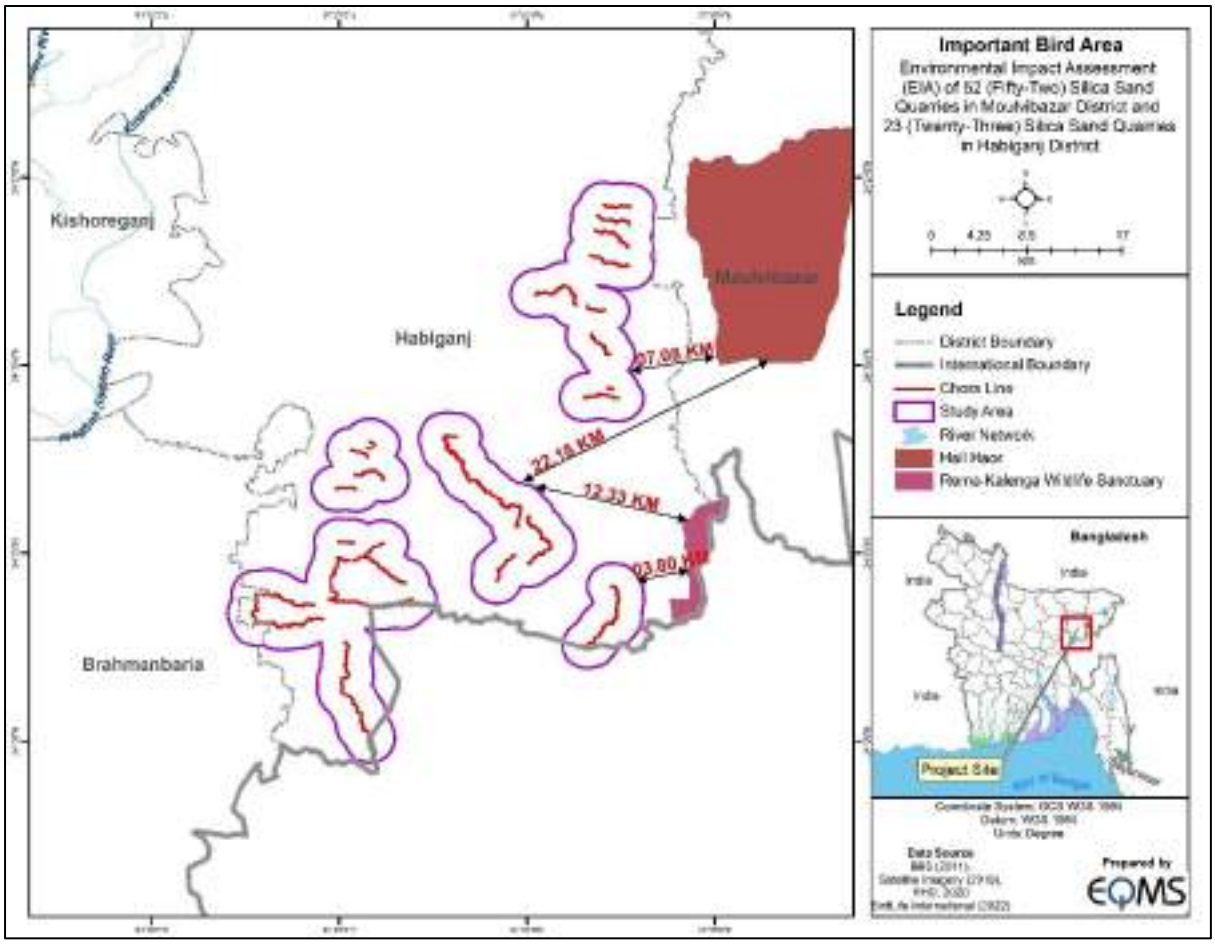
Source: GIS and RS Department, EQMS, January 2025

4.6.4 Important Bird and Biodiversity Areas (IBAs)

According to BirdLife International (2024), there are twenty (20) Important Bird & Biodiversity Areas (IBAs) in Bangladesh[5]. Although there are no Important Bird and Biodiversity Areas (IBA) within the project boundaries, the nearest IBAs include the Rema-Kalenga Wildlife Sanctuary (covering an area of 1,095 ha), located approximately 3.80 km from the site. Hail Haor is about 7.08 km from the study area. The locations and aerial distances of these IBAs from the project site are illustrated in Figure 4-23.

[5]BirdLife International (2025) Important Bird Areas factsheet: Jamuna-Brahmaputra River. Downloaded from http://www.birdlife.org on 10/002/2025.

Figure 4-23. Important Bird and Biodiversity Area (IBA) near the Project Site



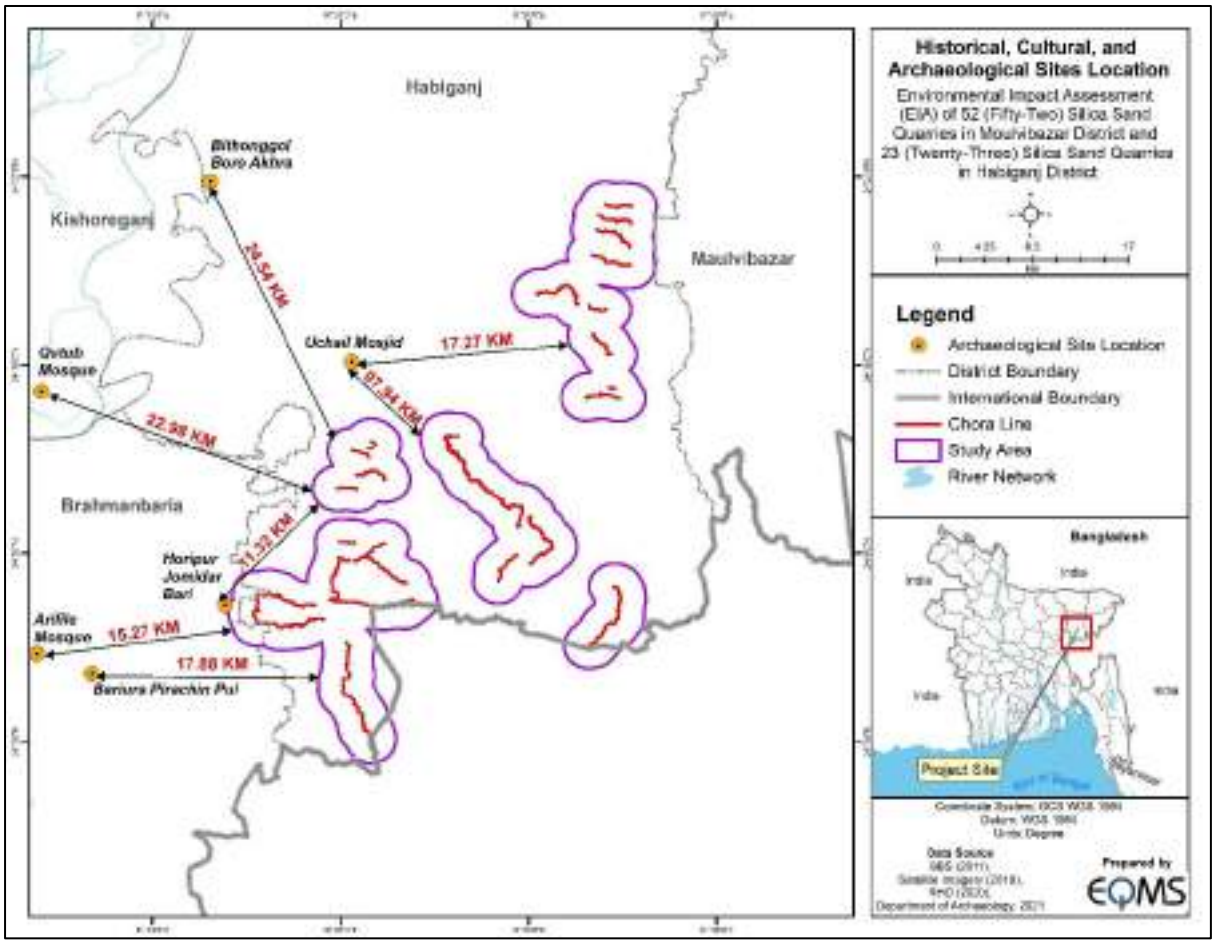
Source: BirdLife International (2025)

4.7 Cultural Resources

4.7.1 Archaeology

There are no significant archaeological and historical structures in and around the project site. The nearest archaeological site is Haripur Jomider Bari which is about 2 km from the sand quarry. The distance and location of the archaeological site from the project location are depicted in Figure 4-24.

Figure 4-24: Archaeological Site of the Study Area



Source: Department of Archaeology

CHAPTER 5

Socio-economic Environment

5 SOCIO-ECONOMIC ENVIRONMENT

5.1 Socio-economic Environment

The socio-economic conditions of the people of the project area in 2011 will provide sound reference and assess the probable socio-economic impact of the proposed interventions. This will enable us to compare the changes and impacts of the project interventions at present. The socio-economic baseline scenario describes the socio-economic characteristics of the project area based on secondary data which was collected during the Population and Housing Census of 2011. The socio-economic characteristics include administrative area, demographic information, household size, status of literacy, occupation, housing, employment opportunity, access to water and sanitation status, etc.

5.1.1 Administrative Area and Location

The proposed 23 Silica Sand Quarries in Habiganj project is located in the Habiganj district, Sylhet division. Based on the assessment of the project, its surroundings, and its area of influence, the social study was focused on a 500-meter core area and extended up to 2 kilometers on both sides of the sand quarries for the secondary area. Table 5-1 shows the study area of the project across Upazilas, Districts, and Divisions.

Table 5-1: Administrative Boundary of the Study Area

Division	District	Upazila
Sylhet	Habiganj	Bahubal
		Chunarughat
		Habiganj Sadar
		Madhabpur
		Nabiganj
	Moulvibazar	Sreemangal
Chattogram	Brahmanbaria	Bijoynagar
		Nasirnagar

The project study area lies within the administrative boundaries of eight (8) Upazilas across three districts—Habiganj, Moulvibazar, and Brahmanbaria—located within the Sylhet and Chattogram divisions.

5.1.2 Demography

In the study area, as per the Population and Housing Census, BBS, 2011 there are about 4,57,623 households comprising a total population of 23,77,678. The average sex ratio[6] is 96.9 whereas the national average sex ratio is slightly higher (99.7[7]). The average household size is 5.2 which is higher than the national average household size (4.4[8]). The demography of the study area is shown in the following **Table** 5-2**.**

[6] The sex ratio is the ratio of males to females in a population. (Source: Wikipedia)

[7] Population and Housing Census, BBS, 2011

[8] Population and Housing Census, BBS, 2011

Table 5-2: Demography of the Study Area

District	Upazila	Total Pop	Total HHs	Avg. HH size	Sex Ratio
Habiganj	Bahubal	1,97,997	37,334	5.2	98
	Chunarughat	3,02,110	61,132	4.9	95
	Habiganj Sadar	3,29,093	62,281	5.2	99
	Madhabpur	3,19,016	62,300	5.1	96
	Nabiganj	3,45,179	61,770	5.5	97
Moulvibazar	Sreemangal	3,18,025	65,165	4.8	100
Brahmanbaria	Bijoynagar	2,57,247	48,617	5.2	95
	Nasirnagar	3,09,011	59,024	5.2	95
Total		**23,77,678**	**4,57,623**	**5.2**	**96.9**

Source: Population and Housing Census, BBS, 2011

5.1.2.1 Ethnic Composition

Based on the 2011 Population and Housing Census, the ethnic composition data from the study area shows a total of 17,353 households with an ethnic population of 78,201 individuals, almost evenly split between males (39,298) and females (38,903). The Monda ethnic group is the most populous, with 11,439 members, followed by Sawntal (8,519) and Orao (4,972). A notable number of individuals 53,271 are categorized as 'Others', indicating a presence of diverse but less numerous ethnic groups. The following **Table** 5-3 indicates the various ethnic composition of the project study area.

Table 5-3: Ethnic Profile of the Study Area

Upazila	HH	Ethnic Population			Ethnic Population in main groups			
		Total	Male	Female	Monda	Sawntal	Orao	Others
Habiganj	1,732	8,268	4,225	4,043	341	1,368	72	6,487
	8,701	39,286	19,589	19,697	8,088	3,157	1,668	26,373
	1,19	588	297	291	0	10	0	578
	3,692	15,898	8,040	7,858	2,275	2,315	436	10,872
	140	694	342	352	0	0	0	694
Moulvibazar	2,967	13,460	6,801	6,659	735	1,665	2,796	8,264
Brahmanbaria	1	4	2	2	0	4	0	0
	1	3	2	1	0	0	0	3
Total	**17,353**	**78,201**	**39,298**	**38,903**	**11,439**	**8,519**	**4,972**	**53,271**

Source: Population and Housing Census, BBS, 2011

5.1.3 Public Utilities

5.1.3.1 Water Supply

In the project study area, the major source of drinking water is tube-well where about 87.9% population uses tube-well water. About 2.6% of people have access to tap water. Other 9.5% people have access to other sources of drinking water. An overview is depicted in below **Table** 5-4.

Table 5-4: Sources of Drinking Water in the Study Area

Upazila	Number of HHs	Source of Drinking Water (%)		
		Tap	Tube-well	Other
Bahubal	37,334	0.5	91.3	8.2
Chunarughat	61,132	3	85.4	11.6
Habiganj Sadar	62,281	7.7	89.5	2.8
Madhabpur	62,300	1.2	89.8	9.1
Nabiganj	61,770	1.1	80.7	18.2
Sreemangal	65,165	6.5	77.8	15.8
Bijoynagar	48,617	0.4	94.9	4.7
Nasirnagar	59,024	0.2	94	5.8
Total	**4,57,623**	**2.6**	**87.9**	**9.5**

Source: Population and Housing Census, BBS, 2011

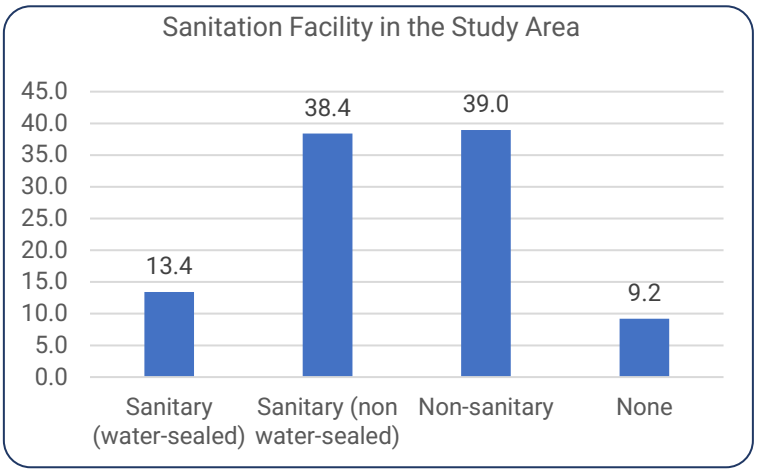
5.1.3.2 Electricity

Electricity is an important indicator for measuring quality of life. In the study area, on average 47.4% of households have grid electricity connections.

5.1.3.3 Sanitation

In the study area, households that use water-sealed sanitary latrines and non-water-sealed sanitary latrines facilities are 13.4% and 38.4% respectively. Whereas around 39.0% of households avail of non-sanitary facilities. The rest 9.2% of households have no access to hygienic latrine facilities. Figure 5-1 shows the sanitation facility of the project area.

Figure 5-1: Sanitation Facility in the Study Area



Source: Population and Housing Census, BBS, 2011

5.1.3.4 Health Care Facility

According to the District Statistics (2011), there are 27 Private Hospitals in Eight (8) Upazilas with 88 MBBS/FCPS doctors in the study area. Also, 32 diagnostic centers are found in the proposed study area. Following **Table** 5-5 shows the healthcare facility of the project area.

Table 5-5 Health Care Facility

Upazila	Private Hospital	Diagnostic	MBBS/FCPS
Bahubal	0	1	9
Chunarughat	13	3	15
Habiganj Sadar	8	11	13
Madhabpur	3	3	22
Nabiganj	0	3	13
Sreemangal	3	6	12
Bijoynagar	0	2	4
Nasirnagar	0	3	0
Total	**27**	**32**	**88**

Source: District Statistics Census, BBS, 2011

5.1.4 Economy and Employment

According to the Population and Housing Census (2011), Agriculture, comprising crop cultivation, fisheries, direct farming, sharecropping, agricultural laborers, and so on, is the most common source of employment in the study area, Agriculture employs approximately 76.7% of males and 53.3% females. Furthermore, a sizable proportion of the study area's population (17.8% male and 33.0% female) is employed in the service sector. In addition, the industrial sector employs 5.6% men and 13.7% women. The following **Table** 5-6 shows the employment status of the project area.

Table 5-6: Employment Status of the Study Area

Upazila	Population Aged 7+, not attending school but employed			Field of Activity					
				Agriculture		Industry		Service	
	Total	Male	Female	Male	Female	Male	Female	Male	Female
Bahubal	26,937	23,476	3,461	64.6	58.9	7.7	18.3	27.7	22.7
Chunarughat	39,771	31,270	8,501	85.7	63.7	4.8	6.7	9.5	29.6
Habiganj Sadar	33,655	30,628	3,027	80.9	51.1	4.7	14.3	14.3	34.7
Madhabpur	39,912	34,825	5,087	84.4	67.3	6.0	18.0	9.6	14.7
Nabiganj	39,400	36,879	2,521	81.9	85.4	4.0	4.0	14.1	10.6
Sreemangal	43,100	31,357	11,743	65.4	26.9	5.5	6.9	29.2	66.2
Bijoynagar	41,411	38,810	2,601	73.6	41.6	6.8	29.7	19.7	28.7
Nasirnagar	31,573	30,093	1,480	76.8	31.5	5.2	11.9	18	56.6
Total	**2,95,759**	**2,57,338**	**38,421**	**76.7**	**53.3**	**5.6**	**13.7**	**17.8**	**33.0**

Source: Population and Housing Census, BBS, 2011

CHAPTER 6
Analysis of Alternatives

6 ANALYSIS OF POTENTIAL ALTERNATIVES

The project has been considered and investigated for several alternatives to reduce the environmental and social impacts. The alternatives assessed were not limited to environmental and social aspects, but the assessment also included the technical aspects of different sand extraction and sand transportation options.

An analysis of these alternatives has been undertaken for the proposed project including consideration of a no-Project scenario. The no-go option, or no sand extraction for the proposed project, is based on the supposition that the project won't proceed. No environmental or social repercussions would be caused by this choice of location or neighborhood.

6.1 No Project Scenario

From a purely physical environmental point of view, the “do-nothing” is preferable to any project implementation, since it would avoid the creation of any of the adverse impacts associated with the project. But sand extraction is important for keeping the water flow channel in the river and canal properly. If the sand extraction in the sand quarries (located in the river, canal, and water body) of the proposed locations is prohibited then there is a change of sand filling in the adjacent agricultural land, and water flow in the river and canal will be diverted. It is concluded that the “No build” alternative is unacceptable and the potential socio-economic benefits of implementation of such a project far outweigh the adverse impacts which are minor and temporary and can be controlled and minimized to an acceptable level.

6.2 Suitability of the Site

All the twenty-three silica sand quarries in the Habiganj District have been gazette by the Government of Bangladesh. So, the locations of the Sand Quarries are fixed for the proposed project. There is no alternative analysis in terms of locations as locations are gazette by the Government of Bangladesh.

The following matter is considered for the proposed project.

Available Land Area: All the lands are government-owned khas land.

Existing Land Use: Currently, the lands are barren land (low water bodies, rivers, and canals).

Approach Road: The Silica Sand Quarries are accessible through river ways and some Silica Sand Quarries are accessible via earthen roads and pavement roads.

6.3 Alternative Technologies

To avoid or minimize the impacts resulting from the activities of the project, BMD authority is expected to adopt appropriate technological design, improvements or adjustments, and policies including good sand extraction practices. There are two conventional ways of sand extraction practices for this project.

- Manual sand extraction
- Using an excavator for sand extraction

Option	Positive	Negative
Manual sand extraction	• Easy to follow • No need for fuel-run machinery for extraction • Less environmental impact	• Sands extraction is human dependent • Time-consuming practices • Not suitable for large-scale sand extraction

Option	Positive	Negative
	• Suitable for small-scale sand quarries	• May impact human health
Using an excavator for sand extraction	• Suitable for large-scale sand quarries • Time shaving practice • Accessible in the shallow water body • Cost-effective	• Need technical knowledge for operator • Higher environmental impact • Need of fuel for machinery for extraction • Not suitable for small-scale sand extraction • Not accessible in the middle of rivers, canals, and ponds where has depth water body

After analyzing the two methods of sand extraction for the proposed project, manual sand extraction is more convenient than mechanical extraction. The study team preferred manual sand extraction for the proposed project.

6.4 Silica Sand Transportation

The transportation options depend on the silica sand quarry locations. There are two alternative ways of transportation of the silica sand, they are

- River network
- Local road network

Option	Positive	Negative
River network	• Easy to use • Less environmental impact • Suitable both for large-scale and small-scale sand quarries • Low-cost option • Can transport huge volumes of sand at a time	• It depends on the navigation of the riverways. • Not suitable in shallow riverways
Local road network	• Suitable for large-scale and small-scale sand quarries • Time-saving practice and faster transport	• Not accessible in the water body • High-cost practice • Higher environmental impact • May impact agricultural land for earthen road • Damage to local roads due to truck movement • Accident risk for the local community • Traffic congestion in local road

After analyzing the two methods of sand transportation for the proposed project, a river network is preferable where applicable. If the river network is not suitable for any location, the local road network will be used for sand transportation. So, both options will be applicable to this project.

CHAPTER 7

Identification and Evaluation of Potential Impacts

7 IDENTIFICATION AND EVALUATION OF POTENTIAL IMPACTS

Assessment of potential impacts is based on activities that will be involved in the implementation of the project, nature, and extent of the proposed activities, and the present environmental setting of the project area.

7.1 Impact Assessment Methodology

7.1.1 Impact Evaluation

7.1.1.1 Nature of the Impact

The nature of the impact will be primarily defined as positive or negative and then will be categorized as direct and indirect. An assessment of the potential impact will be made on the lifecycle of the project or activities (quarrying phase).

The terminology used in this report to define the nature of an impact is presented below.

- **Positive:** an impact that is considered to represent an improvement on the baseline condition or introduces a positive change.
- **Negative:** an impact that is considered to represent an adverse change from the baseline condition or introduces a new undesirable factor.
- **Direct impact:** impacts that can be directly and distinctly attributed to environmental and social parameters.
- **Indirect impact:** impacts that may be associated with a particular impact on a certain environmental or social parameter (not part of the project or activities).

7.1.1.2 Assessing Significance

Once the nature of the impact has been identified, significance was determined for potential positive or negative impacts. For the assessment, impact significance is determined by considering the consequences and probability of the impact occurring. The impact consequence is a function of impact geographical extent, duration, severity, and reversibility. The criteria used by the consultant to determine impact significance are summarized in the following sections.

A. Geographical Extent of Impact

This indicates the spatial area that may be affected by the project activities or its associated facilities (Table A).

Table -A: Geographical extent of impact

Extent	Description
Project Site	Potential E&S impacts area covers only at or within the project site/boundary.
Local	Potential E&S impacts area extends not only to the project site/boundary but also its immediate surrounding areas.
Regional	Potential E&S impacts area extends to the immediate surrounding areas along with adjacent areas.
Provincial	Potential E&S impacts area extends to the regional to provincial scale as determined by administrative boundaries, and habitat type.
National/Transboundary	Potential E&S impacts area extends to the national/transboundary level. Nationally important environmental resources or a nationally important area will be affected. Impact is also considered not only at the national level but also in

Extent	Description
	neighboring countries. Internationally important resources such as areas protected by international conventions will be affected.

B. Duration of Impacts

Duration: this measures the lifetime/existence/continuation of the impact (Table B).

Table -B: Duration of Impact

Duration	Description
Temporary	Potential E&S impacts are anticipated to be intermittent/occasional.
Short Term	Potential E&S impact duration is limited time, or impacts are anticipated to be of short duration (less than 3 years).
Medium Term	Potential E&S impact duration is medium or will continue after the construction period but stop/discontinue/cease within a tenure of 3-10 years.
Long term	Potential E&S impact duration will continue for more than 10 years, or the entire operational life of the project, but cease when the project stops operation.
Permanent	Potential E&S impacts that will cause a permanent change in the affected receptor or resource, remain after the operational life of a project.

C. Severity of Impacts

This is the degree to which the project affects or changes the environment; it includes a measure of the reversibility of impacts (Table C).

Table -C: Severity of Impact

Severity	Description
Negligible	Changes due to potential E&S impact are minor, not visible/noticeable, natural functioning of the environment is not affected.
Low	Natural functioning of the environment is minimally affected. Natural, cultural, and social functions and processes can be reversed to their original state if mitigation measures are taken.
Moderate	Environment remarkably distorted/ disturbed/ impacted, still functions, if in a modified way. Negative impacts cannot be fully reversed.
High	Cultural and social functions and processes distorted/disturbed/impacted - potentially ceasing to function temporarily.
Very High	Natural, cultural, and social functions and processes are permanently stopped/discontinued, and valued, important, sensitive, or vulnerable systems or communities are substantially affected. Negative impacts cannot be reversed.

D. Reversibility of Impacts

This is the degree to which the project will cause a loss of resources that are recoverable (Table D).

Table -D: Reversibility of Impact

Reversibility	Description
Reversible	Potential E&S impact affects the environment in such a way that natural functions and ecological processes can regenerate naturally. Communities can adapt with relative ease and maintain pre-impact livelihoods.

Reversibility	Description
Recoverable	Resources can be restored with effort. The affected environment is altered but natural functions and ecological processes may continue or recover with human input. Able to adapt with some difficulty and maintain pre-impact livelihoods but only with a degree of support or intervention.
Irreversible	There is no potential for replacing a particularly vulnerable resource that will be impacted. Natural functions or ecological processes are altered to the extent that it will permanently cease. Affected communities will not be able to adapt to changes and continue to maintain pre-impact livelihoods.

E. Probability of Impacts

This is the likelihood or the chance that the impact will occur (Table E).

Table -E: Probability of Impact

Probability	Description
Improbable	Under normal conditions, no potential E&S impact is anticipated.
Low	The probability of the impact occurring is low due to its design or historical experience.
Medium	There is a distinct probability of the impact occurring.
High	It is most likely that the impact will occur.
Definite	The impact will occur regardless of any prevention measures.

G. Consequence

The consequence of the impact is derived from factors including geographical extent, duration, severity, and reversibility. The consequence is calculated as ***geographical extent + duration + Severity + Reversibility.***

H. Significance

The significance of an impact was rated by combining the consequences of the impact and the probability of occurrence ***(i.e., Significance of Environmental/Social Impact = Consequence x Probability).*** The maximum value that can be obtained is 100 significance points (Table F).

Table -F: Impact Significance Definitions

Score	Significance Definitions	Negative Ratings	Positive Ratings
>25	An impact of negligible E&S impact significance is where a resource will not be affected in any way by a particular activity, or the predicted effect is deemed to be negligible or indistinguishable from natural background levels.	Negligible	Negligible
26 - 49	An impact of low significance is one where an effect will be experienced, but the impact magnitude is sufficiently small and for negative impacts, well within accepted standards, and/or the receptor is of low sensitivity.	Low	Low
50 - 75	An impact of moderate significance is one where an effect will be within accepted limits and standards. The impact on the receptor will be noticeable and the normal functioning altered, but the baseline condition prevails, albeit in a modified state. The	Moderate	Moderate

Score	Significance Definitions	Negative Ratings	Positive Ratings
	emphasis for moderate impacts is on demonstrating that the negative impact has been reduced to a level that is as low, or positive impacts enhanced as far as reasonably practicable. This does not necessarily mean that "moderate" impacts have to be reduced to "low" impacts, but that moderate impacts are being managed effectively and efficiently to not exceed accepted standards. In the same way, moderate positive impacts may not be able to be enhanced to have high positive impacts.		
76 - 100	An impact of high significance is one where an effect will exceed the accepted limit or standard, or large-magnitude impacts occur to highly sensitive resources. An impact with high significance will completely modify the baseline conditions.	High	High

7.1.2 Residual Impact Evaluation

Once mitigation is declared, the next step in the impact assessment process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the assumed implementation of the additional declared mitigation measures.

7.2 Impact Identification

The potential impacts have been identified through a systematic process whereby the activities (both planned and unplanned) associated with the project have been considered with respect to their potential to interact with environmental and social resources or receptors.

The interaction matrix enables a methodical identification of the potential interactions each project activity may have on the range of resources/receptors within the area of influence i.e., the study area of the project. The interaction matrix for the project activities and likely impacted resources/receptors is presented in Table 7-1.

Table 7-1: Impact Matrix of Twenty-Three Silica Sand Quarries in the Habiganj District

Project Activities	Potential Impacts																											
	Physical Resources											Biological Resources				Socio-economic Resources								Community Health						
	Air Quality	Noise	Vibration	Surface water quality	Groundwater resource	Groundwater quality	Soil resources	Sediment quality	Land use	Drainage pattern	Aesthetics	Vegetation/forest cover	Wildlife	Aquatic fauna	Protected areas	Demographic (incl. Physical displacement)	Economy and livelihood	Occupational health and safety	Employment	Infrastructure and service	Cultural resources	Education and skills	Agriculture/cash crops	Public transportation	Communicable/non-communicable disease	Vector-borne disease	Sexually transmitted disease	Healthcare/recreational facilities	Vulnerable groups	Seismicity
Mobilization of personnel, materials, and equipment	√	√					√										√	√	√				√						
Influx of labour																	√	√	√						√	√				
Sand excavation and extraction works	√	√		√			√			√				√				√												
Transportation of sand for stockpiling	√	√					√										√	√					√							
Transportation of sand from Stockpiling to the distribution channel	√	√					√										√						√	√						
Equipment and machinery	√	√																√												

Project Activities	Potential Impacts																												
	Physical Resources											Biological Resources				Socio-economic Resources								Community Health						
	Air Quality	Noise	Vibration	Surface water quality	Groundwater resource	Groundwater quality	Soil resources	Sediment quality	Land use	Drainage pattern	Aesthetics	Vegetation/forest cover	Wildlife	Aquatic fauna	Protected areas	Demographic (incl. Physical displacement)	Economy and livelihood	Occupational health and safety	Employment	Infrastructure and service	Cultural resources	Education and skills	Agriculture/cash crops	Public transportation	Communicable/non-communicable disease	Vector-borne disease	Sexually transmitted disease	Healthcare/recreational facilities	Vulnerable groups	Seismicity
operation in the quarry site																													
Use of utilities like water, fuel, etc	√			√			√							√				√											
Maintenance and replacement of tools, vehicles, and equipment	√	√																√					√						
Disposal and management of solid, liquid, and hazardous wastes.				√			√							√				√					√	√	√				
Traffic Management during sand transportation	√	√																√					√						

7.2.1 Positive Impacts

7.2.1.1 Employment Opportunities

The overall impacts on the employment opportunity arising during the quarrying phase due to the proposed project are likely to be direct to the local community and sand extraction workers.

- Local people will get employment opportunities due to the project's quarrying and operational works.
- Increased movements due to project activities will give a chance to local transport to earn more money due to the project activities.
- Local unemployed people may start small businesses near the project site to improve their living standards.

Therefore, the significance of impacts on employment opportunities from quarrying activities during the project quarrying phase is evaluated to be **Negligible** mentioned in Table 7-2**.** With the enhancement measures the significance of the impact will be **Negligible**.

Table 7-2: Significance of impacts on livelihood from quarrying activities and enhancement measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Enhancement Measures	Local	Short-term	Low	Reversible	Low	Negligible
Enhancement Measures	Local people should get preference during the recruitment process.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Enhancement Measures	Local	Short-term	Low	Reversible	Low	Negligible

7.2.1.2 Economic Enhancement

The overall impacts on the employment opportunity arising during the quarrying phase due to the proposed project are likely to be direct to the local community and sand extraction workers.

- The local economy will be enhanced by creating opportunities for business enhancement.
- Local real estate infrastructure and businessmen will benefit from the availability of the sand.
- The project will help the government to generate revenue.

Therefore, the significance of impacts on economic enhancement from quarrying activities during the project quarrying phase is evaluated to be **Negligible** mentioned in **Table** 7-3. With the enhancement measures the significance of the impact will be **Negligible**.

Table 7-3: Significance of impacts on livelihood from quarrying activities and enhancement measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Enhancement Measures	Local	Short-term	Low	Reversible	Low	Negligible
Enhancement Measures	Buy materials and services from local businesses to enhance the economy.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance

With Enhancement Measures	Local	Short-term	Low	Reversible	Low	Negligible

7.2.1.3 Impact on Aquatic Ecosystem

In the quarrying phase, properly managed sand quarries can offer several positive impacts on the aquatic ecosystem. As water bodies refill, they can create new aquatic habitats that support biodiversity, offering breeding and feeding grounds for fish and other aquatic species. The restoration of water flow and the reduction of aquatic macrophyte clogging could improve water quality and oxygen levels, benefiting both aquatic plants and animals. Over time, the re-established water bodies could also support local fisheries, improving fishing practices and contributing to the overall health of the aquatic ecosystem.

Therefore, the significance of impacts on aquatic ecosystems from quarrying activities during the project quarrying phase is evaluated to be Negligible mentioned in Table 7-4. With the enhancement measures the significance of the impact will be Low.

Table 7-4: Significance of impacts on aquatic ecosystem from quarrying activities and enhancement measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Enhancement Measures	Project Site	Temporary	Low	Reversible	Unlikely	Negligible
Enhancement Measures	• Excavating sand for the quarries encourages water clotting					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Enhancement Measures	Local	Short-term	Low	Recoverable	Medium	Low

7.2.1.4 Water Resources

Sand extraction activities in some Choras of Madhabpur, Chunarughat, and Bahubal Upazilas in the Habiganj District of Sylhet are expected to yield positive environmental benefits for the local water resource systems. Controlled sand extraction will help reduce flood risks and mitigate excessive sediment deposition by increasing the flow capacity of streams, thereby preventing localized flooding during heavy rainfall. This process will aid in the restoration of natural flow paths, ensuring efficient drainage and reducing waterlogging caused by altered flow patterns.

Additionally, sand extraction will help prevent excessive sedimentation in downstream rivers, wetlands, lakes, and Haors, preserving their ecological balance. Furthermore, controlled extraction will contribute to reducing channel migration and erosion, stabilizing stream banks, and promoting a more balanced sediment transport system.

The potential impacts of sand extraction in the concerned Choras of Habiganj District will influence both abiotic and biotic environments. Abiotic receptors such as rivers and streams, floodplains and wetlands (haors, lakes, and reservoirs), riverbanks and channel morphology, and groundwater recharge areas may be affected by extraction activities.

Additionally, infrastructure and the built environment, such as bridges, roads, and flood embankments, will benefit from reduced sedimentation and enhanced stability.

The potential direct positive impacts from the sand extraction activities in the Choras will be as follows:

- Restores natural flow capacity, reducing flood and waterlogging risks.
- Prevents downstream siltation in wetlands, haors, lakes, and rivers.

- Enhances surface water flow and reduces the risk of channel migration.
- Stabilizes riverbanks, protecting nearby agricultural lands, tea gardens, forest lands, and village settlements.
- Reduces stagnant water, minimizing health risks like waterborne diseases.
- Supports the replenishment of aquifers, ensuring sustainable water availability.

Given the project's geographic extent and the temporary nature of its impacts, the severity remains negligible over time, with a low probability under the 'Without Enhancement Measures' condition. However, after implementing the 'With Enhancement Measures' condition, the impact assessment based on the impact matrix indicates a ***'Definite'*** impact, signifying a ***'High'*** level of significance for the following Choras:

- **Madhabpur Upazila**: Mantala Chaumuhani, Mantala Ballymahal, and Sahapur Noapara Chora.
- **Chunarughat Upazila**: Sahapur Chora, Sutang River Part "Ka" Chora, Sutang River Part "Kha" Chora, Surma River Part "Ga" Chora, Deocahra Chora, and Ichalia Chora.
- **Bahubal Upazila**: Shashan Chora, Kali Chora, Madhavi Chora, Dhalia Chora, Karangi River Chora, and Kamai Chora.

The overall impact significance and analysis under "*without enhancement measures*" and "*with enhancement measures*" have been presented in Table 7-5. The overall impact matrix shows "***High***" impact significance in terms of positive environmental impacts by the sand extraction activities.

Table 7-5: Significance of positive impacts on water resources from sand extraction activities and enhancement measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Enhancement Measures	Project Site	Temporary	Negligible	Reversible	Low	Negligible
Enhancement Measures	• Ensuring optimal sediment removal rates to maintain streamflow capacity and prevent over-extraction by contractor • Controlling extraction near riverbanks • Scheduling seasonal extraction (Yearly and depends on sediment deposition)					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Enhancement Measures	Provincial	Medium-term	Very High	Irreversible	Definite	High

7.2.1.5 Soil and Agricultural

Sand extraction activities will also enhance soil fertility and land productivity by minimizing sand deposition on agricultural lands along both banks, thereby improving crop yields because if the sands are deposited in the river, canal, ponds, and low water body each year then there has a change to deposited sand in the surrounding agricultural lands which will affect cultivation.

The overall impact significance and analysis under "*without enhancement measures*" and "*with enhancement measures*" have been presented in Table 7-6. Therefore, the significance of impacts on soil and agriculture from quarrying activities during the project quarrying phase is evaluated to be Negligible mentioned in Table 7-6. With the enhancement measures the significance of the impact will be Low.

Table 7-6: Significance of positive impacts on soil and agriculture from sand extraction activities and enhancement measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance

Without Enhancement Measures	Local	Short-term	Low	Recoverable	Low	Negligible
Enhancement Measures	• Preventing sand deposition on nearby agricultural lands by yearly sand extraction from sand quarries. • Enforcing Buffer Zones – Maintaining a minimum 10–20m buffer from riverbanks to prevent erosion from agricultural land.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Enhancement Measures	Local	Short-term	Moderate	Recoverable	Medium	Low

7.2.2 Negative Impacts

7.2.2.1 Air Quality

Based on the project description and typical quarrying methods both manual sand extraction and using an excavator for sand extraction, impacts on air quality during sand extraction could arise from the following activities and conditions:

- Dust generation during the manual sand extraction from the project area
- Dust generation during the manual sand transportation for stockpile
- Wheel loader for excavating sand, loading the screener, and screening building stockpiles.
- Dust generation during the operation of sand extraction machinery.
- Loading truck trays from stockpiles.
- Traffic traversing unsealed worked areas and road surfaces.

Surrounding local communities and sand quarry workers are the receptors of air pollution.

The main potential direct impact of the proposed quarry operations as it relates to air quality is dust emissions. The dust has the potential to affect the health of workers, the resident population and vegetation.

Therefore, the significance of impacts on air quality from quarrying activities during the sand extraction is evaluated to be Negligible mentioned in **Table** 7-7. With the mitigation measures the significance of the impact will be Negligible.

Table 7-7: Significance of impacts on air quality from quarrying activities and mitigation measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Short-term	Low	Reversible	High	Negligible
Mitigation Measures	• Ensure that equipment e.g., excavator is properly maintained so as to reduce air emissions. • Haul trucks must maintain speeds of 15 km/h or less. • Drop distances between buckets, screener decks, and truck trays will be kept to a minimum. • Trucks carrying silica sand off-site will have covers fitted.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance

With Mitigation Measures	Local	Short-term	Low	Reversible	Low	Negligible

7.2.2.2 Noise Quality

Based on the project description and typical quarrying methods both manual sand extraction and using an excavator for sand extraction, impacts on noise quality during quarrying could arise from the following activities and conditions:

- Use of excavation machinery like front-end loaders, excavators, and backhoes.
- Movement of silica sand by trucks and trollers.

Surrounding local communities and sand extraction workers are the receptors of the noise pollution.

The main potential direct impact from the proposed quarry operations relates to noise from vehicle movement, haul trucks, and excavators may have a potential negative impact on surrounding residents.

Therefore, the significance of impacts on noise quality from quarrying activities is evaluated to be Negligible mentioned in Table 7-8. With the mitigation measures the significance of the impact will be Negligible.

Table 7-8: Significance of impacts on noise quality from quarrying activities and mitigation measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Temporary	Low	Reversible	High	Negligible
Mitigation Measures	• Reduce unnecessary revving of vehicular engines • Use equipment that has low noise emissions as stated by the manufacturers. • Workers operating equipment that generates noise should be equipped with noise protection. • Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours. Work hours will be from 7.00 am to 6 pm for 8 hours shift.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Local	Temporary	Low	Reversible	Medium	Negligible

7.2.2.3 Soil Quality and Erosion

The proposed sand extraction project may affect the soil quality and erosion of the project area. The potential source of impact on soil quality could arise due to spillage of fuel, lubricant, solid waste, and sand from the storage site. River bank and canal bank erosion may arise during the sand extraction due to an increase in the depth of the water body.

The soil strata have higher permeability, thus allowing contamination at greater depth. Storm water run-off from the contaminated area can pollute the downstream soil and water quality of the receiving water body. The soil characteristics of the native soil may also be changed due to sand deposition during transportation and stockpiling. If the depth of sand extraction is higher than the changes of erosion on the banks of the water body will be higher.

Therefore, the significance of impacts on soil quality and erosion from quarrying activities during the sand extraction is evaluated to be Moderate mentioned in **Table** 7-9. With the mitigation measures the significance of the impact will be Negligible.

Table 7-9: Significance of impacts on noise quality from quarrying activities and mitigation measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Long-term	High	Recoverable	High	Moderate
Mitigation Measures	• Implement a regular maintenance program for all equipment and machinery to prevent fuel spillage or leakage during sand extraction activities. • Manage spills of soil contaminants using standard engineering practices. • Use of spill or drip trays to contain spills and leaks, and use of spill control kits to clean small spills and leaks. • Training labor for waste disposal in designated areas and use of sanitation facilities. • Waste management measures should include provisions to contain and dispose of quarrying wastes, prohibit waste discharge on the ground, and practice recycling as far as practicable. • Sand extraction depth must be maintained at 1 to 10 meters as required for reducing erosion and must maintain proper slope. • Enforcing Buffer Zones – Maintaining a minimum 10–20m buffer from riverbanks to prevent erosion.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Local	Medium-term	Low	Recoverable	Low	Negligible

7.2.2.4 Biodiversity

7.2.2.4.1 Impact on Terrestrial Flora

The potential source of impact on the terrestrial ecosystem during the quarrying phase of the project is air. Terrestrial flora adjacent to the project area is the receptor.

During this phase, the transportation of Quarrying equipment (e.g., excavators, self-loaders) and vehicular movement within the project area may impact terrestrial flora. The primary concern is dust deposition on plant surfaces, which can disrupt essential physiological processes such as photosynthesis, and respiration, and potentially inhibit plants. However, the baseline study conducted in the project area did not identify any threatened terrestrial plant species.

Considering these factors, the impact on the terrestrial ecosystem due to the Quarrying activities can be assessed as low in Table 7-10.

Table 7-10: Significance of impacts on terrestrial ecosystem from quarrying activities and mitigation measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Short-term	Moderate	Recoverable	Medium	Low
Mitigation Measures	• Regularly spray water on roads, extraction sites, and stockpiles to reduce dust emissions.					

	• Cover transported sand and operation equipment with tarps to prevent dust release, and ensure vehicles are cleaned regularly to reduce dust dispersal.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Local	Short-term	Low	Recoverable	Low	Negligible

7.2.2.4.2 Impact on Terrestrial Fauna

The potential sources of impact on the terrestrial ecosystem during the quarrying phase of the project are as follows:

- Air, Noise, and Oil spill.
- An influx of labor force; and
- Transportation of sand, equipment, and vehicle (Truck and Trawler) by road.

Terrestrial faunal species viz. terrestrial mammals and herpetofauna in the project adjacent area are the receptors.

Sand extraction activities, along with the handling and transportation of sand may affect terrestrial wildlife in the project vicinity. These activities generate noise and air pollution, which can disturb natural wildlife movement patterns.

Considering these factors, the impact on the terrestrial ecosystem due to the Quarrying activities can be assessed as low in Table 7-11.

Table 7-11: Significance of impacts on terrestrial ecosystem from quarrying activities and mitigation measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Short-term	Moderate	Recoverable	Medium	Low
Mitigation Measures	• Regularly spray water on roads, extraction sites, and stockpiles to reduce dust emissions. • Cover transported sand and operation equipment with tarps to prevent dust release, and ensure vehicles are cleaned regularly to reduce dust dispersal. • Ensure that machinery and equipment are modern and well-maintained to minimize noise generation and prevent oil leakage. • Operate heavy machinery, like excavators, during the daytime and minimize use at night.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Local	Short-term	Low	Recoverable	Low	Negligible

7.2.2.4.3 Impact on Aquatic Flora

The impact on aquatic flora during the study period was minimal, as the chora were mostly dry, preventing the growth of significant aquatic plants. While some water clotting occurred during the monsoon season, it did not negatively affect the aquatic flora.

7.2.2.4.4 Impact on Aquatic Fauna

During the study period, fishing activities in chara and stagnant water bodies within the sand quarries were minimal, as most of the quarries were dry. KIIs and Stakeholder consultations revealed that fishing is limited due to the clogging of water bodies. Historically, some local residents engaged in fishing during

the rainy season primarily for personal consumption. However, improper management, accidental oil spillage, and wastewater disposal from sand extraction activities have the potential to pollute surface water.

Therefore, the significance of impacts on aquatic ecosystems due to the quarrying activities phase is evaluated to be Low mentioned in Table 7-12.

Table 7-12: Significance of impacts on aquatic ecosystem from quarrying activities and mitigation measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Short-term	Moderate	Recoverable	Medium	Low
Mitigation Measures	• Ensure that vehicles and equipment are regularly maintained to prevent oil spillage.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Local	Short-term	Low	Recoverable	Low	Negligible

7.2.2.5 Waste Generation

The main type of solid waste (e.g., packaging of machinery, shovels, spades, bags, and other carrying tools that may abandoned) is likely to be generated during quarrying activities in the project site. Other wastes that will be generated include waste from foods and packaging materials littered by workers.

The sand extraction activities can be carried along with canals, water bodies, and rivers flowing in the proximity of the project area. Solid waste can also contaminate haors, rivers, canals, etc. in the proximity of the activity. The improper management of the above wastes may have potentially adverse impacts on the environment in the absence of appropriate mitigation measures.

Therefore, the significance of the impacts of waste generated from sand extraction activities during the quarrying is evaluated to be Negligible in Table 7-13.

Table 7-13: Impacts Due to Waste Generation

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Temporary	Low	Reversible	Medium	Negligible
Mitigation Measures	• Properly store and manage hazardous materials, ex: fuel, during sand extraction activities. • Dispose of food waste and packaging materials littered by workers must be maintained properly With temporary storage in the bins and then disposed of at designated landfill areas. • Workers will be strictly instructed about the random disposal of any waste generated from the sand extraction activity. Arrangements will be made to collect and prevent littering by workers on site.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance

With Mitigation Measures	Local	Temporary	Low	Reversible	Low	Negligible

7.2.2.6 Traffic

There will be movement of sand extraction materials, machinery, sand, and manpower during the quarrying phase. The vehicle movements that will be required during the quarrying phase of the project will arise from the following main activities:

- The delivery of the equipment and materials for the sand extraction activities.
- The daily movements of personnel to and from the worksite.
- Transportation of silica sand from the project site to the distribution channel.

Based on the field observation, there existed a substantial number of heavy vehicles moving along the road. Additional silica sand transportation vehicles, equipment, and manpower may impact the traffic of the project area.

The traffic movement during the quarrying phase is likely to be occasional and very low. Therefore, the significance of impacts of traffic from sand extraction activities during quarrying is evaluated to be Negligible in Table 7-14.

Table 7-14: Impacts on Transportation

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Temporary	Low	Reversible	Medium	Negligible
Mitigation Measures	• Vehicles used for sand extraction activities shall move along the already existing roads as far as possible. • Avoiding peak hours for heavy vehicle movement where possible. • Silica Sand transport shall be totally enclosed with an impervious sheet before traveling on public roads. • No overloading is done shall be ensured. • Enforcing speed limits. Speed restrictions on vehicles entering and leaving the site. • All vehicles shall be instructed to follow traffic norms strictly.					
With Mitigation Measures	Local	Temporary	Low	Reversible	Low	Negligible

7.2.2.7 Occupational Health and Safety

Based on the project description and typical quarrying methods both manual sand extraction and using an excavator for sand extraction, impacts on occupational health and safety during the quarrying phase could arise from the following activities and conditions:

- Inhalation of fine silica dust leads to respiratory illnesses.
- Risk of accidents and injuries from equipment use.
- Cut injury by using sand extraction tools e.g. shovels, spades

Sand-extracting workers are affected by occupational health and safety issues.

The main potential direct impact from the proposed quarry operations relates to dust has the potential to affect the health of the resident population. Workers will be exposed to medium noise and dust levels during quarry operations if use an excavator.

Therefore, the significance of impacts on occupational health and safety from quarrying activities during the project phase is evaluated to be moderately mentioned in **Table** 7-15. With the mitigation measures the significance of the impact will be Negligible.

Table 7-15: Significance of impacts on occupational health and safety from quarrying activities and mitigation measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Project Site	Temporary	Moderate	Recoverable	Medium	Negligible
Mitigation Measures	• Establish facilities for drinking water, sanitation, and cooking to promote good hygiene practices. • Minimize the exposure of workers to high noise sources through noise control measures, such as the use of scheduling noisy operations during off-peak hours. • Provide appropriate personal protective equipment (PPE), hand gloves, and safety shoes, for workers to ensure their safety during operational tasks for controlling cut injury.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Project Site	Temporary	Low	Recoverable	Low	Negligible

7.2.2.8 Community Health and Safety

Based on the project description and typical quarrying methods, impacts on Community Health and Safety during the Quarrying phase could arise from the following activities and conditions:

- Increased vehicle movement can increase the risk of accidents and injuries.
- The security and safety of local people became temporarily vulnerable.

Surrounding local communities closest to the operations, experiencing the highest levels of dust, and noise are the receptors of this impact.

The overall impacts on Community Health and Safety during the quarrying phase due to the proposed project are likely to be direct to the local community.

Therefore, the significance of impacts on community health and safety from quarrying activities during the project quarrying phase is evaluated to be **Low** mentioned in **Table** 7-16. With the mitigation measures the significance of the impact will be **Negligible**.

Table 7-16: Significance of impacts on impacts on community health and safety during quarrying activities and mitigation measure

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Short-term	Moderate	Recoverable	Medium	Low
Mitigation Measures	• Reduce unnecessary revving of vehicular engines • Use equipment that has low noise emissions as stated by the manufacturers.					

	• Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours. Work hours will be from 7.00 am to 6:00 pm for 8 hours shift. • Haul trucks must maintain speeds of 15 km/h or less. • Trucks carrying silica sand off-site will have covers fitted.					
	Extent	Duration	Intensity	Reversibility	Probability	Significance
With Mitigation Measures	Local	Short-term	Low	Recoverable	Low	Negligible

7.2.2.9 Water Resources

Based on the project description and sand extraction methods, certain Choras and their associated water resource systems in the Madhabpur, Chunarughat, and Bahubal Upazilas of Habiganj District may experience negative environmental impacts due to various activities and conditions during the sand quarrying phase. The negative impacts that will arise from the activities have been delineated below:

- Large-scale open-pit extraction directly from riverbeds and floodplains leads to excessive sediment removal.
- Large extraction of sand from deeper layers of the riverbed disrupts natural sediment balance.
- Extracting sand directly from active river channels disturbs water flow and sediment transport processes.
- Sand extraction near critical infrastructures like bridges, culverts, roads, and embankments can weaken foundation stability and enhance scouring.
- Sand extraction from the riverbanks and adjacent floodplains without proper planning can cause severe land degradation.
- Sand extraction rates that exceed natural sediment replenishment will lead to long-term geomorphological changes.
- Improper disposal of solid waste and sediments can cause blockages in natural drainage.

The potential negative impacts of sand extraction in the study areas of Habiganj District will affect both abiotic and biotic environments. The abiotic environment, including hydrological and geological systems, may experience disruptions in riverbanks and channel morphology, surface water quality, and recharge areas. Additionally, infrastructure and built environments, such as bridges, roads, flood embankments, and drainage systems, could be impacted by the extraction activities. The impacts on the biotic environment are given in the biodiversity section.

The main potential direct negative impacts from the sand extraction activities in the choras will be:

- Riverbank erosion and instability
- Altering natural water courses, lowering riverbeds
- Increased turbidity and reduced water quality
- Waterlogging and increased risk of localized flash floods
- Failure of flood control structures and local scouring
- Landslides and riverbank collapsing
- Loss of agricultural land

Due to the localized and short-term nature of the impact, the severity remains low, with the effects being recoverable over time. The overall probability assessment, based on the impact matrix, indicates a **Low** impact, implying **Negligible** significance for the following Choras:

- In **Madhabpur Upazila:** Rasulpur Chora, Teliapara Tea Garden' Chora, Kibriabad' Chora, and Madhabpur Chora will have negative impacts.
- In **Chunarughat Upazila:** Ramganga Chandi Chora only will have the negative impacts.

- In **Bahubal Upazila:** Shashan Chora, Digambara Chora, and Lauwa Chora will have negative impacts.

The overall impact significance and analysis under "*without mitigation*" and "*with mitigation*" have been presented in Table 7-17. For both cases, the impact matrix shows "***Negligible***" in terms of the significance of the impact.

Table 7-17: Significance of impacts on water resources from sand extraction activities and mitigation measures

	Extent	Duration	Intensity	Reversibility	Probability	Significance
Without Mitigation Measures	Local	Short-term	Low	Recoverable	Low	Negligible
Mitigation Measures	• Identification of specific areas for sand extraction that do not destabilize riverbanks will have to be taken into account for sand quarrying management. • Limiting extraction depth and volume – Avoiding excessive excavation that weakens banks and alters flow dynamics. o For Mantala Chaumuhani, Mantala Ballymahal, Kibriabad, Sutang River Part "Kha" Chora', Surma River Part "Ga", Deocahra, Ramganga Chandi, Shashan chora: depth should be 5-7 meters. o For Sahapur Noapara, Rasulpur, Jagdishpur, Sutang River Part "Ka", Digambara, Madhavi, Dhalia, and Kali chora: the depth should be 4-5 meters. o For Karangi River', Teliapara Tea Garden, Sahapur, Ichalia, Kamai, Lauwa Chora: the depth should be 5-8 meters. • Enforcing Buffer Zones – Maintaining a minimum 10–20m buffer from riverbanks to prevent erosion. • Using mechanical excavation instead of hydraulic dredging to avoid heavy bank erosion. • Maintaining an excavation plan for a long reach to scale-downing the turbidity near the excavation area. • Depth Monitoring – Restricting excavation depth to avoid over-extraction. • Alternating Extraction Sites – Implementing rotational extraction to allow natural sediment replenishment. • Minimum Flow Requirements – Maintaining environmental and ecological flow to support aquatic ecosystems. • Prohibiting sand extraction within 200 meters of bridges, roads, and embankments in the large rivers or Chora areas. • Strengthening government oversight and imposing heavy fines for illegal sand extraction. • Riverbank Protection Programs – Introducing afforestation initiatives to restore vegetation cover for some large rivers/choras. • Sediment Budget Analysis – Conducting hydrological studies to ensure sustainable extraction rates before each year's sand quarrying phase and BMD does this each year. • Restrict Extraction During Low-Flow Periods – Enforcing a seasonal sand extraction ban in the dry season. • Establishing designated solid waste disposal areas away from water bodies and maintaining 20-50 clearance from the river Bankline area. • Water quality monitoring during the sand extraction.					

With Mitigation Measures	Project Site	Temporary	Low	Reversible	Low	Negligible

CHAPTER 8

Management Plan/Procedures

8 MANAGEMENT PLAN/PROCEDURES

8.1 Introduction

The main purpose of the Environmental Management Plan (EMP) is to identify project-specific actions that will be undertaken by the project authority for mitigation of the specific impacts identified in the proposed project. These actions will be incorporated into the project management system and integrated into the implementation at various stages of project development. The EMP describes both generic good practice measures and site-specific measures, the implementation of which is aimed at mitigating the potential impact associated with the project activity.

8.2 Objectives of the Environmental Management Plan

The main objective of the EMP is to warrant that the development in an identified particular study area needs to be entangled with judicious utilization of non-renewable resources and to ensure that the stress/load on the ecosystem is within its permissible assimilative capacity i.e., its' carrying capacity. In the above context, assimilative capacity refers to the maximum amount of pollution load that can be discharged into the environment without affecting the designated use of various environmental attributes and is governed by dilution, dispersion, and removal due to physicochemical and biological processes. An effective EMP ensures that these environmental requirements and objectives are satisfied during all phases of the project. The long-term objectives of the EMP for all the environmental attributes are as follows:

- To comply with all the regulations/applicable laws stipulated by the DOE;
- To create good working conditions for employees;
- To encourage and achieve the highest performance and response from individual employees and contractors;
- To plan out the complete strategy to take care of stakeholder engagement;
- Budgeting and allocation of funds for environmental management;
- Continuous development and search for innovative technologies for a cleaner and better future environment; and
- To contribute significantly to sustainable development.
- To provide a system for incorporating the Project EIA outcomes into the construction process;
- To establish relevant systems and processes that will support compliance with applicable legislation as well as BMD’s guideline;
- To detail construction monitoring, reporting, and auditing requirements;
- To identify environmentally sensitive areas to assist the construction team in avoiding and/or reducing potential impacts;
- To incorporate the environmental mitigation measures into a comprehensive framework to facilitate the application of appropriate environmental management throughout the Project;
- To provide a tool to assist in tracking compliance with environmental obligations; and
- To clarify areas of responsibility during Project activities

8.3 Environmental Mitigation/Enhancement Measures

8.3.1 Quarrying Phase

The possible environmental impacts during the quarrying phase have been already identified and assessed in Chapter 7 of this EIA report. For mitigating the possible environmental impacts, mitigation/enhancement measures for the quarrying phase are proposed in Table 8-1.

Table 8-1: Environmental Management Plan During Quarrying

Affected Aspect	Potential Impacts	Proposed Mitigation/Enhancement Measures	Responsibility		Budget
			Implementation	Supervision	
Positive Impact					
Employment Opportunities	Impact on Livelihood	• Local people should get preference during the recruitment process.	Appointed contractor	Department of Labour (DOL) and DC office	--
Economic Enhancement	Impact on Economic	• Buy materials and services from local businesses to enhance the economy.	Appointed contractor	DC Office and Economic Relations Division (ERD)	--
Aquatic Ecosystem	Impacts on aquatic ecosystem	• Excavating sand for the quarries encourages water clotting	Appointed contractor	Department of Environment (DOE)	--
Water Resources	• Reduce flood risks • Prevent excessive sedimentation in downstream rivers, wetlands, lakes, and Haors • Reducing channel migration and erosion	• Ensuring optimal sediment removal rates to maintain streamflow capacity and prevent over-extraction by contractor • Controlling extraction near riverbanks • Scheduling seasonal extraction (Yearly and depends on sediment deposition)	Appointed contractor	Department of Environment (DOE)	5,000

Affected Aspect	Potential Impacts	Proposed Mitigation/Enhancement Measures	Responsibility		Budget
			Implementation	Supervision	
Soil and Agricultural	Land Degradation	• Preventing sand deposition on nearby agricultural lands by yearly sand extraction from sand quarry • Enforcing Buffer Zones – Maintaining a minimum 10–20m buffer from riverbanks to prevent erosion from agricultural land	Appointed contractor	Department of Environment (DOE)	5,000
Negative Impact					
Air Quality	Dust generation and Exhaust emissions	• Ensure that equipment e.g. excavator is properly maintained so as to reduce air emissions. • Haul trucks must maintain speeds of 15 km/h or less. • Drop distances between buckets, screener decks, and truck trays will be kept to a minimum. • Trucks carrying silica sand off-site will have covers fitted.	Appointed contractor	Department of Environment (DOE)	5,000
Noise	Increased ambient noise	• Reduce unnecessary revving of vehicular engines • Use equipment that has low noise emissions as stated by the manufacturers. • Workers operating equipment that generates noise should be equipped with noise protection. • Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours. Work hours will be from 7.00 am to 6:00 pm for 8 hours shift.	Appointed contractor	Department of Environment (DOE)	5,000
Soil Quality and Erosion	Soil contamination Soil erosion	• Implement a regular maintenance program for all equipment and machinery to prevent fuel spillage or leakage during sand extraction activities. • Manage spills of soil contaminants using standard engineering practices. • Use of spill or drip trays to contain spills and leaks, and use of spill control kits to clean small spills and leaks.	Appointed contractor	Department of Environment (DOE)	--

Affected Aspect	Potential Impacts	Proposed Mitigation/Enhancement Measures	Responsibility		Budget
			Implementation	Supervision	
		• Training labor for waste disposal in designated areas and use of sanitation facilities. • Waste management measures should include provisions to contain and dispose of quarrying wastes, prohibit waste discharge on the ground, and practice recycling as far as practicable. • Sand extraction depth must be maintained at 1 to 10 meters as required for reducing erosion and must maintain proper slope. • Enforcing Buffer Zones – Maintaining a minimum 10–20m buffer from riverbanks to prevent erosion.			
Biodiversity	Impact on Terrestrial Flora	• Regularly spray water on roads, extraction sites, and stockpiles to reduce dust emissions. • Cover transported sand and operation equipment with tarps to prevent dust release, and ensure vehicles are cleaned regularly to reduce dust dispersal.	Appointed contractor	Department of Environment (DOE)	3,000
	Impact on Terrestrial Fauna	• Regularly spray water on roads, extraction sites, and stockpiles to reduce dust emissions. • Cover transported sand and operation equipment with tarps to prevent dust release, and ensure vehicles are cleaned regularly to reduce dust dispersal. • Ensure that machinery and equipment are modern and well-maintained to minimize noise generation and prevent oil leakage. • Operate heavy machinery, like excavators, during the daytime and minimize use at night.			
	Impact on Aquatic Flora	• Ensure that vehicles and equipment are regularly maintained to prevent oil spillage.			

Affected Aspect	Potential Impacts	Proposed Mitigation/Enhancement Measures	Responsibility		Budget
			Implementation	Supervision	
	Impact on Aquatic Fauna				
Waste Generation	Solid Waste and Liquid Waste	• Properly store and manage hazardous materials, ex: fuel, during sand extraction activities. • Dispose of food waste and packaging materials littered by workers must be maintained properly with temporary storage in the bins and then disposed of at designated landfill areas. • Workers will be strictly instructed about the random disposal of any waste generated from the sand extraction activity. Arrangements will be made to collect and prevent littering by workers on site.	Appointed contractor	Department of Environment (DOE)	3,000
Traffic	Disturbance to existing road users through an increase in road traffic	• Vehicles used for sand extraction activities shall move along the already existing roads as far as possible. • Avoiding peak hours for heavy vehicle movement where possible. • Silica Sand transport shall be totally enclosed with an impervious sheet before traveling on public roads. • No overloading is done shall be ensured. • Enforcing speed limits. Speed restrictions on vehicles entering and leaving the site. • All vehicles shall be instructed to follow traffic norms strictly	Appointed contractor	Bangladesh Road Transport Authority (BRTA) and Local Authority (Police Department)	--
Occupational Health and Safety	Occupational Health and Safety	• Establish facilities for drinking water, sanitation, and cooking to promote good hygiene practices. • Minimize the exposure of workers to high noise sources through noise control measures, such as the use of scheduling noisy operations during off-peak hours.	Appointed contractor	Department of Environment (DOE)	15,000

Affected Aspect	Potential Impacts	Proposed Mitigation/Enhancement Measures	Responsibility		Budget
			Implementation	Supervision	
		• Provide appropriate personal protective equipment (PPE), hand gloves, and safety shoes, for workers to ensure their safety during operational tasks for controlling cut injury.			
Community Health and Safety	Community Health and Safety	• Reduce unnecessary revving of vehicular engines • Use equipment that has low noise emissions as stated by the manufacturers. • Avoid nighttime activities. People are more aware of vibration in their homes during the nighttime hours. Work hours will be from 7.00 am to 6:00 pm for 8 hours shift. • Haul trucks must maintain speeds of 15 km/h or less. • Trucks carrying silica sand off-site will have covers fitted.	Appointed contractor	Ministry of Health and Family Welfare (MOHFW) and Community Health Workers	3,000
Water Resources	• Surface water and groundwater • Drainage System • River bank Erosion	• Identification of specific areas for sand extraction that do not destabilize riverbanks will have to be taken into account for sand quarrying management. • Limiting extraction depth and volume – Avoiding excessive excavation that weakens banks and alters flow dynamics. o For Mantala Chaumuhani, Mantala Ballymahal, Kibriabad, Sutang River Part "Kha" Chora', Surma River Part "Ga", Deocahra, Ramganga Chandi, Shashan chora: depth should be 5-7 meters. o For Sahapur Noapara, Rasulpur, Jagdishpur, Sutang River Part "Ka", Digambara, Madhavi, Dhalia, and Kali chora: the depth should be 4-5 meters. o For Karangi River', Teliapara Tea Garden, Sahapur, Ichalia, Kamai, Lauwa Chora: the depth should be 5-8 meters. • Enforcing Buffer Zones – Maintaining a minimum 10–20m buffer from riverbanks to prevent erosion.	Appointed contractor	Department of Environment (DOE)	10,000

Affected Aspect	Potential Impacts	Proposed Mitigation/Enhancement Measures	Responsibility		Budget
			Implementation	Supervision	
		• Using mechanical excavation instead of hydraulic dredging to avoid heavy bank erosion. • Maintaining an excavation plan for a long reach to scale-downing the turbidity near the excavation area. • Depth Monitoring – Restricting excavation depth to avoid over-extraction. • Alternating Extraction Sites – Implementing rotational extraction to allow natural sediment replenishment. • Minimum Flow Requirements – Maintaining environmental and ecological flow to support aquatic ecosystems. • Prohibiting sand extraction within 200 meters of bridges, roads, and embankments in the large rivers or Chora areas. • Strengthening government oversight and imposing heavy fines for illegal sand extraction. • Riverbank Protection Programs – Introducing afforestation initiatives to restore vegetation cover for some large rivers/choras. • Sediment Budget Analysis – Conducting hydrological studies to ensure sustainable extraction rates before each year's sand quarrying phase and BMD does this each year. • Restrict Extraction During Low-Flow Periods – Enforcing a seasonal sand extraction ban in the dry season. • Establishing designated solid waste disposal areas away from water bodies and maintaining 20-50 clearance from the river Bankline area. • Water quality monitoring during the sand extraction.			
				Grand Total	**54,000**

8.4 Environmental Monitoring Plan

The effectiveness of the various mitigation measures described will be monitored through a well-defined environmental monitoring program. This will be done by direct measurement of parameters related to environmental quality, emissions, discharges, etc. An environmental monitoring program is important as it provides useful information on the following aspects:

- It helps to verify the predictions on the environmental impacts presented in this study.
- It helps to indicate warnings of the development of any alarming environmental situations, and thus, provides opportunities for adopting appropriate control measures.

The monitoring program in different areas of the environment, outlined in the next few sections, has been based on the findings of the impact assessment studies, described earlier.

8.4.1 Monitoring Plan

The proposed environmental monitoring plan can be incorporated into the sand extraction project. The following Table 8-2 presents the environmental monitoring plan for the project with a budget.

Table 8-2: Environmental Monitoring Plan

Aspect	Proposed Monitoring Parameters	Number and location of sampling stations	Frequency of Monitoring	Responsible Party	Implementing Agency	Budget
Air Quality	SPM, PM_{10}, $PM_{2.5}$, SOx, NOx, CO	1 location of each quarry site	During quarry	Contractor	BMD	3,000
Noise	L_{day}	1 location of each quarry site	During quarry	Contractor	BMD	1,000
Soil	pH, texture, NH4+, total P, heavy metals, Organic Matter	1 location of each quarry site	During quarry	Contractor	BMD	8,000
Groundwater quality	pH, DO, BOD, COD, TDS, Lead, Hg, Fe	1 location of each quarry site	During quarry	Contractor	BMD	9,000
Surface Water Quality	DO, BOD, EC, Turbidity, TDS, pH, AS, Fe, Total Hardness, Chloride, FC	1 location of each quarry site	During quarry	Contractor	BMD	9,000
Sediments Quality	As per baseline data	1 location of each quarry site	During quarry	Contractor	BMD	8,000
					Grand Total	**38,000**

8.4.2 Budget Plan for Environmental Mitigation Measures and Monitoring

The contractor will allocate a separate budget for environmental mitigation, monitoring, analysis and reporting, verification monitoring, and capacity building. The estimated budget for environmental monitoring for each sand quarry is 38,000 BDT per year and the environmental mitigation measure is 54,000 BDT per year.

8.5 Integrated Quarry Development, Deposit Characterization, Controlled Sand Extraction, Monitoring and Transportation Plan

Important design note: The five quarry categories and the associated cross-sections are conceptual planning classes. The final annual excavation depth, bed grade, side slope, bank buffer, extractable quantity and working sequence shall be established from the latest topographic/bathymetric/hydrographic survey and site-specific engineering review.

8.5.1 Introduction and Purpose

In response to the observation of the Department of Environment (DoE), this integrated Quarry Development, Deposit Characterization, Controlled Sand Extraction, Monitoring and Transportation Plan has been prepared for the twenty-three selected silica sand quarries of Habiganj District. The plan is intended to provide a technically structured framework for annual deposit assessment, site preparation, excavation planning, sequence of development, quarrying method selection, control of excavation-floor grade, side-slope management, erosion prevention, temporary storage, transportation, monitoring, post-extraction verification and record keeping.

Most project sites are locally defined as charas: natural hill-fed or drainage channels that convey monsoon and flash-flood runoff and receive recurrent sand deposition. They are therefore morphologically dynamic rather than fixed open-pit mining sites. The proposed activity shall not create isolated mining pits or permanent depressions. Sand shall be removed only from an annually surveyed and approved extraction envelope while maintaining the hydraulic and drainage function of each chara. The selected twenty-three charas include seasonal channels and larger channel systems. The applicable extraction control category shall be determined based on annual survey findings, channel characteristics and site-specific engineering assessment.

The technical approach is based on the Balumahal and Soil Management Rules, 2011; the BWDB Dredging and Dredged Material Management Guideline, 2025; the BWDB Operation and Maintenance Manual, 2017; the BWDB Technical Specification for Civil Works; the East Bengal Embankment and Drainage Act, 1952; the BWDB 2010 implementation policy for relevant embankment repair and river/khal re-excavation schemes; and the Criterion for Determining the Crest Level of Flood Control Embankment, 2020 (Government of Bangladesh, 2011; Bangladesh Water Development Board [BWDB], 2010, 2020, 2025; BWDB & Japan International Cooperation Agency [JICA], 2017; Government of Bangladesh, 1952).

8.5.2 Dynamic Design Principle

The quarry development concept is deliberately dynamic. Monsoon rainfall, flash floods, sediment supply, previous extraction, channel migration, bank erosion and local scour can alter the bed elevation, water depth, low-flow path, bank geometry and deposit thickness from one year to the next. BWDB defines the flood season as a period characterized by high water levels, strong currents and rapid morphological changes, and its O&M framework relies on repeated observation, cross-sectional survey and sounding to understand such changes (BWDB, n.d.; BWDB & JICA, 2017).

Accordingly, a cross-section or excavation level approved for one year shall not automatically be repeated in the following year. Before each extraction cycle, the responsible authority shall review the latest survey, annual replenishment, structural risks, bank condition, ecological constraints and operational performance. The approved quantity and extraction geometry may be reduced, modified, relocated within the gazetted reach or temporarily withheld where survey or monitoring indicates unacceptable risk.

8.5.3 Regulatory and Technical Basis

The Balumahal and Soil Management Rules, 2011 provide the principal regulatory basis for survey-based management of sand extraction, including hydrographic/survey information, identification of extractable material, supervision of extraction, control of storage and monitoring of effects on the watercourse, fisheries, water quality and nearby structures (Government of Bangladesh, 2011).

The Dredging and Dredged Material Management Guideline, 2025 distinguishes topographic, bathymetric and hydrographic surveys and links survey information with technical/feasibility assessment, environmental assessment, dredging/excavation planning and management. Hydrographic assessment includes water depth, water flow, velocity and other hydraulic characteristics relevant to defining a safe excavation envelope (BWDB, 2025).

The BWDB Operation and Maintenance Manual identifies water-level and discharge observation, checking of bed material, water-quality observation, periodic cross-sectional survey, sounding survey, patrol and inspection as core channel-management functions. It further states that dredging/excavation planning and design should be based on cross-sectional survey, with additional detailed survey where necessary (BWDB & JICA, 2017).

The BWDB Technical Specification for Civil Works requires setting-out against approved benchmarks and reference points, excavation to approved lines, grades and sections, continuous rather than piecemeal channel excavation, control of over-excavation, smooth transition where the design bed width or level changes, protection of banks and structures and pre-work/post-work measurement for dredging or excavation quantities (BWDB, n.d.).

The East Bengal Embankment and Drainage Act, 1952 and the BWDB crest-level criterion are particularly relevant where a quarry is close to an embankment or other water-management work. In such locations, the excavation plan shall protect the toe, bank, hydraulic performance and overall stability of the structure. The crest-level criterion is not used to impose a generic freeboard on ordinary charas; it is used only where an actual flood-control embankment may be affected (Government of Bangladesh, 1952; BWDB, 2020).

8.5.4 Deposit Description and Annual Deposit Characterization

The project deposits are predominantly fluvial/alluvial silica-bearing sands transported from hilly, forested and tea-garden catchments and deposited within chara beds and lower-energy channel reaches. The present inventory generally describes sand occurrence qualitatively as significant, significant amount, limited or seasonally limited. These qualitative descriptions are appropriate for baseline characterization but are insufficient by themselves for fixing an annual tender quantity.

Each quarry shall therefore have an annual deposit record prepared before extraction. At minimum, the record shall include:

- Quarry/chara name, gazetted reach, mouza, upazila and geographic coordinates.
- Survey datum, permanent or recoverable BM/TBM and survey date.
- Existing left and right bank lines, active channel width and representative channel cross-sections.
- Longitudinal bed profile and identified low-flow/thalweg route, where applicable.
- Existing bed elevations, water level and water depth at wet or perennial reaches.
- Thickness and lateral distribution of the current year's sand deposit.
- Existing natural deep pools, scour holes and eroding-bank locations.
- Bridges, culverts, sluices, road crossings, embankments, bank-protection works and other structures.
- Ecological and hydrological exclusion areas, including wetland/haor/beel connectivity.
- Calculated gross, excluded, available and approved annual extraction volume.
- Post-extraction final bed condition and actual quantity removed.

Where material characterization is required, representative sand samples should be retained for grain-size and other relevant testing. BWDB's O&M framework specifically recognizes examination of bed material and survey of river/channel morphology as important inputs to channel management (BWDB & JICA, 2017).

8.5.5 Quarry Group Development Classification

To provide practical conceptual drawings and operating controls without preparing a completely independent design for every quarry, the twenty-three selected charas are grouped into five primary planning categories. The groups are based on the existing inventory, including quarry area, qualitative

sand availability, channel form, seasonal/perennial flow, infrastructure, wetland connectivity, surrounding settlement and ecological sensitivity. Where a site satisfies more than one category, the more conservative control shall govern.

Table 8-3: Quarry Group Development Classification

Group	Primary Planning Condition	Quarries Provisionally Included
Group I	Small/Shallow Seasonal Charas with Limited Sand Deposition	Digambara Chara; Kali Chara; Ramganga Chandi Chara; Shashanchora Chara; Ichalia Chara
Group II	Typical Medium Seasonal Charas with Moderate Sand Deposition	Sahapur Noapara Chara; Madhabpur Chara; Jagadishpur Chora; Deo Chora; Madhavi Chara; Kamai Chara
Group III	Wide/High-Flow or Large-Deposit Channels	Mantala Chaumuhani; Mantala Balimahal; Sutang River Part “Ka”; Sutang River Part “Kha”; Sutang River Part “Ga”; Karangi River
Group IV	Infrastructure/Settlement-Constrained Charas	Rasulpur Chara; Dhalia Chara; Kibriabad Chara
Group V	Environmentally/Hydrologically Sensitive Charas	Teliapara Tea Garden Chara; Sahapur Chora; Lauya Chara

Source: EQMS Consulting Limited

The classification is not intended to replace site-specific annual design. It is a framework for selecting the most appropriate conceptual cross-section, extraction method and monitoring intensity. Category boundaries may be revised if later surveys identify changed flow conditions, bank instability, new infrastructure risk or ecological sensitivity.

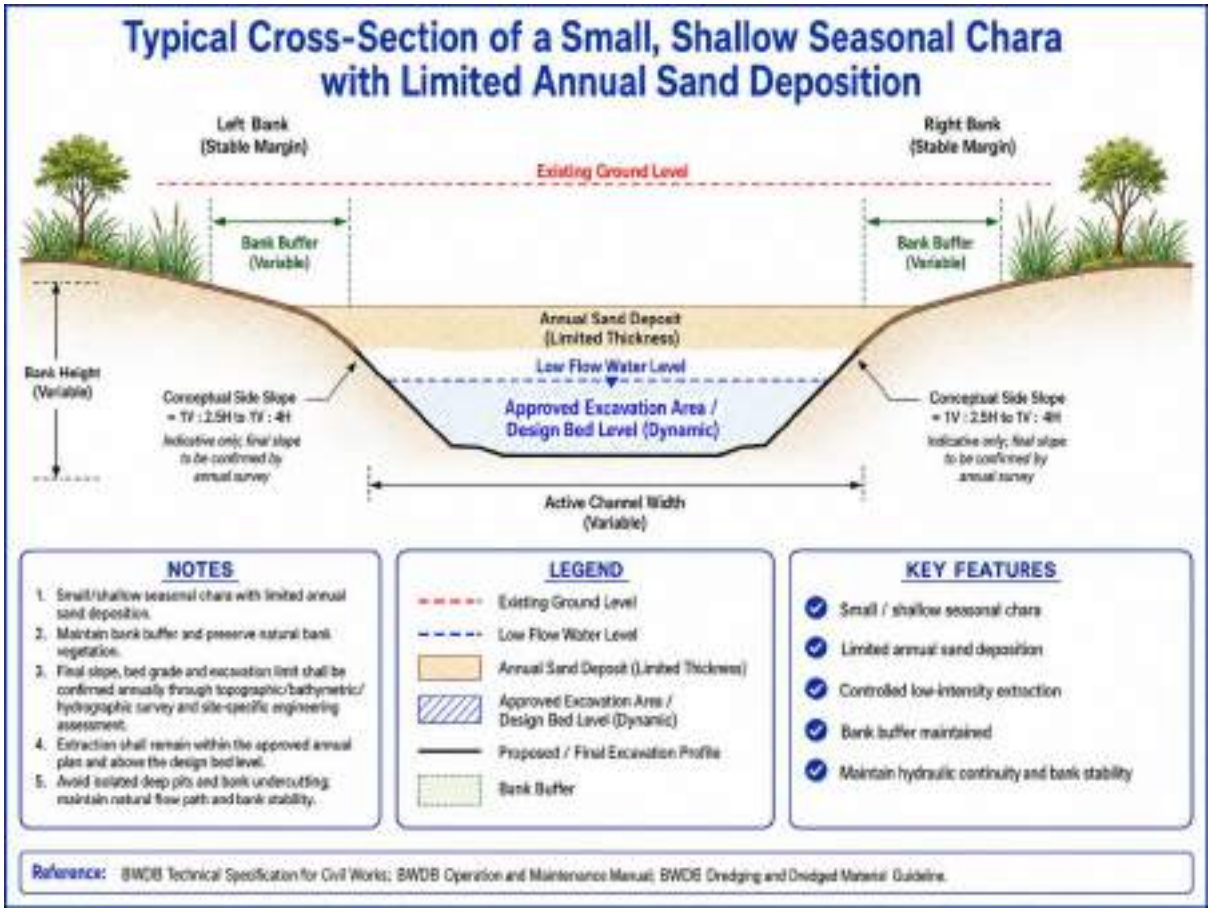
8.5.5.1 Group I - Small/Shallow Seasonal Charas with Limited Sand Deposition

Group I represents narrow or shallow seasonal charas with relatively limited annual accumulation of extractable sand. The primary objective is to remove the current year's deposit without deepening the natural low-flow path or converting the channel into a sequence of artificial pits.

Manual extraction or small equipment should be preferred. Excavation shall remain above the annually approved design bed and shall preserve an unexcavated bank margin. Bank undercutting and vertical faces are prohibited. The extraction surface should follow the natural longitudinal trend of the chara.

For the conceptual figure only, an indicative side-slope screening range of approximately 1V:2H to 1V:3H may be shown for relatively stable, low-velocity conditions. This range is a project-adopted conceptual planning value and is not a universal statutory BWDB slope. The final side slope shall be confirmed by annual survey and site-specific engineering assessment consistent with BWDB requirements for approved design sections and bank stability (BWDB, n.d.; BWDB & JICA, 2017).

Figure 8-1: Conceptual Cross-Section for Group I (Small/Shallow or Limited-Deposit Seasonal Chara)



Source: EQMS Consulting Limited

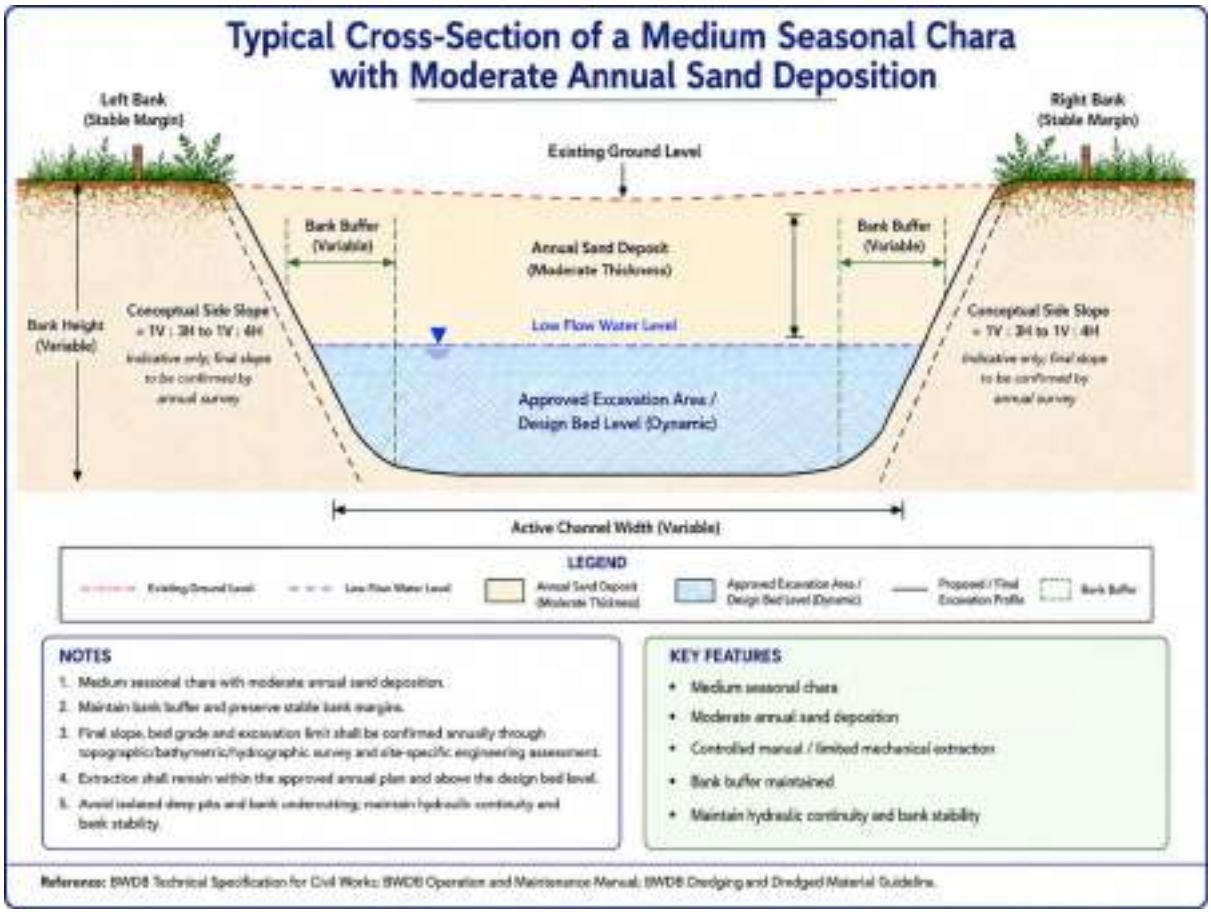
8.5.5.2 Group II - Typical Medium Seasonal Charas with Moderate Sand Deposition

Group II comprises medium-width seasonal charas with moderate annual deposition and generally manageable channel geometry. Controlled manual excavation may be supplemented by appropriately sized mechanical equipment where access, bank condition and environmental constraints permit.

The approved final surface shall be defined from the annual survey and should form a continuous, naturalized or trapezoidal section rather than a series of disconnected pockets. The bed shall tie smoothly into the natural upstream and downstream bed, and an unexcavated buffer shall be maintained along both banks.

For conceptual illustration, a project-adopted indicative side-slope screening range of approximately 1V:3H to 1V:4H may be used. The final slope, bed elevation, bank buffer and excavation depth shall be set annually based on soil condition, saturation, flow, bank stability and working width. The numerical range is conceptual rather than a quoted BWDB standard (BWDB, n.d.; BWDB & JICA, 2017).

Figure 8-2: Conceptual Cross-Section for Group II (Typical Medium Seasonal Chara)



Source: EQMS Consulting Limited

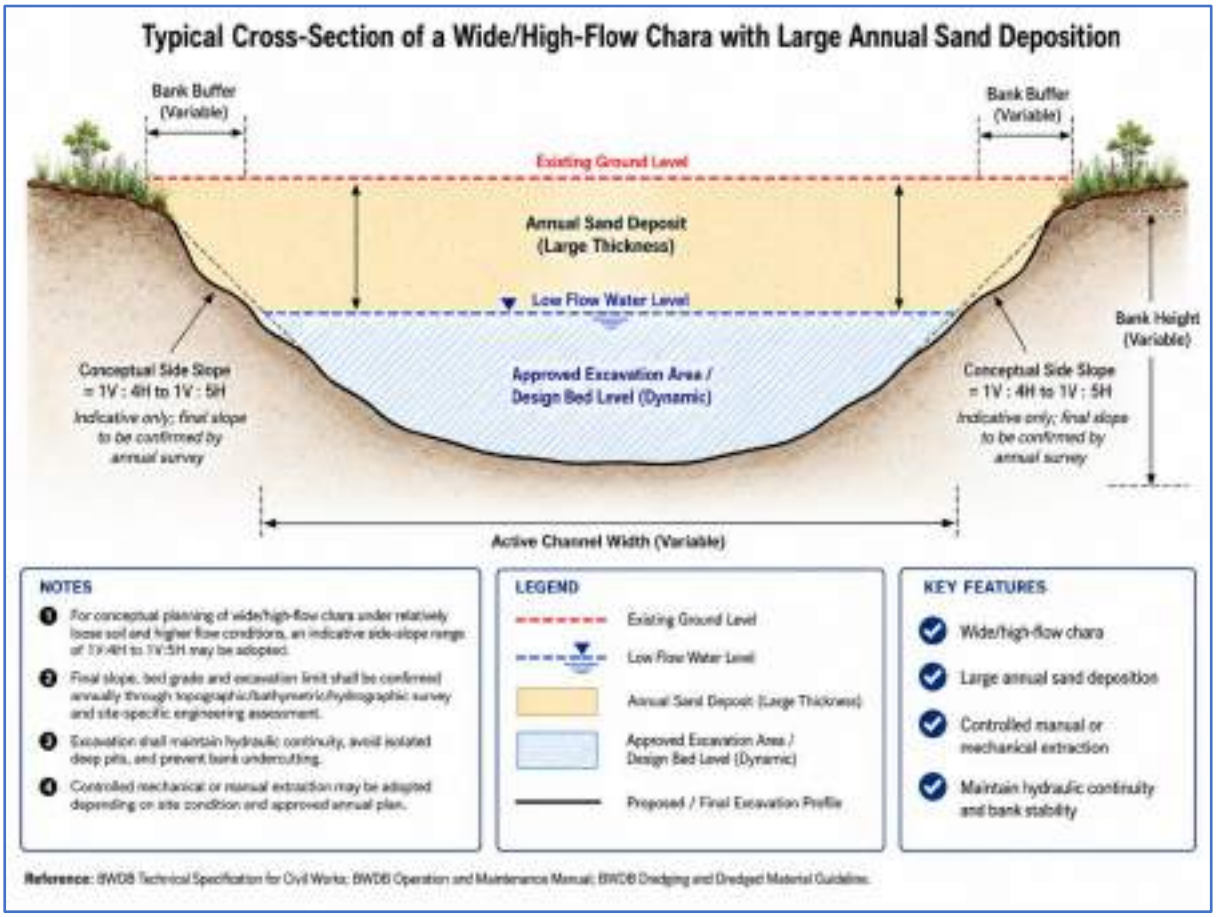
8.5.5.3 Group III - Wide/High-Flow or Large-Deposit Channels

Group III includes relatively wide or hydraulically stronger reaches and sites with large quarry areas or large annual deposits. These reaches require a denser pre-extraction survey covering the active channel, bank lines, existing low-flow path, water levels, sand bars, scour holes, structures and representative cross-sections.

The annual design shall maintain hydraulic conveyance and shall not direct the principal flow toward an eroding bank. Larger equipment may be used only within approved working areas and where access does not destabilize the bank. Existing natural deep pools or scour holes below the approved design surface should generally be preserved rather than deepened.

For conceptual figures, an indicative project screening range of approximately 1V:4H to 1V:5H may be shown where loose sand and higher flows justify a flatter transition. The actual slope shall be determined from site conditions. Larger channel reaches within this group shall require applicable hydrographic and hydraulic controls appropriate to their flow condition (BWDB, 2025; BWDB, n.d.).

Figure 8-3: Conceptual Cross-Section for Group III (Wide/High-Flow or Large-Deposit Chara)



Source: EQMS Consulting Limited

8.5.5.4 Group IV - Infrastructure/Settlement-Constrained Charas

Group IV includes quarry reaches influenced by bridges, culverts, highways, local roads, sluices/regulators, embankments, settlements or other infrastructure. Structural safety is the controlling criterion in this category.

A site-specific no-extraction or restricted-extraction zone shall be established around each sensitive structure. Its extent shall be based on structure type, foundation arrangement, current scour condition, bed level, channel alignment, protective apron/revetment and available engineering information. A single universal setback shall not be assumed for every structure.

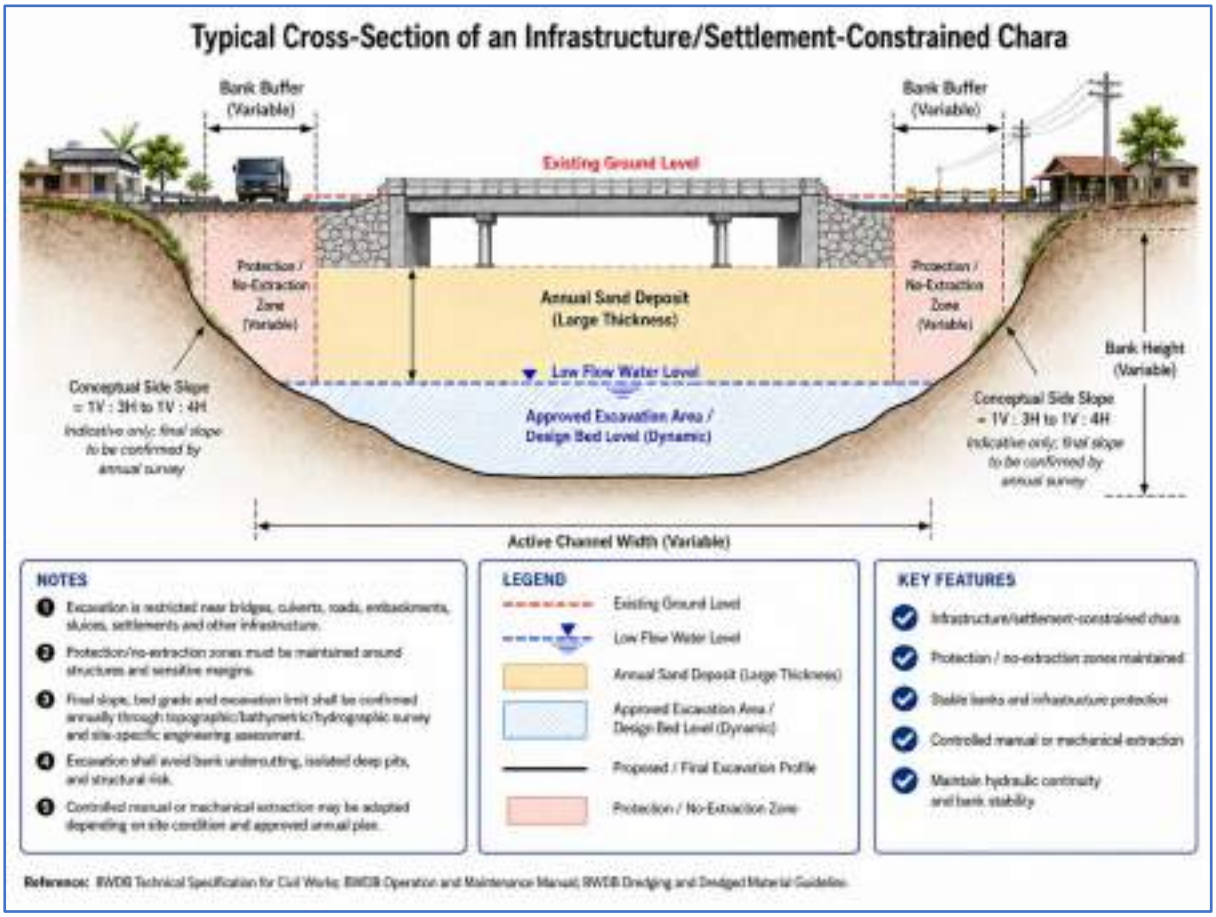
The minimum safety distance from bridges, culverts, sluices, regulators, embankments and other hydraulic structures shall be determined through site-specific engineering assessment considering foundation condition, scour depth, existing protection works, channel alignment, flow velocity and bed-level variation. No universal setback distance shall be applied to all structures. As a preliminary screening measure, extraction shall not normally be allowed immediately adjacent to bridge foundations, culvert inlets/outlets, regulator structures or embankment toes until a structure-specific safety zone is established through engineering assessment. The annual quarry plan shall identify structure-specific restricted or no-extraction zones based on pre-extraction survey, visual inspection and available design information. Where the structure condition or scour risk cannot be confirmed, extraction shall not be permitted within the potentially affected zone until further assessment is completed.

The BWDB O&M Manual identifies bridge piers, concave banks, scour-prone reaches and hydraulic structures as locations requiring particular inspection, while the Technical Specification requires safe separation from banks/protective works and avoidance of damage to existing structures (BWDB & JICA, 2017; BWDB, n.d.). Where the chara is adjacent to a flood-control embankment, the excavation

envelope shall protect the toe and hydraulic safety of the embankment (Government of Bangladesh, 1952; BWDB, 2020).

A conceptual side-slope range of approximately 1V:3H to 1V:4H may be shown outside the structure-protection zone, subject to annual confirmation. Within the protection zone, extraction shall be prohibited or substantially restricted.

Figure 8-4: Conceptual Cross-Section for Group IV (Infrastructure/Settlement-Constrained Chara)



Source: EQMS Consulting Limited

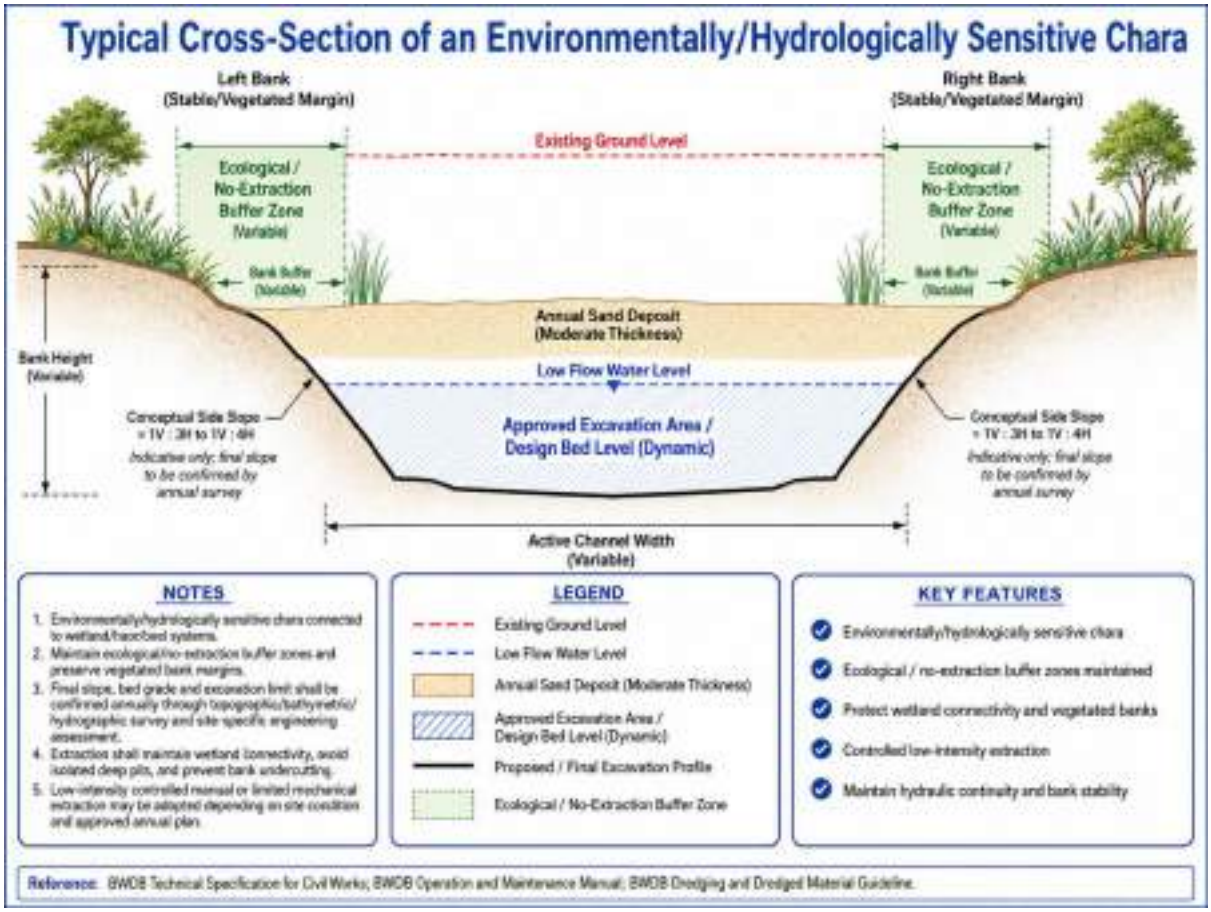
8.5.5.5 Group V - Environmentally/Hydrologically Sensitive Charas

Group V consists of charas with strong wetland/haor/beel connectivity, important aquatic or terrestrial habitat, sensitive vegetated banks, community dependence on chara water or other environmental constraints. The objective is to maintain ecological flow, drainage continuity and the integrity of the vegetated riparian margin.

The annual plan shall identify ecological/no-extraction buffer zones and preserve the natural low-flow route. Extraction shall not create a sump or barrier that interrupts downstream flow or fish movement. Mechanical excavation should be limited where access or operation would damage bank vegetation, aquatic habitat or wetland connectivity. The Balumahal and Soil Management Rules require monitoring of effects on water quality, fish/aquatic organisms and watercourse conditions (Government of Bangladesh, 2011).

For conceptual figures, an indicative project screening range of approximately 1V:3H to 1V:4H may be shown, together with wider ecological buffers. Final dimensions shall remain site specific.

Figure 8-5: Conceptual Cross-Section for Group V (Environmentally/Hydrologically Sensitive Chara)



Source: EQMS Consulting Limited

8.5.6 Methodology for Annual Sand-Volume Assessment and Calculation

8.5.6.1 Survey-Based Principle

The annual extractable sand quantity shall not be calculated by multiplying the total gazetted area by a single assumed excavation depth. Instead, it shall be determined from the three-dimensional difference between the current surveyed sand/bed surface and an approved annual final excavation surface. This approach is consistent with the survey-based management principle of the Balumahal and Soil Management Rules and with BWDB requirements for survey-based dredging/excavation planning and pre-work/post-work measurement (Government of Bangladesh, 2011; BWDB, 2025; BWDB, n.d.).

8.5.6.2 Establishment of Survey Control

Each quarry shall establish a permanent or semi-permanent survey control system before commencement of extraction. A reference monument pillar, Bench Mark (BM) or Temporary Bench Mark (TBM) shall be installed at a stable location outside the active erosion zone. The control point shall be geo-referenced using an approved coordinate system (e.g., WGS84) and vertically tied with an approved datum. The same BM/TBM shall be used during pre-extraction survey, extraction monitoring and post-extraction verification to ensure consistency of annual volume calculation and bed-level comparison.

8.5.6.3 Pre-Extraction Survey

The annual pre-extraction survey should be undertaken after the principal monsoon/replenishment period and before the annual extraction quantity is finalized. Dry or shallow charas may be surveyed by

Total Station, RTK-GNSS or equivalent topographic methods; wet or deeper channels require bathymetric/hydrographic survey; and mixed reaches require a combined surface. Survey density shall be sufficient to capture the actual deposit rather than merely complying with a coarse general O&M interval (BWDB, 2025; BWDB & JICA, 2017).

The survey shall record, at minimum:

- Left and right bank lines and bank-crest reference points.
- Existing bed elevations and water-surface elevations.
- Representative cross-sections and longitudinal profile.
- Current sand-deposit surface and thickness.
- Deep pools, scour zones, eroding banks and abrupt bed changes.
- Low-flow/thalweg alignment where identifiable.
- Bridges, culverts, sluices, embankments and protective works.
- For each identified structure, the survey shall document approximate location, foundation/scour condition, existing protection measures and potential influence zone to support determination of structure-specific extraction restrictions.
- Existing gas transmission pipelines, utility corridors and other underground/above-ground service infrastructure within or near the quarry influence area.
- Schools, religious centres, healthcare facilities and other sensitive community receptors near extraction, storage and transportation routes.
- Environmental and no-extraction zones.

8.5.6.4 Existing Surface and Approved Design Surface

The pre-extraction survey shall be converted into an Existing Pre-Extraction Surface, S_{pre}. A separate Approved Final/Design Surface, S_{design}, shall then be developed from the annual quarry plan. S_{design} shall incorporate the approved final bed grade, side-slope transitions, bank buffers, structure-protection zones, ecological exclusions and preservation of natural deep/scour pools.

8.5.6.5 Volume Calculation

Where cross-sectional calculation is used, the Average End Area method may be applied:

$$V_i = [(A_i + A_{i+1}) / 2] \times L_i$$

where A_i and A_{i+1} are the extractable areas at two successive cross-sections and L_i is the distance between them. The gross extractable volume is the sum of all segment volumes:

$$V_{gross} = \Sigma V_i$$

For GIS/Civil 3D/TIN-based computation, V_{gross} may be calculated as the positive three-dimensional difference between S_{pre} and S_{design}. Sand lying within no-extraction zones, structure-protection areas, unstable banks, natural deep/scour pools or ecological exclusions shall then be deducted:

$$V_{available} = V_{gross} - V_{excluded}$$

8.5.6.6 Annual Replenishment

Where the previous year's post-extraction surface is available, annual natural replenishment may be estimated by comparing that surface with the new pre-extraction surface within the same fixed comparison boundary:

$$V_{replenishment,n} = Volume(S_{pre,n} - S_{post,n-1})$$

This provides a practical basis for determining whether the deposit has genuinely replenished instead of assuming that the same sand quantity will recur annually.

8.5.6.7 Annual Permissible Quantity

The annual permissible extraction quantity shall be the quantity accepted by the competent authority after considering physical availability, measured replenishment, hydraulic/environmental constraints and regulatory approval. For project management, it may be expressed conceptually as:

$$V_{annual} = \min(V_{available}, V_{sustainable/replenished}, V_{approved})$$

This is a project-management expression developed for the EIA and should not be represented as a statutory formula.

8.5.7 Site Preparation

Before commencement of extraction in each annual cycle, the approved quarry boundary and working limits shall be set out against the survey control. Site preparation shall be intentionally limited so that the chara and surrounding land are not unnecessarily disturbed.

Dust management measures shall be incorporated during site preparation and operation planning. Before extraction, nearby dust-sensitive receptors including settlements, schools, religious centres and public roads shall be identified. Appropriate measures such as controlled vehicle speed, covering of transported sand, periodic watering of dry access roads and proper stockpile management shall be implemented to minimize airborne dust generation.

- Demarcate the approved quarry boundary, extraction blocks, bank buffers and no-extraction zones.
- Mark bridges, culverts, sluices, embankments, road crossings, erosion-prone banks and other sensitive receptors.
- Existing gas transmission pipelines, schools, religious centres, healthcare facilities and other community-sensitive locations shall be verified before commencement of extraction and transportation activities.
- Confirm the approved stockpile/loading area and transport access route.
- Use existing access roads and tracks wherever practicable; avoid unnecessary new access through wetlands, agricultural land or unstable banks.
- Preserve existing stable bank vegetation and prohibit unnecessary clearing.
- Install warning signs, access control and safety markers at active work areas.
- Establish machinery operating zones on stable ground; prohibit equipment operation from unstable or undercut banks.
- Locate fuel/lubricant handling and equipment maintenance away from the active watercourse and provide spill-control measures.
- Photographically record the pre-work condition of nearby roads, bridges, banks and structures.

BWDB's Technical Specification requires setting out against approved lines, levels, benchmarks and reference points and requires important operations to be notified for inspection before execution (BWDB, n.d.).

8.5.8 Pit Operation and Sequence of Development

For the purpose of this EIA, 'pit operation' means controlled sequential removal of deposited sand from the approved chara-bed envelope. It does not mean the formation of independent open pits.

Each annual quarry reach shall be divided into manageable extraction blocks (for example, Blocks A, B, C and D) based on length, width, deposit distribution, access and environmental/structural constraints. Unless a site-specific engineering reason dictates otherwise, extraction should progress continuously from the downstream side toward the upstream side, with inspection and level verification between blocks. BWDB's channel-excavation specification similarly favors continuous excavation and discourages piecemeal/discontinuous works (BWDB, n.d.).

- Pre-extraction survey, deposit mapping and setting out.
- Demarcation of bank buffers, structure-protection zones and ecological exclusions.
- Block A extraction within the approved level.
- Intermediate inspection of levels, bank condition, turbidity, access and structures.
- Progressive extraction of subsequent blocks.
- Completion of final trimming/transition to the approved bed profile.
- Post-extraction survey and quantity/compliance verification.

8.5.9 Quarrying / Sand Extraction Method

The extraction method shall be matched to the quarry category and annual site condition. Controlled mechanical excavation may be permitted in medium and wide categories where the approved annual plan demonstrates adequate working width, stable banks and safe access.

Where the operation constitutes actual dredging in a water-filled channel, the applicable dredging provisions of BWDB shall be followed. Uncontrolled suction-type or local methods that create deep holes or undermine banks shall not be permitted. The operator shall work only within the approved extraction envelope and shall continuously check bed levels during mechanical extraction (BWDB, n.d.).

Table 8-4: Quarrying / Sand Extraction Method

Group	Preferred Method	Mechanical Use	Primary Control
I	Manual / small equipment	Normally limited	Avoid deepening; protect narrow banks
II	Manual + controlled excavator	Where stable and accessible	Maintain continuous design bed
III	Controlled mechanical / manual	As approved	Hydraulic conveyance and bank stability
IV	Manual / restricted equipment	Outside protection zones only	Structure/scour safety
V	Low-intensity manual preferred	Restricted	Ecological flow and wetland connectivity

Source: EQMS Consulting Limited

8.5.10 Grade of Pit Floor / Final Chara Bed

The final excavation floor shall be defined by elevation and longitudinal grade rather than by one uniform excavation depth measured downward from the current sand surface. This is necessary because both the existing bed and annual sand thickness vary along a chara.

The annual design shall show the existing longitudinal bed profile, the approved final excavation grade and the upstream/downstream tie-in. Abrupt artificial depressions shall not be created. Where the approved design bed width or level changes, a smooth transition shall be provided. The BWDB Technical Specification identifies a 1:50 transition at changes in design bed width or level for channel excavation; this may be adopted where technically applicable (BWDB, n.d.).

If an existing natural scour hole or deep pool is already below the annual design grade, the area shall normally be excluded from further excavation. This principle is especially important for Groups III and IV, where hydraulic and structural risks are comparatively higher.

8.5.11 Side-Slope Design and Bank Stability

No single side-slope ratio is prescribed for all twenty-three quarries. The appropriate slope depends on bank material, sand gradation, saturation, excavation depth, flow velocity, channel width, existing bank geometry, scour, vegetation, nearby structures and available working space.

The conceptual figures use project-adopted screening ranges to visually distinguish progressively different site conditions: Group I approximately 1V:2H–1V:3H; Group II 1V:3H–1V:4H; Group III 1V:4H–1V:5H; Group IV approximately 1V:3H–1V:4H outside protection zones; and Group V approximately 1V:3H–1V:4H with wider ecological buffers. These ranges are conceptual EIA planning values and shall be confirmed through annual survey and site-specific engineering assessment. (BWDB, n.d.; BWDB & JICA, 2017).

Final annual slopes may be steeper or flatter only when supported by survey and engineering assessment and accepted by the competent authority. Vertical faces and bank undercutting shall not be permitted in unconsolidated sand.

8.5.12 Erosion Prevention and Bank Protection

The principal erosion-control objective is to prevent extraction from accelerating bank retreat, redirecting the low-flow channel toward an erodible bank, enlarging local scour or undermining roads, bridges, embankments or protective works.

- Maintain an unexcavated bank margin/buffer defined by the annual survey.
- Prohibit undercutting of the bank or excavation directly beneath the bank toe.
- Identify and map existing scour holes and eroding bends before extraction.
- Do not deepen an existing scour/deep-pool area without specific engineering justification.
- Preserve stable bank vegetation and avoid unnecessary clearing.
- Keep heavy equipment and stockpiles away from unstable bank crests.
- Suspend extraction where tension cracks, slumping, toe erosion or rapid bank retreat is observed.
- Increase monitoring around bridges, culverts, sluices, embankments, concave bends and other scour-sensitive locations.
- Where necessary, implement approved localized bank restoration/protection after consultation with the responsible authority.

BWDB's O&M Manual identifies bed degradation, local scour and bank erosion as mechanisms that can deform or damage river/channel structures, and recommends condition-based bank-protection measures such as slope protection, gabions or groynes where the stream approaches vulnerable infrastructure (BWDB & JICA, 2017).

8.5.13 Temporary Sand Storage and Loading Area

Extracted silica sand shall be temporarily stored only at predetermined locations outside the active flow path. Storage shall not obstruct drainage, encroach on a wetland/haor/beel, load an unstable bank crest or allow sand to be washed back into the chara.

Temporary stockpile and loading areas shall maintain adequate separation from schools, religious centres, residential areas, healthcare facilities and other sensitive receptors. The required separation distance shall be determined based on site-specific conditions, including prevailing wind direction, traffic movement, noise level, drainage condition and local environmental sensitivity.

- Use stable ground outside the active channel and bank-protection/no-extraction zones.
- Maintain adequate separation from houses, schools, roads and other sensitive receptors.
- Provide safe access and a defined loading zone.
- Use perimeter drainage, silt traps, check bunds or vegetative/silt-fence controls where runoff could carry sand back to the watercourse.
- Do not place stockpiles at the top edge of an unstable cut or eroding bank.
- Remove residual stockpiles and restore the area after completion of the extraction cycle.

These controls are consistent with the Balumahal and Soil Management Rules' requirement to identify storage arrangements and with BWDB technical provisions concerning excavated material and protection of channels and slopes (Government of Bangladesh, 2011; BWDB, n.d.).

8.5.14 Transportation Arrangement

Transportation is an integral part of quarry operation because many charas intersect village roads, highways, bridges and settlements.

The preferred transport chain shall be:

Approved extraction block → designated temporary stockpile/loading point → local access road → Union/Upazila road → regional/national road → end user/market.

Use existing roads and access tracks wherever practicable.

- Confirm that intended bridges and roads are suitable for the proposed vehicle type and load.
- Comply with legal axle/load limits and avoid overloading.
- Cover dry sand where necessary to prevent dust and spillage.

- Control vehicle speed near settlements, schools, markets and narrow roads.
- Do not queue trucks on bridge approaches or block household/agricultural access.
- Remove spilled sand or mud from public roads.
- Suspend haulage where heavy rainfall makes an access road unsafe.
- Report and repair project-attributable road damage in coordination with the responsible road authority.

8.5.15 Dynamic Annual Monitoring and Adaptive Management

Monitoring shall be designed to detect changes quickly enough to modify the operation before unacceptable damage develops. The BWDB O&M Manual is based on repeated observation, cross-sectional survey, sounding, inspection and condition-based maintenance, while the 2025 dredging guideline emphasizes survey and monitoring as part of dredging/excavation planning (BWDB & JICA, 2017; BWDB, 2025).

Table 8-5: Dynamic Annual Monitoring and Adaptive Management

Monitoring Component	Proposed Minimum Requirement
Pre-extraction topographic/bathymetric/hydrographic survey	Once every extraction year before fixing annual quantity
Post-extraction survey	After annual extraction is completed
Bank erosion/scour inspection	Routine during extraction and after significant flash-flood/heavy-rain events
Excavation level/depth verification	Periodic during operation; more frequent for Groups III and IV where hydraulic, infrastructure or channel-scale risks are higher.
Bridge/culvert/sluice/embankment condition	Before extraction and periodically during work at Group IV sites
Water level/flow condition	Routine observation during active extraction; intensified during changing flow
Stockpile and drainage condition	Routine and after significant rainfall
Water quality/ecology	As per EMP and additionally when visible deterioration or ecological effect is observed
Haul-road condition	Routine during transportation
Quantity compliance	Production records plus post-extraction survey verification

Source: EQMS Consulting Limited

Monitoring shall also include verification of nearby infrastructure, utility corridors and community-sensitive receptors where applicable. Any observed deterioration of bridges, culverts, roads, gas pipelines, settlements or other critical facilities shall require immediate review of the approved extraction and transportation plan.

If monitoring identifies bank slumping, rapid erosion, a new scour hole, unexpected depth, structural vulnerability, unacceptable turbidity, loss of ecological connectivity or excavation below the approved level, work in the affected block shall be suspended and the annual plan shall be reviewed.

8.5.16 Post-Extraction Verification

After completion of the annual extraction cycle, a post-extraction survey shall be undertaken using the same datum and, as far as practicable, the same cross-sections/points used for the pre-extraction survey. The survey shall establish final bed elevations, final cross-sections, actual extraction extent, bank condition, new scour or erosion, structural condition and remaining deposit.

$$V_{actual} = Volume(S_{pre} - S_{post})$$

The actual extracted quantity shall be compared with the approved annual quantity. Significant deviation shall be documented and reported. The post-extraction surface shall become a reference for the following year's replenishment calculation. This pre-/post-survey principle is consistent with BWDB's measurement approach for dredging and excavation (BWDB, n.d.).

8.5.17 Record Keeping and Institutional Coordination

A separate annual file/database shall be maintained for each quarry. It should contain survey control, pre-extraction DTM/cross-sections, deposit estimate, approved volume, applicable group and conceptual section, extraction-block plan, structure/ecological exclusions, stockpile and haul route, monitoring records, production records, photographs, complaints/corrective actions and post-extraction survey.

Where a quarry interacts with BWDB infrastructure or schemes, coordination with the relevant BWDB O&M/Design office shall be undertaken. The BWDB 2010 policy provides a committee-based implementation and coordination framework for relevant embankment repair and river/khal re-excavation schemes, while the Balumahal and Soil Management Rules retain the statutory management and monitoring functions of the competent authorities (BWDB, 2010; Government of Bangladesh, 2011).

8.5.18 Consolidated Operational Controls for DoE Compliance

- Conceptual drawings are planning templates only and shall not be treated as permanent dimensions.
- Routine monitoring shall allow excavation depth, block sequence, bank buffer or annual quantity to be reduced or suspended where unacceptable change is observed.
- Pre-extraction and post-extraction survey shall be the principal basis for determining and verifying annual quantity.
- Transportation shall use approved routes and shall not compromise public safety or road/bridge condition.
- Temporary stockpiles shall be kept away from the active flow path, unstable banks and sensitive receptors.
- Hydrological and ecological connectivity with Hail Haor, Baikka Beel, Hakaluki Haor, Toler Beel and other receiving wetlands shall be maintained.
- Bridges, culverts, sluices, embankments, roads and protective works shall be protected by site-specific restricted/no-extraction zones.
- Existing natural deep/scour pools below the approved design surface shall normally be preserved.
- Sites with perennial flow, greater channel depth or complex hydraulic conditions shall receive additional bathymetric/hydrographic assessment and enhanced monitoring where required.
- Final side slopes and bank buffers shall be site specific and annually reviewed.
- The final bed shall follow an annually surveyed and approved longitudinal/cross-sectional profile.
- No isolated deep pits, uncontrolled suction holes or discontinuous excavation shall be created.
- No annual extraction quantity shall automatically be repeated from the previous year.
- No fixed excavation depth shall be applied uniformly to all twenty-three quarry sites.

8.6 Tender Management Plan for Silica Sand Extraction

The Tender Management Plan establishes a systematic procedure for the assessment of extractable silica sand, determination of its estimated market value, tendering and bidder selection, award of lease, demarcation and handover of the quarry, and subsequent monitoring of extraction activities. The process shall be implemented under the coordination of the District Commissioner (DC) Office, Bureau

of Mineral Development (BMD), Geological Survey of Bangladesh (GSB), Upazila Nirbahi Officer (UNO), and other relevant authorities, as applicable.

The tender quantity should be based on the latest field survey because the silica sand deposits are dynamic and may vary annually due to monsoon flows, sediment replenishment, erosion and previous extraction. The Integrated Quarry Development Plan therefore requires annual deposit characterization rather than relying solely on qualitative estimates of sand availability. The Figure 8-6 shows the process flow of the Tender Management Plan.

Figure 8-6: Process Flow of Tender Management Plan



Source: EQMS Consulting Limited

Step 1: Assessment of Sand Quantity and Determination of Estimated Market Value

Prior to initiation of the tender process, a three-member technical committee comprising representatives from the Bureau of Mineral Development (BMD), Geological Survey of Bangladesh (GSB), and District Commissioner (DC) Office shall assess the quantity of silica sand available within the approved quarry area.

The committee shall conduct or review the required topographic, bathymetric and/or hydrographic survey, depending on the physical condition of the quarry. The assessment should identify the quarry boundary, active channel width, sand-deposit thickness, bed elevation, bank condition, structures, ecological exclusion areas and other areas where extraction is restricted. The project plan specifically requires the annual quantity to be based on the difference between the existing surface surveyed and the approved final excavation surface.

For a preliminary estimate where the deposit can reasonably be represented by an approximately uniform geometry, the sand volume may be expressed as:

$$\boxed{V = L \times W \times D}$$

Where:

- V= Estimated volume of silica sand (CFT)
- L= Extractable length of quarry (ft)
- W= Average extractable width (ft)
- D= Average permissible extraction/deposit depth (ft)

Therefore:

$$\boxed{\text{Sand Volume (CFT)} = \text{Length (ft)} \times \text{Width (ft)} \times \text{Average Depth (ft)}}$$

However, for the final tender quantity, a survey-based method should be used rather than applying one uniform depth to the entire gazetted area. For irregular channel geometry, the Average End Area Method may be applied:

$$V_i = \frac{A_i + A_{i+1}}{2} \times L_i$$

and:

$$\boxed{V_{\text{gross}} = \sum V_i}$$

where $A_i$and $A_{i+1}$are the extractable cross-sectional areas (ft²) at successive survey sections and $L_i$is the distance (ft) between them. The Integrated Quarry Development Plan specifically provides this method for calculating quarry volumes.

Any sand located within bank buffers, structure-protection zones, unstable areas, natural scour/deep pools, ecological buffers and other no-extraction areas should be deducted:

$$\boxed{V_{\text{available}} = V_{\text{gross}} - V_{\text{excluded}}}$$

The committee shall then establish the assessed/base market rate of silica sand, based on the applicable government procedure and prevailing market conditions. Where the assessed rate is, for example, Tk 20/CFT, the estimated market value shall be:

$$\boxed{MV = V_{\text{approved}} \times P}$$

Where:

- MV= Estimated market value (Tk)
- V_{approved}= Approved quantity of extractable sand (CFT)
- P= Assessed market price (Tk/CFT)

For example, if the approved extractable volume is 500,000 CFT and the assessed market price is Tk 20/CFT:

$$MV = 500{,}000 \times 20 = \boxed{\text{Tk } 10{,}000{,}000}$$

or **Tk 1 crore**.

For a two-year lease period, the total estimated value should be based on the approved quantities applicable to the respective extraction years:

$$MV_{2yr} = (V_1 \times P_1) + (V_2 \times P_2)$$

The second year's quantity should preferably be confirmed through a new/replenishment survey rather than automatically assuming that the first year's quantity will recur, because the project plan recognizes annual replenishment and morphological change.

The committee's assessment shall provide the technical and financial basis for establishing the tender quantity and estimated/base value.

Step 2: Preparation and Publication of Tender

Following approval of the assessed quantity and estimated value, the DC Office shall prepare and issue the tender notice and tender documents for leasing the identified silica sand quarry.

The tender documents should clearly specify the quarry location and boundary, approved quantity, lease period, eligibility requirements, tender security, payment requirements, environmental obligations, extraction restrictions, stockpile requirements, transportation arrangements, reporting requirements, monitoring provisions, penalties and conditions for suspension/cancellation.

The tender notice shall be published through the prescribed channels, including newspapers and the DC Office, to ensure adequate competition and transparency. The DC Office as the principal authority for publishing tender documents following BMD approval.

Step 3: Submission of Bids by Eligible Bidders

Interested bidders shall obtain the tender documents and submit their bids within the specified deadline. Each bidder shall provide all administrative, legal, financial and technical documents required by the tender conditions. The bidder should also demonstrate its capacity to undertake controlled sand extraction, transportation, environmental management, occupational health and safety, waste management and compliance with the approved quarry management requirements. Environmental management requirements should form part of the bidding obligations.

Step 4: Formation of Tender Evaluation Committee and Evaluation of Bids

An 11-member Tender Evaluation Committee shall be constituted by the competent authority/within the DC Office in accordance with the applicable administrative procedure.

The committee shall evaluate all submitted bids against the requirements and evaluation criteria specified in the tender documents. Evaluation should include verification of eligibility, completeness of documentation, tender security, financial offer, technical capability, past experience and compliance with the conditions of the tender. Only bids meeting the mandatory requirements shall be considered responsive and eligible for final financial comparison.

Step 5: Selection of the Successful Bidder

Following completion of the evaluation, the highest evaluated responsive bidder, subject to the applicable tender/lease procedure, shall be recommended for award.

The highest financial offer alone shall not be sufficient where the bidder fails to satisfy mandatory legal, financial, technical, environmental or other tender requirements.

Accordingly, the successful bidder shall be the bidder that:

Meets all mandatory requirements + submits the highest acceptable evaluated offer

The competent authority shall issue the Notification of Award/lease approval following completion of the required approval process.

Step 6: Execution of Lease Agreement

After completion of the required payments, securities and other formalities, the competent authority shall execute a lease agreement with the successful bidder for the approved lease period, proposed as two years.

The lease agreement shall specify, among others, the approved quarry boundary, permissible extraction quantity, extraction method and depth, lease payment, extraction period, environmental and social obligations, approved stockpile areas, transportation routes, monitoring arrangements, reporting requirements, prohibited activities, penalties, suspension provisions and termination conditions.

Where the lease extends for two years, the permissible extraction quantity for each extraction cycle should remain subject to annual survey and approval, rather than providing unrestricted extraction of the entire estimated two-year quantity.

Step 7: Demarcation and Handover of the Quarry

Before commencement of extraction, representatives of the UNO, BMD and DC Office shall jointly inspect and physically demarcate the approved quarry area.

The approved quarry boundary, extraction blocks, bank buffers, restricted areas and no-extraction zones shall be clearly marked in the field using flags, pegs, pillars, GPS coordinates and/or other suitable markers. This is consistent with the Integrated Quarry Development Plan, which requires demarcation of the approved quarry boundary, extraction blocks, bank buffers and no-extraction zones before extraction.

Following joint verification, the demarcated quarry shall be formally handed over to the successful bidder through a site handover record, including maps, coordinates, approved quantity and applicable extraction conditions.

Step 8: Approval of Stockpile Locations and Transportation Routes

The UNO, BMD and DC Office, in coordination with relevant authorities where necessary, shall identify and approve designated locations for temporary stockpiling, loading and transportation of extracted silica sand.

Stockpile locations shall be established on stable ground outside the active flow path and should not obstruct drainage, affect unstable banks, encroach upon wetlands or create unacceptable impacts on nearby settlements and sensitive receptors.

The approved transportation sequence should generally follow:

("Extraction Area" →"Approved Stockpile/Loading Area" →"Local Access Road" →"Union/Upazila Road" →"Regional/National Road" →"Market")

This transportation hierarchy is also identified in the Integrated Quarry Development Plan.

The successful bidder shall comply with the approved Stockpile Location and Transportation Road Management Plan, including vehicle movement, road safety, load control, dust suppression and protection of local infrastructure.

Step 9: Monitoring, Compliance Enforcement and Lease Control

Throughout the extraction and lease period, the UNO, BMD and DC Office shall regularly monitor the activities of the successful bidder to ensure compliance with the lease agreement, approved extraction quantity, quarry boundary, environmental requirements and applicable laws.

Monitoring should cover, as applicable, actual quantity extracted, excavation depth and bed level, quarry boundary, bank stability, buffer/no-extraction zones, stockpile locations, transportation routes, dust, noise, water quality, waste management, occupational and community safety, and impacts on nearby structures and ecological receptors.

The project framework specifically requires supervision of extraction, control of storage and monitoring of effects on the watercourse, fisheries, water quality and nearby structures.

Where monitoring identifies over-extraction, extraction outside the approved boundary, excessive excavation depth, unauthorized stockpiling, use of unauthorized transportation routes, environmental damage, non-payment, or any other violation of the lease agreement or applicable law, the competent authority may issue corrective instructions, temporarily suspend extraction, withhold/suspend the lease, impose applicable penalties or initiate cancellation/termination proceedings in accordance with the lease conditions and applicable legal requirements.

8.7 Stockpile Locations, Transportation System and Routes Management Plan

8.7.1 Introduction

A Stockpile Locations, Transportation System and Routes Management Plan shall be prepared and implemented for each silica sand quarry to ensure that extracted sand is temporarily stored and transported in a controlled manner without causing unnecessary disturbance to agricultural land, river/canal banks, drainage systems, local roads, settlements or other sensitive receptors.

Both river networks and local road networks as possible transportation options. The appropriate system depends on the location and accessibility of each quarry. The study gives preference to river transport where navigation conditions permit because it can accommodate relatively large quantities with comparatively lower environmental impacts; where waterways are unsuitable, the existing local road network may be used.

The UNO, BMD and DC Office, in coordination with other relevant authorities where necessary, shall identify, approve, demarcate and monitor the stockpile locations and transportation routes before commencement of extraction. The successful bidder/leaseholder shall strictly follow the approved arrangements and shall not establish an unauthorized stockpile or transportation route.

8.7.2 Stockpile Location Management Plan

8.7.2.1 Selection and Approval of Stockpile Locations

Before commencement of sand extraction, the **UNO, BMD and DC Office** shall jointly inspect the quarry and surrounding area and identify suitable locations for temporary stockpiling and loading of extracted silica sand.

The gazetted government land associated with the quarry may be used for primary stockpiling, thereby avoiding additional land requirements for stockpiles. Accordingly, stockpiles should, as far as practicable, be located within approved/gazetted government land and designated areas, rather than on agricultural or privately used land.

The following criteria shall be applied in selecting stockpile locations:

- Stockpiles shall be located only within predetermined and officially approved locations.
- Agricultural land shall not be used for stockpiling.
- Stockpiles shall not be established within the active river/chara/canal flow path.
- Riverbanks, canal banks, unstable bank crests and erosion-prone locations shall not be used for stockpiling.
- Stockpiles shall not obstruct existing natural drainage or water movement.
- Wetlands, haors, beels and other environmentally sensitive areas shall be avoided.
- Adequate separation shall be maintained from houses, schools, religious institutions, healthcare facilities and other sensitive receptors.

- The location shall provide safe access for the transportation system approved for the particular quarry.
- Stockpiles shall not be placed where their weight could destabilize a river/canal bank or other slope.
- Locations susceptible to flooding, erosion or uncontrolled washout of sand shall be avoided.

These provisions are consistent with the Integrated Quarry Development Plan, which requires temporary stockpiles to remain outside the active flow path, wetlands and unstable bank areas and requires consideration of nearby sensitive receptors.

8.7.2.2 Demarcation of Approved Stockpile Areas

Following selection and approval, each stockpile area shall be physically demarcated before being handed over to the bidder.

The UNO, BMD and DC Office shall, as appropriate:

- Record the geographic coordinates/GPS position of the approved stockpile area;
- Prepare or maintain a location map showing the stockpile area relative to the quarry and access route;
- Mark the outer boundary using flags, pegs, pillars or other clearly visible markers;
- Identify the approved loading/unloading point;
- Identify access and exit points; and
- Photographically document the condition of the area before use.

The bidder shall be informed that the demarcated boundary constitutes the maximum approved stockpile area, and temporary or permanent storage outside this boundary shall not be permitted without prior approval.

8.7.2.3 Stockpile Operation and Environmental Controls

The bidder shall manage the approved stockpile area so that sand storage and loading do not cause erosion, drainage obstruction, dust, traffic hazards or disturbance to surrounding communities. Where runoff from the stockpile could transport sand or sediment toward a watercourse, appropriate controls such as perimeter drainage, silt traps, check bunds or suitable sediment barriers shall be provided. Residual sand shall be removed and the temporary storage area restored following completion of the extraction cycle.

Stockpile height, extent and loading activities shall remain within the approved area. Sand shall not be pushed toward river/canal banks or deposited in adjacent agricultural land.

8.7.2.4 Monitoring of Stockpile Locations

The UNO, BMD and DC Office shall periodically inspect the stockpile locations to verify that the bidder is operating only within the approved area.

Monitoring should include:

- Compliance with the approved stockpile boundary;
- Condition of flags/pillars/boundary markers;
- Encroachment onto agricultural or other unauthorized land;
- Drainage obstruction and waterlogging;
- Erosion and sediment runoff;

- Stability of nearby river/canal banks;
- Dust and sand dispersion;
- Condition of loading areas and access points; and
- Housekeeping and removal of residual sand.

The Integrated Quarry Development Plan specifically recommends routine monitoring of stockpile and drainage conditions, including additional checks after significant rainfall. Any unauthorized stockpiling shall require immediate corrective action in accordance with the lease conditions.

8.7.3 Transportation System and Routes Management Plan

8.7.3.1 Identification and Approval of Transportation Routes

Before transportation begins, the UNO, BMD and DC Office, in consultation with the relevant road, local government and other authorities where necessary, shall identify the appropriate transportation system and approved route for each quarry.

The route selection shall consider:

- Existing road type and width;
- Pavement/earthen road condition;
- Road carrying capacity;
- Bridges and culverts;
- Nearby settlements, schools and markets;
- Agricultural land;
- River/canal navigation;
- Vehicle type and expected load;
- Potential road damage;
- Community safety; and
- Seasonal accessibility.

The Integrated Quarry Development Plan requires confirmation of the approved stockpile/loading area and transport access route before operation and recommends using existing access roads wherever practicable while avoiding unnecessary new access through wetlands, agricultural land and unstable banks.

8.7.3.2 Transportation Hierarchy

The transportation chain shall generally follow:

Approved Extraction Area → Designated Stockpile/Loading Area → Approved Local Access Route → Union/Upazila Road or Waterway → Regional/National Road → Market/End User

The Integrated Quarry Development Plan similarly identifies the preferred road-based transport chain from the approved extraction block through the designated stockpile/loading point and local access road to Union/Upazila and regional/national roads.

No bidder shall independently create or use an alternative transportation route without approval from the authority responsible.

8.7.3.3 Selection of Transportation System

Because access conditions differ among the 23 quarries, one type of vehicle should not be applied to all locations. Many quarries are accessible by waterways, while others are accessible through earthen and paved roads.

8.7.3.3.1.1 Waterway Transportation

Where a navigable river/canal route is available and environmentally acceptable, waterway transportation should be preferred. Suitable boats/trollers may be used to transport sand from the quarry or stockpile/loading location to an appropriate transfer point. The river network as preferable where applicable because it can transport comparatively large quantities and has lower environmental impacts than road transportation.

Waterway transportation shall not obstruct normal navigation, damage river/canal banks or result in uncontrolled discharge or spillage of sand into the watercourse.

8.7.3.3.1.2 Earthen and Narrow Local Roads

Many local access roads around the quarries may be earthen, narrow and unsuitable for heavy vehicle movement. Where the approved route comprises an earthen or narrow local road, transportation shall therefore be undertaken using light/manual transportation appropriate to the road condition, including human-driven carts/vans or other suitable low-impact means approved for the route.

Heavy trucks shall not be permitted on an earthen/narrow access road where the responsible authority determines that the road width, pavement condition, bridge/culvert capacity or community safety is inadequate for such vehicles.

This restriction is an additional project-management control; the study team identifies road damage from truck movement, impacts on agricultural land, accident risk and local traffic congestion as disadvantages of road transportation.

8.7.3.4 Paved and Higher-Capacity Roads

Trucks or other suitable motorized vehicles may be used after the sand reaches an approved paved/local, regional or national road capable of accommodating the proposed vehicle and load.

The EIA's typical transportation system illustrates trollers, tractor-driven vans and trucks, with trucks used for onward transportation to market/national-level destinations.

The suitability of bridges, culverts and roads for the proposed vehicle type and load shall be verified before heavy-vehicle transportation is permitted.

8.7.3.5 Transportation and Traffic Control Measures

The bidder shall comply with the following requirements throughout the transportation period:

- Use only the transportation routes designated/approved by the authorities.
- Use existing government/public roads wherever practicable.
- No new transportation route shall be created through agricultural land.
- Heavy vehicles shall not use narrow or weak earthen roads unless specifically assessed and approved as suitable.
- Vehicle type shall be selected according to road width, road condition, bridge/culvert capacity and permissible load.
- Vehicles shall not be overloaded and shall comply with applicable axle/load restrictions.
- Sand transported on public roads shall be properly covered with an impervious sheet to prevent dust and spillage.

- Vehicle speed shall be controlled, particularly near settlements, schools, markets and narrow roads.
- Heavy vehicle movement should avoid peak traffic periods wherever practicable.
- Trucks shall not queue on bridge approaches or block household/agricultural access.
- Any spilled sand or mud shall be promptly removed from public roads.
- Transportation shall be temporarily suspended where heavy rainfall makes an access road unsafe.
- Any project-attributable damage to roads shall be reported and repaired/restored in coordination with the responsible road authority.

The study team specifically requires use of existing roads as far as possible, avoidance of peak hours, covering transported sand, prevention of overloading, enforcement of speed limits and compliance with traffic rules. It also specifies a 15 km/h limit for haul trucks as an air-quality mitigation measure.

8.7.3.6 Route Demarcation and Documentation

For each quarry, the approved transportation arrangement should be documented before extraction begins. The UNO, BMD and DC Office should identify the route on a map and, where necessary, install signs/markers at critical locations.

The route record should identify the quarry, stockpile/loading location, road/waterway sections, road type, permitted transportation mode, bridge/culvert crossings, sensitive receptors, transfer points and connection to the regional/national road network.

The bidder shall receive the approved route as part of the quarry handover/operational instructions and shall not deviate from it without written authorization.

8.7.3.7 Monitoring and Corrective Actions

The **UNO, BMD and DC Office** shall regularly monitor stockpiles and transportation activities throughout the extraction period. The contractor/bidder shall also undertake routine operational monitoring. The monitoring of contractor EHS activities to the DC Office and BMD.

Particular attention shall be given to unauthorized stockpiling, unauthorized routes, use of agricultural land, operation of heavy vehicles on unsuitable earthen roads, overloading, road deterioration, dust, sand spillage, traffic congestion, community safety and damage to bridges/culverts.

Haul-road conditions should be monitored routinely during transportation. Where deterioration of roads, bridges, culverts or other infrastructure is identified, the transportation arrangement shall be reviewed and appropriate corrective action taken.

Where a bidder repeatedly violates the approved stockpile or transportation arrangement, the responsible authorities may suspend the relevant activity and take action in accordance with the tender/lease conditions.

Recommended Transportation Principle for the Project

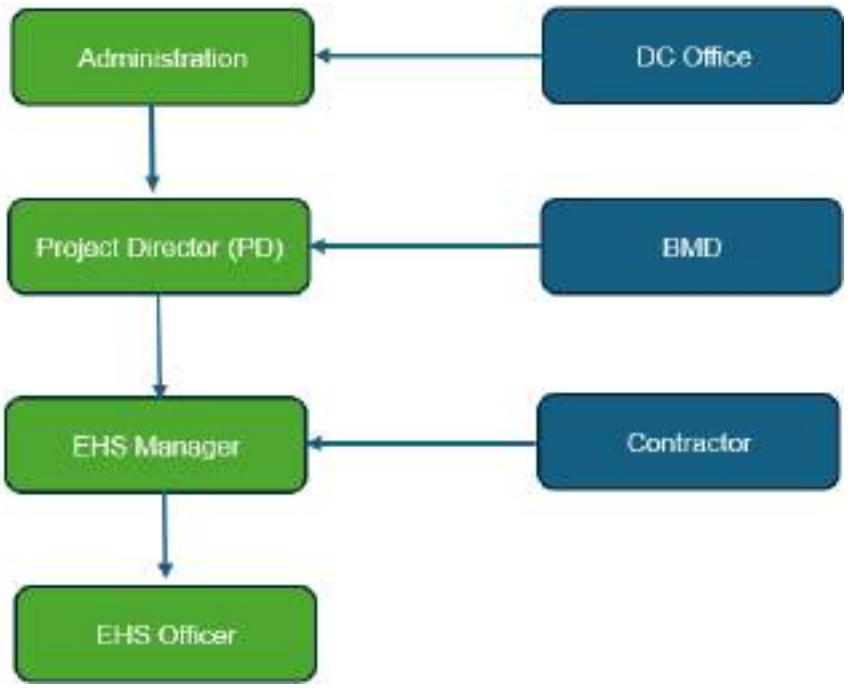
Quarry → Approved Stockpile → Waterway (preferred where navigable) OR approved light transport on narrow/earthen access road → Suitable paved road/transfer point → Truck transportation on suitable road → Market/End User

This approach is consistent with the EIA's preference for waterways where practicable while recognizing that both river and local road networks will be required across the 23 quarry locations.

8.8 Institutional Setting and Implementation Arrangement

The effective implementation and operation of the EMP depends on the regular monitoring of environmental and social components in the proposed project area. During the sand extraction of the project, the Environment, Health, and Safety manager of the contractor will be responsible for the implementation of the EMP, and the project developer's staff, specifically the EHS officer, will supervise the implementation of these mitigation measures by the contractors at the site. The flow diagram showing the institutional arrangement for the implementation of the EMP during the construction and operation period is presented in Figure 8-7.

Figure 8-7: Organogram of the EMP Implementation



Source: BMD, 2025

CHAPTER 9

Consultation with Stakeholders

9 CONSULTATION WITH STAKEHOLDERS

This chapter presents all the stakeholders identified and consulted and elaborates on the key issues and concerns raised by these stakeholders during the EIA study. Views from the general public, local political leaders, surrounding institutions, communities, and development partners who are interested in and/or would be potentially affected by the proposed project were consulted through interviews and public consultation meetings. The stakeholder consultations were held to ensure that interested and affected parties were informed of the project. The consultations allowed stakeholders to present their views concerning the proposed project. Recording stakeholders' views and preferences was essential to inform the identification of impacts and drawing up effective mitigation measures that are presented in this report.

9.1 Scope and Specific Objectives

Stakeholders are defined as "persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively"[9].

The broad objective of the stakeholder engagement and involvement process is to provide authorities, as well as interested and affected stakeholders with the opportunity to identify issues, concerns, and opportunities regarding the proposed project and to address key stakeholder concerns during the preparation of the EIA for the project. Specific objectives for stakeholder consultations are as follows:

- To address relevant issues including those perceived as being important by other sectoral agencies, public bodies, local communities, affected groups, and others.
- To improve information flows between proponents and different stakeholders, improving understanding of a project.
- To identify important environmental and social characteristics or mitigation opportunities.
- To ensure that the magnitude and significance of impacts have been assessed properly.
- Improves the acceptability and quality of the mitigation and monitoring process.

9.2 Identification of Stakeholders

Stakeholder identification is one of the most important processes throughout the project life cycle and documenting relevant information regarding their interests in the project, independencies, influence, and potential impact on the project. Stakeholders vary in terms of the degree of interest, influence, and control they have over the project. While those stakeholders who have a direct impact on or are directly impacted by the project are known as Primary Stakeholders, those who have an indirect impact or are indirectly impacted are known as Secondary Stakeholders. Identification of stakeholders was carried out by EQMS in discussion with authority. Keeping in mind the nature of the project and its setting, the stakeholders have been identified and listed in Table 9-1.

Table 9-1: Identification of stakeholders

S/N	Stakeholder Group/Category	Key Stakeholders	Description of the Stakeholder Profile
Primary Stakeholders			
1	Project Affected Persons (PAPs)	• Impacted stream Users.	• Stream user who used to stream for his livelihood

[9] IFC. (2007). *Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets*. International Finance Corporation.

S/N	Stakeholder Group/Category	Key Stakeholders	Description of the Stakeholder Profile
2	Institutional Stakeholders	• Regulatory Authorities • Local Administration-Union Parishad	• This stakeholder group comprises regulatory authorities at the district and national levels that are responsible for various permits and licenses pertaining to the project.
Secondary Stakeholders			
5	Local Community	• Local (Hindu, Fishing, Ethnic) community residing near the stream location.	• This stakeholder group comprises the community residing near the vicinity of the sand quarries area. • This group is expecting to be indirectly impacted by the sand-sourcing activities but may be indirectly impacted.
6	Institutional Stakeholders	• Department of Agriculture • Department of Fisheries • Forest Department	• This stakeholder group comprises experts in different sectors to provide inputs and information which are crucial for designing and project implementation.

9.3 Stakeholder Mapping

Stakeholder Mapping is a process of sourcing the relative influence that different individuals and groups have over a project as well as the influence of the project over them. The purpose of a stakeholder mapping is to:

- Study the profile of the stakeholders identified and the nature of the stakes.
- Understand each group's specific issues, concerns as well as expectations from the project that each group retains.
- Gauge their influence on the project.

Based on this understanding, the stakeholders are categorized into High Influence/ Priority, Medium Influence/Priority, and Low Influence/Priority. The stakeholders who are categorized as a high influence are those who have a high influence over the project or are likely to be heavily impacted by the project activities and are thus high up on the project proponent's priority list for engagement and consultation.

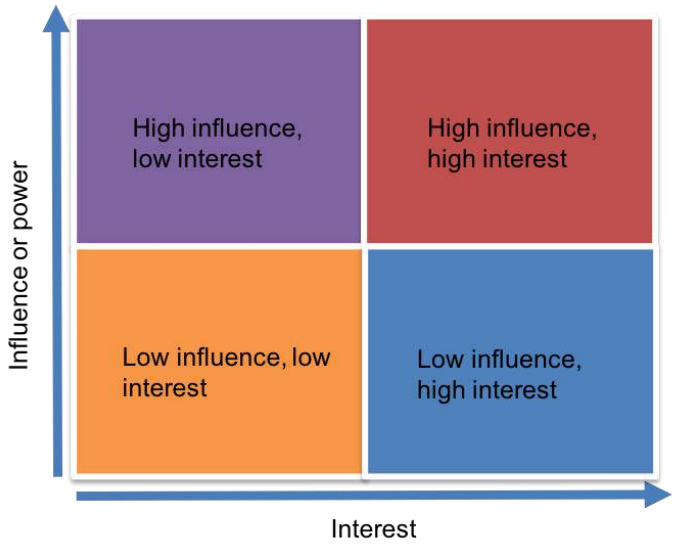
Similarly, the stakeholders categorized as medium influence are those who have a moderate influence over the project, or even though they are to be impacted by the project, it is unlikely to be substantial and these stakeholders are thus neither high nor low in the project proponent's list for engagement. On the other hand, the stakeholders with low influences are those who have a minimal influence on the decision-making process or are to be minimally impacted by the project and are thus low in the project proponent's engagement list.

9.4 Approach and Methodology for Stakeholder Mapping and Analysis

The approach adopted for mapping and analyzing involves mapping the key stakeholders (directly and indirectly) and assessing their significance, influence, and impact on the project. The methodology adopted is described below:

The significance of a stakeholder group is categorized considering the magnitude of impact (type, extent, duration, scale, frequency) or degree of influence (power, proximity) of a stakeholder group and urgency/likelihood of the impact/influence associated with the particular stakeholder group in the project context. The magnitude of stakeholder impact/influence is assessed by taking the power/responsibility of the stakeholder group and is categorized as negligible, small, medium, and large. The Urgency or likelihood of the impact on/influence by the stakeholder is assessed on a scale of low, medium, and high. The overall significance of the stakeholder group is assessed as per the matrix provided in Figure 9-1.

Figure 9-1: Stakeholder Mapping Matrix



The following section provides brief profiles of the various stakeholders in the project as discussed in the previous sub section along with their degree of influence. The details are provided Table 9-2.

Table 9-2: List of identified key project stakeholders

Stakeholders	Category of Stakeholder	Brief Profile	Impact[10]	Influence[11]	Basis of Influence Rating
Project Management					
Bureau of Mineral Development (BMD)	Primary	• Bureau of Mineral Development is the primary project proponent and owns a controlling stake of 100% in the project.	High	High	- The primary project proponents. - Responsible for all the project-related risks and impact liabilities. - Primary financial beneficiaries. - Responsible for the entire project-related risks and impact liabilities.
Bangladesh Water Development Board BWDB	Primary	• Bangladesh Water Development Board (BWDB) is responsible for managing water resources, flood control, irrigation, and drainage systems.	Medium	Low	- Ensuring sustainable use of water resources - Overseeing the project's impact on water infrastructure
District Commissioner (DC)	Primary	• District commissioner (DC) is responsible for the administration and revenue of a district.	High	High	- Responsible for monitoring the project - Managing Tender activities throughout the project lifecycle.
Community					
Local Community	Primary	• Primarily includes the adjacent local (Hindu, Ethnic) community to the project site.	High	Low	- The project will bring development to the area. - Improvement in infrastructure in the area.

[10] How much does the project impact them? (Low, Medium, High).

[11] How much influence do they have over the project? (Low, Medium, High)

Stakeholders	Category of Stakeholder	Brief Profile	Impact[10]	Influence[11]	Basis of Influence Rating
					- Increase of employment opportunities and preference for the job. - Business or economic conditions, access to health facilities, and education will be improved.
Fisherman	Primary	• Fishermen in the area are primarily engaged in small-scale fishing in the stream.	Low	Low	- No major impact on overfishing and the cycle. - Low scale for self-consumption and selling.
Farmer	Primary	• Farmers in the area are primarily engaged in small-scale fishing in the stream.	Low	Low	- No major impact on agricultural land.
Local workers and laborers	Primary	• Laborers and workers were recruited from the area of influence mostly during the sand sourcing of the stream.	High	Medium	- Responsible for undertaking mostly unskilled and semiskilled-based work during the sand sourcing of the stream.
Tea Workers	Primary	• Tea workers are involved in tea harvesting besides sand sources in the tea estates.	High	Medium	- If sand sourcing begins, the tea workers daily work may be disrupted.
Regulatory/Administrative Authorities and Agencies					
Department of Environment (DOE), Bangladesh	Primary	• The Department of Environment (DOE) is the primary government regulatory authority for	Low	High	- Government Regulatory agency to provide Environmental Clearance (EC) to the project based on the evaluation and approval of the Environmental Impact Assessment (EIA) study.

Stakeholders	Category of Stakeholder	Brief Profile	Impact[10]	Influence[11]	Basis of Influence Rating
		environmental protection in Bangladesh.			- Responsible for monitoring the project's Environmental compliance throughout the project lifecycle. - High influence and high interest.
Department of Agriculture	Secondary	• Department of Agriculture is responsible for agricultural development.	Low	Low	- No major influence on project-related activities. - Influence can be increased if the project authority engages with the dept. for any purpose.
Department of Forestry	Secondary	• The Department of Forestry is responsible for the conservation, management, and sustainable use of forests and biodiversity.	Low	Medium	- No major influence on project-related activities. - Influence can be increased if the project authority engages with the dept. for any purpose.
Department of Fisheries	Secondary	• DOF is responsible for fisheries development, conservation, and maintenance of the fish sanctuary.	Low	Low	- No major influence on project-related activities. - Influence can be increased if the project proponent engages directly with the implementation of the proposed project.
Other Regulatory and Permitting Authorities	Primary	-	Low	Medium	- Primary involvement during the pre-construction, construction, and operation phases.

9.5 Information Disclosure, Consultation, and Participation

A number of consultation exercises were conducted during this phase of EIA preparation. The stakeholders consulted include local people, the community in the vicinity of the project area, local elected representatives, and other external stakeholders such as government officials. The details of consultations held with issues raised or discussed and suggestions provided by the respective stakeholders are well noted and incorporated in the EIA report.

A combination of mixed methods of information disclosure and consultation process was adopted at this stage. The method selected for consultation was basically designed keeping in mind the profile of the stakeholders, the type of information desired, and the level of engagement required. In each consultation session, the consultants introduced themselves and introduced the project and the purpose of engagement with the respective stakeholders.

The methods used in the consultation process were:

- Individual or Key Informant Interview (KII)
- Focus Group Discussion (FGDs)

The consultation and information disclosure were held in a free and fair environment giving prior information about the same to the stakeholders. On all occasions, the date, time, and venue of the consultation were decided by the stakeholders keeping in view their prior engagement and availability.

9.5.1 Communication Methods

Stakeholder engagement becomes a successful exercise when proper and participatory communicative methods are used. This ensures that the stakeholders are kept engaged and well-informed of the project's development at every stage. A combination of communicative methods is usually used to engage with the stakeholders. To determine which option is best suited to the various stakeholders, a benefits analysis of each option has been carried out. The communicative methods are:

- General Information consisting of the project’s various activities, the operation stage, and impacts that might arise shall be made available for stakeholders.
- In addition to this, a host of tools and techniques also be adapted to engage with the stakeholders in a transparent and accountable manner.

Below a list of the tools and techniques adopted are mentioned:

9.5.1.1 Individual and Key Informant Interview (KII)

Individual and KII techniques have been used to disclose the information regarding this project during the EIA study. During EIA preparation, seven (7) KII have been conducted with the relevant authorities.

9.5.1.2 Focus Group Discussion (FGDs)

FGDs are important when gauging with a group of stakeholders on issues related to the project activities. FGD has been used to understand the needs, perceptions, and concerns of the group. The discussion also gave space for the members to voice their concerns and suggestions. During the EIA study, FGD with various groups of affected people was conducted.

Table 9-3: Details of KII held for the project.

SL#	Name	Designation	Comment/Suggestions
1	Mohammad Ghiyas Uddin	Upazila Executive Officer, (UNO), Bahubal	• The sand quarry project proposed by BMD is known and supported by him. However, concerns are raised with him regarding health, safety, and security, as bringing in workers from outside the area for sand extraction could lead to the spread of viral diseases, potentially affecting the local community. • He expressed concern that sand collection could result in landslides, which might lead to the destruction of local houses. • He hopes that the project will create employment opportunities for the local community.
2	Mohammad Robin Mia	Upazila Executive Officer (UNO), Chunarughat	• The project was appreciated and accepted by him. • It is recommended that sand quarries should primarily operate during the dry season, which lasts about four months, as this helps the sand mines recover and reduces the risk of landslides and other disasters. • It is expected by him that local people will not be negatively affected by the project.
3	Md. Mamunur Rahman	Forest Officer, Satchori National Park	• The details of the project were well understood by him. • It was highlighted that forests act as a natural barrier against severe natural disasters like floods and tornadoes, and their preservation is essential to protect the area from such events. • He hopes that the project proponent will be careful to protect the forest.
4	Ramkrisna Ghosh	Forest Range Officer, Shaistaganj	• Some ethnic communities have lived near these forests. • While a small number of people rely on the forest for resources, most are engaged in tea harvesting, making their dependence on the forest minimal. • These communities are socially isolated and cannot relocate from the area. If the government fails to follow proper protocols, it could harm the livelihoods of these communities,
5	Md. Noora Alam Siddique	Upazila Fisheries Officer, Chunarughat	• The Fisheries Department plays a key role in sharing knowledge, enforcing government rules, and implementing programs to support local communities. • Fishing activities mainly take place in areas like Chora, rivers, and nearby marshlands, which are vital for the livelihoods of local fishermen.

SL#	Name	Designation	Comment/Suggestions
			• Chora is enriched with various small fishes. • Local communities will support the project if it ensures the protection of natural fisheries, as these resources are essential for their survival and cultural heritage.
6	Md. Mahidul Islam	Upazila Agricultural Officer, Chunarughat, Habiganj	• Some sand sources fill up naturally. During heavy rains, large amounts of sand slide from the sources onto nearby land owned by locals. Vendors then collect this sand, causing damage to the land. • Additionally, the sand slides also destroy crops on the land, causing further harm to the local farmers.
7.	Md. Amzad Hossain	DGM, Rashidpur Tea Factory	• Sand sourcing can be a good initiative, but if the rules are not followed properly, it could harm the tea estates. • Sand is bad for tea plants and can stop them from growing well. If sand sourcing begins, then the tea state will be demolished. This could lead to many people losing their jobs because many households depend on the tea estates to earn a living. If the tea estates are damaged, it will not only have an adverse impact on the land but also on the lives of the people who rely on them. • So, it is important to manage the sand extraction project carefully to protect both the environment and the people's livelihoods.

9.6 Focus Group Discussion

9.6.1 Focus Group Discussion (FGDs)

FGDs are important when gauging with a group of stakeholders on issues related to the project activities. FGD has been used to understand the needs, perceptions, and concerns of the group. The discussion also gave space for the members to voice their concerns and suggestions. During EIA preparation, FGD with various groups including women and projected people who are going to be affected by the project directly or indirectly was conducted in different locations throughout the project's adjacent area. Table 9-4 shows the details of FGD Participants and Table 9-5 findings of the FGD.

Table 9-4 Details of FGD Participants

Date	Group Details	Number of Participants			Location
		Male	Female	Total	
06-01-2025	Local People	6	-	6	Bainna Ati, Bahubal
06-01-2025	Agricultural Community	5	-	5	Bainna Ati, Bahubal
06-01-2025	Local People	3	1	4	Bahubal Upazila
06-01-2025	Local People	7	-	7	Bahubal Upazila
07-01-2025	Local People	7	-	7	Telia Para, Madhabpur
07-01-2025	Ethnic Groups	5	-	5	Chunarughat
07-01-2025	Tea Workers	12	-	12	Rashidpur Tea State, Bahubal
07-01-2025	Local People	5	-	5	Chunarughat, Satchori
08-01-2025	Local People	4	-	4	Chunarughat, Satchori
09-01-2025	Fisherman Community	6	-	6	Madhabpur

9.6.1.1 Findings of the FGD

Table 9-5 Details of Focus Group Discussion

Issues Discussed	Participant's Opinions, comments, and Suggestions	Response to Questions/Action Point
General perception	The participants expressed both positive and negative perceptions regarding the proposed silica sand quarry project in Habiganj District. However, most of them are in favor of the proposed project.	Concerns regarding the project will be taken into consideration.
Potential Problems	People were particularly concerned about how the project might have an adverse impact on the air, noise level, and water in the area. They noted that the Khowai and Korangi Rivers, as well as other nearby water sources, are already in poor condition, and additional pollution from the project could make it worse. Key worries included dust from sand sourcing and transportation, noise from heavy machinery, and	Proper mitigation measures will be taken and impacts due to the project will be monitored regularly.

Issues Discussed	Participant's Opinions, comments, and Suggestions	Response to Questions/Action Point
	the risk of contaminating water supplies. They said it is important to regularly check air, noise, and water quality at every stage of the project to protect the environment and fix problems quickly.	
Concerns Raised by Local People	Participants raised several critical issues and concerns regarding the project. These included: • **Protecting Sensitive Areas:** They asked that places like houses, schools, religious sites (temples and mosques), and natural habitats be avoided during the project. • **Saving Forests:** They were worried about the Sat Chori Reserve Forest and other forests, which are already suffering from logging and sand sourcing. • **Wildlife Safety:** They pointed out the area's rich wildlife, including migrant birds, and feared that the project could disturb habitats and harm animals if not managed carefully. • **Sand Collection Protocols:** They said it is important to follow strict rules when sourcing sand, especially in sensitive areas.	Protection of forests, wildlife, and sensitive areas, with mitigation plan.
Protected Areas (National Parks, Protected Forests, Historical or Archaeological Sites)	They highlighted the ecological value of nearby areas like the Sat Chori Reserve Forest & National Park, Chunaru Ghat, and the Rema-Kalenga Wildlife Sanctuary. The Rema-Kalenga Wildlife Sanctuary is a biodiversity hotspot. People say it is important to keep these areas safe from any damage the project might cause, directly or indirectly.	
Employment Status, Percentage of Employment/ Unemployment	People recognized that the project could create jobs for locals, especially during the planning and building stages. They hoped it would offer work for skilled, semi-skilled, and unskilled workers, helping to reduce unemployment in the area.	Opportunities for the locals will be given as a priority based on their education and skill level.
Social Concerns and Challenges	During the different stages of the project, the locals might feel unsecured due to labor influx in the areas. As well as community health issues will be one of another challenges.	A grievance box will be placed at the quarrying site and within the community so that the local people can raise key issues arised due to the project activities in the community.

9.7 Public Consultation Meeting

Three Public Consultation Meetings (PCMs) were conducted as part of the Environmental Impact Assessment (EIA) study to gather stakeholder opinions, local concerns, and recommendations

regarding the proposed project. The first consultation meeting was held at the Upazila Parishad, Madhabpur Upazila on 5 April 2026, with participation from 40 stakeholders, including local community representatives, government officials, farmers, businesspersons, and other interested groups. During the meeting, participants discussed the potential environmental and socio-economic impacts of the project. Many stakeholders expressed positive views regarding anticipated employment opportunities, local economic development, and infrastructure improvement. However, some participants also raised concerns regarding possible impacts on the environment, local transportation, and public health and safety during project implementation.

The second Public Consultation Meeting took place at the Upazila Parishad, Bahubal Upazila on 6 April 2026, where 26 participants attended the consultation session. The meeting provided an opportunity for local stakeholders to express their expectations and concerns regarding the project activities. Participants appreciated the potential economic benefits of the project, including increased business opportunities, local employment generation, and regional development. At the same time, several participants highlighted concerns related to environmental pollution, waste management, traffic movement, and occupational safety. The concerns and recommendations provided by the stakeholders were recorded and considered for incorporation into the mitigation and management measures of the EIA study.

Photographs of the Public Consultation Meetings (PCMs) conducted in Madhabpur, Bahubal, and Chunarughat Upazilas are also incorporated in Annex I of this EIA report.

The detailed meeting minutes of the three Public Consultation Meetings (PCMs), including participant lists, key discussion points, stakeholder opinions, concerns, and recommendations, are incorporated in Annex I of this EIA report.

CHAPTER 10
Emergency Response Plan

10 EMERGENCY RESPONSE PLAN

10.1 Emergency Response Plan

An Emergency Response Plan (ERP) is a written document, which is required for an organization according to occupational health safety standards and must be displayed at every job site with a certain number of employees (usually five to ten). An emergency response plan also includes information such as whom to notify, who should do what, and the location of emergency stock.

The Emergency Response Plan includes any measures that should be in place at all facilities to combat an accident resulting from road accident during sand transportation, any health hazard during sand extraction especially severe extremes of temperature (cold or hot) cut injury, etc., flash flood due to heavy rain during sand extraction, landslide due to sand extraction and erosion due to sand extraction.

10.1.1 Purpose

This Emergency Response Plan has been developed to provide an organizational and procedural framework for the management of emergencies in the sand extraction project. The purpose of an ERP is to facilitate and organize employer and employee actions during workplace emergencies. Well-developed emergency plans and proper employee training (such that employee understands their roles and responsibilities within the plan) will result in fewer and less severe employee injuries and less structural damage to the facility during emergencies.

10.1.2 Scope

This Emergency Response Plan covers those designated actions managers and employees must take to ensure employees and community safety from technological and natural hazards as well as other emergencies. This plan includes first aid, emergency escape procedures, and emergency activities.

10.1.3 Objectives

In general, the objectives of a plan describe what we expect to achieve by a plan. An emergency plan specifies the aim and procedures for handling sudden or unexpected situations. For the Emergency Response Plan some select outstanding objectives are given below-

1. To identify the various types of natural, manmade, and technological disasters and hazards, that may impact the project;
2. The consequence of these hazards in the project;
3. To propose some necessary action plan for minimizing the worst situations;
4. To conduct safety operations to save lives and properties;
5. To build up awareness among employees to prevent fatalities and injuries;
6. To ensure the duty of management to take emergency action in a short time;
7. To find out the means are available to stop or prevent the situation;
8. To ensure Occupational Health & Safety.

10.1.4 Potential Emergencies

Any incident affecting the entire sand extraction area, which may place life and property in a disaster and hazard, is considered an emergency. Various kinds of emergencies are as follows:

1. **Technological hazards that may arise during sand extraction**
    - Spills of flammable liquids (Oils) from transportation vehicles, excavators and troller
    - Crash or collision during sand transportation and excavation by excavator
2. **Natural hazards that may arise during sand extraction**

- Flash Flood due to heavy rain
- Landslide due to sand extraction
- River bank, and canal erosion due to sand extraction

10.1.5 Emergency Procedure

The Safety Operating Procedure of Emergency Response Plan means executing the systematic operation of any Emergency, which can occur inside the project area.

Based on these events, the required actions are determined.

1. First aid for employees and community
2. Initiate rescue operation
3. Evacuate danger zone
4. Call for external aid
5. Fight against the hazard

The final consideration is a list and the location of resources needed:

1. First aid box
2. Mobile and rescue equipment and tools
3. Trained personnel from worker

Any employee noticing the emergency shall report to their manager to take initiatives for managing the emergency.

10.1.6 Emergency Communication

In an emergency, one needs to communicate with the manager to inform hazard nature, affected persons/materials quantity, location, etc. The person should report activity to emergency responders when they arrive on the scene.

- Notify the emergency according to its degree to contractors, BMD, and DC office;
- Availability of medical equipment e.g. First Aid
- The effective rescue operation to save lives and properties;
- No need to overcrowd in incident area;

10.1.7 Activities Due to Emergency

The following activities will follow during an emergency.

- Stop work immediately and vacate the workplace.
- The facility should provide first aid attendants as well as medical equipment suitable for the people if any injury took place during the incident and quickly react to give maximum medical facility.
- When the incident place has been evacuated a head count shall be done by the manager accounting for all.

10.1.8 Record Keeping

Record keeping of any incident shows the required steps that need to be taken and the weakness of the previous incident. The contractor will keep the records of any emergency and will submit them to the BMD and DC offices. For proper recordkeeping need to maintain some regular procedures as:

- Emergency Response Plan
- Emergency training records to the employee from the contractor
- Keeping records for any emergency

10.1.9 Emergency Response for Spills of Flammable Liquids (Oils)

The following activities will be done in case of spills of flammable liquids (Oils).

- Employ absorbent pads, cloths, or spill kits to soak up the spill and prevent it from spreading.
- If possible, use sand, dirt, or absorbent material to create a barrier around the spill.
- If the spill is ongoing, take measures to stop the leak or source of the spill.
- Collect and contain the cleanup residues and place them into heavy-duty poly bags, plastic buckets, or other containers.
- All used absorbent materials should be placed in heavy-duty poly bags, which are then sealed, labeled, and disposed of through hazardous waste management by a contractor.

10.1.10 Emergency Response for Natural Hazards

10.1.10.1 Flash Flood

The following activities will follow in case of flash floods due to heavy rain.

- Evacuate the people from the flooded area and send them to a safe area.
- The switch of the power supply from the affected area is needed.
- Remove all types of obstructions from the drainage system.
- In cases of any accident in human life, please call the first aid team and get medical attention as soon as possible.
- Call the local fire brigade through the communication system in case of a worst or out-of-control situation.
- In case of flood polyethylene and sandbags are to protect against adverse effects.

10.1.10.2 Landslide Due to Sand Extraction

The following activities will follow in case of landslides due to sand extraction.

- Evacuate the people from the landslide and send them to a safe area.
- Listen and watch for rushing water, mud, or unusual sounds for new landslides.
- Checking new cracks appear in riverbanks or canals.
- Avoid river valleys and low-lying areas during times of danger.
- Check for injured and trapped persons near the slide, without entering the direct slide area.
- In cases of any accident in human life, please call the first aid team and get medical attention as soon as possible.
- Call the local fire brigade through the communication system in case of a worst or out-of-control situation.

10.1.10.3 River Bank and Canal Erosion Due to Sand Extraction

The following activities will be done in case of river bank and canal erosion due to sand extraction.

- Stop all sand extraction activities.
- Checking new cracks appear in riverbanks or canals.
- Giving protection in river banks and canals by using concrete bags and Geobags in extreme cases.

Chapter 11
Conclusion and Recommendation

11 CONCLUSION AND RECOMMENDATIONS

The silica sand extraction project has been initiated by BMD. An Environmental Clearance Certificate (ECC) will be required for the sand extraction project in favor of BMD. This EIA study was conducted to get the ECC from DOE. This EIA presents a comprehensive assessment of the potential impacts associated with the project. The EIA also identifies and develops specific management and mitigation measures to address each potential impact. Residual risks have then been assessed and quantified to determine the potential effectiveness of the proposed management and mitigations, focusing on reducing the significance of the identified potential impact.

The EIA has identified that there are negligible to medium negative environmental and social impacts as a result of the project. However, this EIA has also determined that if comprehensive and effective management and mitigation measures are implemented as proposed, the negative impacts should be reduced to a non-significant level.

Based on the analysis conducted in this environmental and social assessment, it is concluded that overall, the project will result in positive socio-economic benefits because the government will produce revenue from sand extraction from the sand quarries and the negative environmental impacts that have been identified are mostly short-term and localized in nature, and can be minimized adequately through manual sand extraction and excavator sand extraction process, and appropriate application of mitigation measures, monitoring and regular supervision of implementation. It's also assessed during EIA that the sand extraction from quarries also has positive impacts on drainage systems, agricultural lands, flash floods, employment, and biodiversity in the project area.

The following recommendations are made based on EIA that should be considered for achieving the goal of minimum environmental and social impact and maximum benefits:

- Findings and suggestions of the EIA study of the proposed project should be considered and implemented in the sand extraction project with strong monitoring.
- Manual sand extraction for minimizing the environmental impacts over the excavator where applicable.
- Income and employment opportunities for the local community.
- The Environmental Management Plan (EMP) should be implemented during sand extraction.
- Establishing Institutional arrangements with proper logistics and training for Environment, Health, and Safety for the sand extraction project.

APPENDIX

APPENDIX A: REFERENCES

Appendix A: References

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Appendix B: Approved TOR for the Study

Government of the People's Republic of Bangladesh
Department of Environment
Head Office
Poribesh Bhaban, E-16, Agagaon, Sher-E-Banglanagar, Dhaka-1207
www.doe.gov.bd

Date: 17/08/2025

Record No: 22.02.3600.338.071.003.25.1

Subject: Approval of Terms of Reference (ToR) for the EIA of the Twenty Three Silica Sand Quarries in Habiganj District

Reference: 28.07.0000.000.004.66.0005.19.80; Dated: 25.03.2025

With reference to the subject mentioned above, the Department of Environment hereby gives approval of the Terms of Reference (ToR) for the Environmental Impact Assessment (EIA) of the **Twenty-Three Silica Sand Quarries in Habiganj District,** subject to fulfilling the following terms and conditions:

1. The project authority shall conduct a comprehensive Environmental Impact Assessment (EIA) considering the overall activity of the said project in accordance with the ToR submitted to the Department of Environment (DoE). The EIA study shall be conducted as per the provisions laid down in the Environmental Conservation Rules, 2023.
2. The EIA report shall be prepared in accordance with the guidelines provided in Schedule 11 and Rules 15 and 16 of the ECR, 2023.
3. Multidisciplinary experts are required in the study team to prepare the EIA report.
4. Consultation with Stakeholders/Public Consultation should be done in accordance with Rule 16 of the Environmental Conservation Rules, 2023.
5. The project authority shall submit the EIA report to the Head Office of DoE in Dhaka.
6. Without approval of the EIA report by the Department of Environment, the project authority shall not make any land and infrastructure development.



17-08-2025
Masud Iqbal Md Shameem
Director
222218342
direc@doe.gov.bd

Mr. Md. Mamunur Rashid, Director (Mine and Minerals) (Routine Charge)
Bureau of Minerals Development (BMD), 153, Pioneer Road, Segunbagicha, Dhaka
01744496605, emrdbmd@gmail.com.

Record Number: 22.02.3600.338.071.003.25.1/1 (1) Date: 17/08/2025

A Copy for has been sent consideration and necessary (if applicable) action :

1. Deputy Director, Department of Environment, Habiganj District Office, Habiganj.



17-08-2025
Masud Iqbal Md Shameem
Director

Appendix C: No Objection Certificate (NOC) from Local Authority

Appendix D: Challan Copy

ব্যাংকের কপি

ই-আর ফরম নং-৬ (ই)
(এস আর অনুচ্ছেদ ৫৭ দ্রষ্টব্য)

চালান ফরম

ব্র্যাক ব্যাংক লিমিটেড, বিকাশ - ব্র্যাক ব্যাংক লিমিটেড শাখায় টাকা জমা দেওয়ার চালান

যে সরকারি প্রতিষ্ঠানের অনুকূলে অর্থ জমা হচ্ছে	যার মাধ্যমে টাকা প্রদত্ত হলো তার নাম, সনাক্তকরণ নম্বর ও ঠিকানা	যে ব্যক্তি/প্রতিষ্ঠানের পক্ষ হতে টাকা প্রদত্ত হলো তার নাম, সনাক্তকরণ নম্বর ও ঠিকানা	চালান নং:	কি খাতে জমা দেওয়া হলো তার বিবরণ	জমার পরিমাণ
প্রধান কার্যালয়, পরিবেশ অধিদপ্তর	Md. Mamunur Rashid Director ০১৪৮-৫১৮৮৫৭ Bhutanta Bhaban (6th Floor), 153 Pioneer Road, Segunbagicha, Dhaka-1000.	BUREAU OF MINERAL DEVELOPMENT Bhutanta Bhaban (6th Floor), 153 Pioneer Road, Segunbagicha, Dhaka-1000.	২৪২৫-০০২৫০৬০৫৩৩ ২৪২৫-০০২৫০৬০৫৩৪	১৪২২৫১৯-পরিবেশগত ছাড়পত্র ফি ১১৪১১০১-ফেলজ পণ্য ও সেবার ওপর মূসক	১০,০০০.০০ ১,০০০.০০

নমুনা কোড: ১৪৫০৬০১১২৪৫৭২-১১০০০০০০০-১১০০১০০০-১৪২২৫১৯ অন্যান্য বিবরণ/মন্তব্য (যদি থাকে):

মোট (অংকে) = ১১,০০০.০০

টাকা (কথায়): এগার হাজার শূন্য শত টাকা

তারিখ: ২০/০২/২০২৫ ই.

এটি একটি সিস্টেম জেনারেটেড চালান, কোন স্বাক্ষর প্রয়োজন নেই।

গ্রাহকের কপি

ই-আর ফরম নং-৬ (ই)
(এস আর অনুচ্ছেদ ৫৭ দ্রষ্টব্য)

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প্রধান কার্যালয়, পরিবেশ অধিদপ্তর	Md. Mamunur Rashid Director ০১৪৮-৫১৮৮৫৭ Bhutanta Bhaban (6th Floor), 153 Pioneer Road, Segunbagicha, Dhaka-1000.	BUREAU OF MINERAL DEVELOPMENT Bhutanta Bhaban (6th Floor), 153 Pioneer Road, Segunbagicha, Dhaka-1000.	২৪২৫-০০২৫০৬০৫৩৩ ২৪২৫-০০২৫০৬০৫৩৪	১৪২২৫১৯-পরিবেশগত ছাড়পত্র ফি ১১৪১১০১-ফেলজ পণ্য ও সেবার ওপর মূসক	১০,০০০.০০ ১,০০০.০০

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প্রধান কার্যালয়, পরিবেশ অধিদপ্তর -এর কপি

ই-আর ফরম নং-৬ (ই)
(এস আর অনুচ্ছেদ ৫৭ দ্রষ্টব্য)

চালান ফরম

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মোট (অংকে) = ১০,০০০.০০

টাকা (কথায়): দশ হাজার টাকা

তারিখ: ২০/০২/২০২৫ ই.

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কাজীপাড়া মার্কেট, মিরপুর বিহার, শুল্ক, আবগারী ও আটি কমিশনারেট, ঢাকা (পশ্চিম) -এর কপি

ই-আর ফরম নং-৬ (ই)
(এস আর অনুচ্ছেদ ৫৭ দ্রষ্টব্য)

চালান ফরম

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যে সরকারি প্রতিষ্ঠানের অনুকূলে অর্থ জমা হচ্ছে	যার মাধ্যমে টাকা প্রদত্ত হলো তার নাম, সনাক্তকরণ নম্বর ও ঠিকানা	যে ব্যক্তি/প্রতিষ্ঠানের পক্ষ হতে টাকা প্রদত্ত হলো তার নাম, সনাক্তকরণ নম্বর ও ঠিকানা	চালান নং:	কি খাতে জমা দেওয়া হলো তার বিবরণ	জমার পরিমাণ
কাজীপাড়া মার্কেট, মিরপুর বিহার, শুল্ক, আবগারী ও আটি কমিশনারেট, ঢাকা (পশ্চিম)	Md. Mamunur Rashid Director ০১৪৮-৫১৮৮৫৭ Bhutanta Bhaban (6th Floor), 153 Pioneer Road, Segunbagicha, Dhaka-1000.	BUREAU OF MINERAL DEVELOPMENT Bhutanta Bhaban (6th Floor), 153 Pioneer Road, Segunbagicha, Dhaka-1000.	২৪২৫-০০২৫০৬০৫৩৪	১১৪১১০১-ফেলজ পণ্য ও সেবার ওপর মূসক	১,০০০.০০

নমুনা কোড: ১১১০৫০০১০২৪৫৭-১১০০০০০০০-১১০০১০০০-১১৪১১০১ অন্যান্য বিবরণ/মন্তব্য (যদি থাকে):

মোট (অংকে) = ১,০০০.০০

টাকা (কথায়): এক হাজার শূন্য শত টাকা

তারিখ: ২০/০২/২০২৫ ই.

এটি একটি সিস্টেম জেনারেটেড চালান, কোন স্বাক্ষর প্রয়োজন নেই।

Appendix E: Photographs of the Monitoring Location

Appendix E-1: Photographs of Ambient Air Quality Monitoring



AAQ1: Toton Mia, Mangalpur,Chownmohani,Madhavpur



AAQ2: Sha Alam,Vendrroa,Shajahanpur, Madhavpur



AAQ3: Rofik Choudhury, Bonogram, Gazipur, Chunarughat



AAQ4: Panchash Jame Mosque, Chunarughat



AAQ5: Soden, Pukurpar,Eashidpur



AAQ6: Nasir Mia, Hilalpur,Bahubal

Appendix E-2: Photographs of Ambient Noise Monitoring



NL-1: Ripon Mia, Mangalpur, Chownmohani, Madhavpur



NL-2: Almas Uddin, Chownmohani, Madhavpur



NL-3: Abul Basgar, Orissama, Madhavpur



NL-4: Sha Alam,Vendrroa, Shajahanpur, Madhavpur



NL-5: Abul Hamid, Panchash, Chunarughat



NL-6: Md, Abid Mia, Shabpur, Madhavpur



NL-7: Chandpur Gov: Primary School, Chunarughat



NL-8: Asam Para.Dhankin Bazar, Chunarughat



NL-9: Kiron, Pukurpar,Rashidpur



NL-10: Md, Shahid Mia, Daragao, Sreemangal



NL-11: Mohi Uddin, Berakhal, Bahubal



NL-12: Kasu Mia, Uttor Bhavani, Bahubal

Appendix E-3: Photographs of Surface Water Sampling



SWQ-1: Sunai River, Mangalpur,Chownmohani,Madhavpur



SWQ-2: Sunai River,Jagadishpur, Tea Garden, Madhavpur



SWQ-3: Sutang River,Novagram, 4 no Pippara,Chunarughat



SWQ-4: Khowa River, Konagao, Gazipur, Chunarughat



SWQ-5: Kayaki River, Kazipur, Sreemangal



SWQ-6: Dikambor Chara, Hazi Bazar, Bahubal

Appendix E-4: Photographs of Ground Water Sampling



GWQ-1: Horiman Das, Orissama, Madhavpur



GWQ-2: Md, Youns Mia, Shabpur, Madhavpur



GWQ-3: Md, Manik Mia,Berakhal,Bahubal



GWQ-4: Sha alam, Deorgach 3 no Union, Chunarughat



GWQ-5: Modusodan, Chirchirkot, Sreemangal



GWQ-6: Ahmedpur Jame Mosque, Ahmedpur, Bahubal

Appendix E-5: Photographs of Soil Sampling



SQ-1: Samol Das, Monoherpur, Chownmohani, Madhavpur



SQ-2: Shipma Bala Khal, Shajahanpur, Madhavpur



SQ-3: Ujjilpur,4 no Pippara, Chunarughat



SQ-4: Abadgao, Gazipur, Chunarughat



SQ-5: Rashidpur Boroled, Rashidpur



SQ-6: Dobai Potijori, Bahubal

Appendix E-6: Photographs of Sediment Sampling



SD-1: Sunai River, Orissama, Madhavpur



SD-2: Sunai River,Jagadishpur, Tea Garden, Madhavpur



SD-3: Sutang River, Novagram, 4 no Pippara, Chunarughat



SD-4: Khowa River, Konagao, Gazipur, Chunarughat



SD-5: Kayaki River, Kazipur, Sreemangal



SD-6: Dikambor Chara, Hazi Bazar, Bahubal

Appendix F: Photographs of the KII and FGD

Appendix F-1: KIIs, FGDs, and Consultations in the Study Area



KII with Upazila Executive Officer (UNO), Bahubal



KII with Upazila Executive Officer (UNO), Chunarughat



Consultation with Forest officer, Satchari National Park



KII with Range Forest officer, Shaistaganj



KII with Raghunandan Range forest officer, Shahjibazar, Chunarughat



KII with Forest Range Officer, Kalenga, Chunarughat



KII with Upzilla Agriculture officer, Madhabpur



KII with Upzilla Agriculture Officer, Bahubal



KII with Upzilla Agriculture officer, Chunarughat



Consultation with DGM, Rashidpur Tea Factory, Rashidpur, Bahubal



FGD with Tea state worker, Rashidpur, Bahubal



FGD with local people, Chowmohani, Madhabpur

Source: EQMS Field Survey, January 2025

Appendix F-2: KIIs, FGD, Consultations, and Market Surveys in the Study area



KII with Senior Upzilla Fisheries Officer, Chunarughat



KII with Upzilla Fisheries Officer, Bahubal



Informal Consultation in Bahubal Upzilla



Informal Consultation in Tulshipur, Chowmohani, Madhabpur



Informal Consultation in Dubaoi, Bahubal



Fish Market Survey at Bahubal

Source: EQMS Field Survey, January 2025

Appendix F-3: KIIs, FGDs, and Consultations in the Study Area



FGD with the Fisherman



FGD with the Business People





FGD with the Tea State community



FGD with the Labor



FGD with the Farmer



FGD with the Business people



KII with Upazila Agriculture Officer

KII with Tea State Staff



FGD with the local community KII with Upazila Education Officer



KII with Forest Range Officer

Appendix G: Biodiversity

Appendix G-1: Checklist of Terrestrial Floral (Tree) Species Recorded within the Project AoI

SL No.	Local Name	Common Name	Scientific name	Family	Uses	Abundance	Core Area	Buffer Area
1	Aam	Mango	*Mangifera indica*	Anacardiaceae	Fruit	VC	√	√
2	Akashmoni	Acacia	*Acacia auriculiformis*	Fabaceae	Timber	C	√	√
3	Arjun	Arjun tree	*Terminalia arjuna*	Combretaceae	Medicinal	C	√	√
4	Ata	Custard apple	*Annona reticulata*	Annonaceae	Fruit	VC	√	√
5	Badorlathi	Golden shower	*Cassia fistula*	Caesalpiniaceae	Aesthetic	C	√	√
6	Bel	Bael	*Aegle marmelos*	Rutaceae	Fruit	C	√	√
7	Bokul	Spanish cherry	*Mimusops elengi*	Sapotaceae	Medicinal	C	√	√
8	Boroi	Indian Jujube	*Ziziphus mauritiana*	Rhamnaceae	Fruit	VC	√	√
9	Bot	Ficus	*Ficus benghalensis*	Moraceae	Aesthetic	C	√	√
10	Chalta	Elephant apple	*Dillenia indica*	Dilleniaceae	Fruit	VC	√	√
11	Chatim	Backboard tree	*Alstonia scholaris*	Apocynaceae	Medicinal	R	√	√
12	Deshi Gab	Gaub tree	*Diospyros malabarica*	Ebenaceae	Fruit	C	√	√
13	Eucalyptus	Eucalyptus	*Eucalyptus citriodora*	Myrtaceae	Timber	VC	√	√
14	Hijol	Mango-pine	*Barringtonia acutangula*	Lecythidaceae	Timber	R	√	√
15	Jam	Java Plum	*Syzygium cumini*	Myrtaceae	Fruit	VC	√	√
16	Jambura	Pomelo	*Citrus maxima*	Rutaceae	Fruit	C	√	√
17	Jamrul	Wax apple,	*Syzygium samarangense*	Myrtaceae	Fruit	C	√	√
18	Jarul	Queen's Flower	*Lagerstroemia speciosa*	Lythraceae	Aesthetic	C	√	√
19	Kalo Koroi	Lebbek tree	*Albizia lebbeck*	Fabaceae	Timber	VC	√	√
20	Kath Badam	Indian Almond	*Terminalia catappa*	Combretaceae	Fruit	C	√	√
21	Kathal	Jackfruit	*Artocarpus heterophyllus*	Moraceae	Fruit	VC	√	√
22	Khejur	Indian date	*Phoenix sylvestris*	Arecaceae	Fruit	VC	√	√

SL No.	Local Name	Common Name	Scientific name	Family	Uses	Abundance	Core Area	Buffer Area
23	Khoksa	Fig	*Ficus hispida*	Moraceae	Aesthetic	VC	√	√
24	Kodom	Burflower-tree	*Neolamarckia cadamba*	Rubiaceae	Timber	C	√	√
25	Krishnochura	Royal poinciana	*Delonix regia*	Caesalpiniaceae	Aesthetic	C	√	√
26	Lichu	Lychee	*Litchi chinensis*	Sapindaceae	Fruit	C	√	√
27	Mahogany	Mahogoni	*Swietenia mahagoni*	Meliaceae	Timber	VC	√	√
28	Narikel	Coconut	*Cocos nucifera*	Arecaceae	Fruit	VC	√	√
29	Neem	Neem	*Azadirachta indica*	Meliaceae	Medicinal	C	√	√
30	Pepe	Papaya	*Carica papaya*	Caricaceae	Fruit	VC	√	√
31	Peyara	Guava	*Psidium guajava*	Myrtaceae	Fruit	VC	√	√
32	Pitali	False White Teak	*Trewia nudiflora*	Euphorbiaceae	Timber	C	√	√
33	Raintree	Raintree	*Samanea saman*	Fabaceae	Timber	VC	√	√
34	Sada Koroi	White Siris	*Albizia procera*	Fabaceae	Timber	VC	√	√
35	Segun	Teak	*Tectona grandis*	Verbenaceae	Timber	C	√	√
36	Supari	Areca palm	*Areca catechu*	Arecaceae	Fruit	VC	√	√
37	Taal	Palm	*Borassus flabellifer*	Arecaceae	Fruit	VC	√	√
38	Tetul	Tamarind	*Tamarindus indica*	Caesalpiniaceae	Fruit	C	√	√
39	Lebu	Lemon	Citrus sp.	Rutaceae	Fruit	VC	√	√
40	Cha	Tea	Camellia sinensis	Theaceae	Making tea, medicinal use	C	√	√

Source: EQMS Field Survey, January 2025

* VC = Very Common, C= Common, R= Rare

Appendix G-2: List of Herpetofauna species recorded in the Study Area

Sl No	Family	Common Name	Local Name	Scientific Name	IUCN Red List Status		Wildlife Conservation and Security Act, 2012	Core Area	Buffer Area
					National*	Global**			
Amphibians									
1	Bufonidae	Asian Common toad	Kuno bang	*Duttaphrynus melanostictus*	LC	LC	Schedule II	√	√
2	Dicroglossidae	Indian Bullfrog	Kola bang	*Hoplobatrachus tigerinus*	LC	LC	Schedule II	√	√
3		Indian skipper frog	Kotkoti bang	*Euphlyctis cyanophlyctis*	LC	LC	Schedule II	√	√
4		Indian Green Pond Frog	Sobuj bang	*Euphlyctis hexadactylus*	LC	LC	Schedule II	√	
5	Microhylidae	Ornate Narrow-mouthed Frog	China bang	*Microhyla ornata*	LC	LC	Schedule II	√	√
6	Rhacophoridae	Common Tree Frog	Chitra Gecho bang	*Polypedates maculatus*	LC	LC	Schedule II		√
Reptiles									
1	Gekkonidae	Common House Gecko	Pati tiktiki	*Hemidactylus frenatus*	LC	LC	Schedule II	√	√
2		House Lizard	Choto Tiktiki	*Hemidactylus bowringii*	LC	LC	Schedule II	√	√
3	Agamidae	Common Garden Lizard	Rokto Chusha	*Calotes versicolor*	LC	LC	Schedule II	√	√
4	Scincidae	Indian Mabuya	Achil	*Eutropis carinata*	LC	LC	Schedule II	√	√
5		Common Garden Skink	Anjon	*Lampropholis guichenoti*	LC	LC	Schedule II	√	√

Sl No	Family	Common Name	Local Name	Scientific Name	IUCN Red List Status		Wildlife Conservation and Security Act, 2012	Core Area	Buffer Area
					National*	Global**			
6	Varanidae	Bengal Monitor Lizard	Gui shap	*Varanus bengalensis*	NT	NT	Schedule II	√	√
7	Colubridae	Checkered Keelback	Dhora shap	*Xenochrophis piscator*	LC	LC	Schedule I	√	√
8		Indian Rat Snake	Daraj shaap	*Ptyas mucosa*	LC	LC	Schedule I	√	√
9	Homalopsidae	Common Smooth Water Snake	Painna Shap	*Enhydris enhydris*	LC	LC	Schedule I	√	√
10	Elapidae	Banded Krait	Shangkhini	*Bungarus fasciatus*	LC	LC	Schedule II	√	√

Source: EQMS Field Survey, January 2025

*IUCN Bangladesh. 2015. Red List of Bangladesh Volume 4: Reptiles and Amphibians; LC=Least Concern; NT=Near Threatened; NE=Not Evaluated

**IUCN 2025. The IUCN Red List of Threatened Species. Version 2024-2. (https://www.iucnredlist.org/)

Appendix G-3: List of Terrestrial Avifaunal species found in Study Area

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife (Conservation and Security) Act 2012	Core Area	Buffer Area
					National*	Global**			
1.	Asian Koel	Kokil	*Eudynamys scolopaces*	Cuculidae	LC	LC	Schedule II	√	√
2.	Asian Pied Starling	Go Shalik	*Sturnus contra*	Sturnidae	LC	LC	Schedule I	√	√
3.	Bank Myna	Gang Shalik	*Acridotheres ginginianus*	Sturnidae	LC	LC	Schedule I	√	√

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife (Conservation and Security) Act 2012	Core Area	Buffer Area
					National*	Global**			
4.	Barn Swallow	Pati Ababil	*Hirundo rustica*	Hirundinidae	LC	LC	Schedule II	√	√
5.	Baya Weaver	Babui	*Ploceus philippinus*	Ploceidae	LC	LC	Schedule I	√	√
6.	Black Drongo	Kala Fingey	*Dicrurus macrocercus*	Cuculidae	LC	LC	Schedule II	√	√
7.	Black hooded Oriole	Kalomatha Benebou	*Oriolus xanthornus*	Oriolidae	LC	LC	Schedule II	√	√
8.	Black Kite	Bhubon Chil	*Milvus migrans*	Accipitridae	LC	LC	Schedule II	√	√
9.	Black naped Monarch	Kalo Katkatia	*Hypothymis azurea*	Monarchidae	LC	LC	Schedule I	√	√
10.	Black-rumped Flameback	Sonali kaththokra	*Dinopium benghalense*	Picidae	LC	LC	Schedule II	√	√
11.	Blue-throated Barbet	Nil-gola Basonti Baori	*Psilopogon asiaticus*	Megalaimidae	LC	LC	Schedule I	√	√
12.	Brahminy Kite	Shonkho Chil	*Haliastur indus*	Accipitridae	LC	LC	Schedule II	√	√
13.	Bronzed Drongo	Fingey	*Dicrurus aeneus*	Dicruridae	LC	LC	Schedule I	√	√
14.	Bronze-winged jacana	Jolpipi	*Metopidius indicus*	Jacanidae	LC	LC	Schedule I	√	√
15.	Brown Shrike	Badami Koshai	*Lanius cristatus*	Laniidae	LC	LC	Schedule II	√	√
16.	Cattle Egret	Go Boga	*Bubulcus ibis*	Ardeidae	LC	LC	Schedule II	√	√
17.	Chestnut Munia	Pora Munia	*Lonchura atricapilla*	Estrildidae	LC	LC	-	√	√

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife (Conservation and Security) Act 2012	Core Area	Buffer Area
					National*	Global**			
18.	Chestnut-tailed starling	Kath Shalik	*Sturnia malabarica*	Sturnidae	LC	LC	Schedule II	√	√
19.	Common Iora	Fotikjol	*Aegithina tiphia*	Aegithinidae	LC	LC	Schedule II	√	√
20.	Common King Fisher	Chhoto Maachranga	*Alcedo atthis*	Accipitridae	LC	LC	Schedule II	√	√
21.	Common Myna	Salik/Bhat Salik	*Acridotheres tristis*	Sturnidae	LC	LC	Schedule II	√	√
22.	Common Sandpiper	Pati Batan	*Actitis hypoleucos*	Scolopacidae	LC	LC	Schedule II	√	√
23.	Common Tailorbird	Tuntuni	*Orthotomus sutorius*	Cisticolidae	LC	LC	Schedule II	√	√
24.	Coppersmith Barbet	Chhoto Basanta Bauri	*Psilopogon haemacephalus*	Megalaimidae	LC	LC	Schedule II	√	√
25.	Eurasian collared dove	Dhobol Ghughu	*Streptopelia decaocto*	Columbidae	LC	LC	Schedule I	√	√
26.	Fulvous-breasted Woodpecker	Batabi Kathkurali	*Dendrocopos macei*	Picidae	LC	LC	Schedule II	√	√
27.	Great Egret	Majhari Bok	*Casmerodius albus*	Ardeidae	LC	LC	Schedule II	√	√
28.	Green bee-eater	Suichora	*Merops orientalis*	Meropidae	LC	LC	Schedule II	√	√
29.	House Crow	Pati Kak	*Corvus splendens*	Corvidae	LC	LC	-	√	√
30.	House Sparrow	Pati choroi	*Passer domesticus*	Passeridae	LC	LC	Schedule II	√	√
31.	Indian Pond Heron	Kani Bok	*Ardeola grayii*	Ardeidae	LC	LC	Schedule I	√	√

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife (Conservation and Security) Act 2012	Core Area	Buffer Area
					National*	Global**			
32.	Indian Roller	Bangla Neelkanto	*Coracias benghalensis*	Coracidae	LC	LC	Schedule I	√	√
33.	Intermediate Egret	Majhari Bok	*Ardea intermedia*	Ardeidae	LC	LC	Schedule I	√	√
34.	Large-billed Crow	Dar Kak	*Corvus macrorhynchos*	Corvidae	LC	LC	-	√	√
35.	Little Cormorant	Choto Pankowri	*Microcarbo niger*	Phalacrocoracidae	LC	LC	Schedule II	√	√
36.	Little Egret	Choto boga	*Egretta garzetta*	Ardeidae	LC	LC	Schedule II	√	√
37.	Long-tailed Shrike	Badami Koshai	*Lanius schach*	Laniidae	LC	LC	Schedule II	√	√
38.	Oriental Magpie Robin	Doel	*Copsychus saularis*	Muscicapidae	LC	LC	Schedule II	√	√
39.	Plain Prinita	Nirol Prina	*Prinia inornata*	Cisticolidae	LC	LC	Schedule II	√	√
40.	Purple Sunbird	Niltuni	*Cinnyris asiaticus*	Nectarinidae	LC	LC	Schedule I	√	√
41.	Red Turtle Dove	Lal Rajghughu	*Streptopelia tranquebarica*	Columbidae	LC	LC	Schedule I	√	√
42.	Red-vented Bulbul	Bangla bulbul	*Pycnonotus cafer*	Pycnonotidae	LC	LC	Schedule II	√	√
43.	Rufous Treepie	Harichacha	*Dendrocitta vagabunda*	Corvidae	LC	LC	Schedule II	√	√
44.	Spotted Dove	Tila Ghughu	*Streptopelia chinensis*	Columbidae	LC	LC	Schedule I	√	√
45.	Tricoloured Munia	Shyamsundar	*Lonchura malacca*	Estrildidae	LC	LC	Schedule I	√	√

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife (Conservation and Security) Act 2012	Core Area	Buffer Area
					National*	Global**			
46.	White -bellied Munia	Dhola Komor Munia	*Lonchura leucogastra*	Estrildidae	LC	LC	-	√	√
47.	White Wagtail	Khonjon	*Motacilla alba*	Motacillidae	LC	LC	Schedule II	√	√
48.	White-breasted Kingfisher	Dhola gola Machranga	*Halcyon smyrnensis*	Alcedinidae	LC	LC	Schedule II	√	√

Source: EQMS Field Survey, January 2025

*IUCN Bangladesh. 2015. Red List of Bangladesh Volume 3: Birds; LC=Least Concern, NT=Near Threatened

**IUCN 2025. The IUCN Red List of Threatened Species. Version 2024-2. (https://www.iucnredlist.org/)

Appendix G-4: List of Mammalian species recorded in the Study Area

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife Conservation and Security Act, 2012	Core Area	Buffer Area
					National*	Global**			
1	Lesser Bandicoot Rat	Dhari Idur	*Bandicota bengalensis*	Muridae	LC	LC	Schedule III	√	√
2	Pallas's Squirrel	Lalche-buk Kathbirali	*Callosciurus erythraeus*	Sciuridae	LC	LC	-	√	√
3	Irrawaddy Squirrel	Kathbirali	*Callosciurus pygerythrus*	Sciuridae	LC	LC	Schedule I	√	√
4	Golden Jackal	Pati-Siyal	*Canis aureus*	Canidae	LC	LC	Schedule I	√	√
5	Jungle Cat	Choto Ban Biral	*Felis chaus*	Felidae	LC	LC	Schedule I	√	√
6	Rhesus Macaque	Banor, Bandor	*Macaca mulatta*	Cercopithecidae	VU	LC	-	√	√

Sl No	Common Name	Local Name	Scientific Name	Family	IUCN Red List Status		Wildlife Conservation and Security Act, 2012	Core Area	Buffer Area
					National*	Global**			
7	Common Indian Field Mouse	Metho Idur	*Mus booduga*	Muridae	LC	LC	Schedule III	√	√
8	House Mouse	Nengti Idur	*Mus musculus*	Muridae	LC	LC	Schedule III	√	√
9	Indian pipistrelle	Chamchika	*Pipistrellus coromandra*	Vespertilionidae	LC	LC	Schedule I	√	√
10	Indian Fruit Bat	Badur	*Pteropus giganteus*	Pteropodidae	LC	LC	Schedule I	√	√
11	Common House Rat	Idur	*Rattus rattus*	Muridae	LC	LC	Schedule III	√	√
12	House shrew	Chika	*Suncus murinus*	Soricidae	LC	LC	-	√	√
13	Phayre's langur	Chosmapora Hanuman	*Trachypithecus phayrei*	Cercopithecidae	CR	EN	-	Rema-Kalenga Reserved Forest is approximately 2.5 km from Ichalia Chara.	
14	Capped Langur	Mukhpora Hanuman	*Trachypithecus pileatus*	Cercopithecidae	EN	VU	-		
15	Small Indian Mongoose	Choto beji	*Urva auropunctata*	Herpestidae	LC	LC	Schedule I		

Source: EQMS Field Survey, January 2025

*IUCN Bangladesh. 2015. Red List of Bangladesh Volume 2: Mammals; LC=Least Concern, NT= Near Threatened

**IUCN 2025. The IUCN Red List of Threatened Species. Version 2024-2. (https://www.iucnredlist.org/)

Appendix G-5: Fish and Crustacean Species are Recorded Within the Project AOI

SL No	Local Name	Common Name	Scientific Name	Family	IUCN Red List Status		Core area	Buffer Area
					National*	Global**		
Fish								
1.	Bajari Tengra	Tengara Catfish	*Mystus tengara*	Bagridae	LC	LC	√	√

SL No	Local Name	Common Name	Scientific Name	Family	IUCN Red List Status		Core area	Buffer Area
					National*	Global**		
2.	Bata	Bata Labeo	*Labeo bata*	Cyprinidae	LC	LC	√	√
3.	Bele	Freshwater Goby	*Glossogobius giuris*	Gobiidae	LC	LC	√	√
4.	Bheda	Mottled Nandus	*Nandus nandus*	Nandidae	NT	LC	√	√
5.	Gol chanda	Indian Glassy Fish	*Parambassis ranga*	Ambassidae	LC	LC	√	√
6.	Gonia	Kuria Labeo	*Labeo gonius*	Cyprinidae	NT	LC	√	√
7.	Gulsha Tengra	Bleeker's Mystus	*Mystus bleeker*	Bagridae	LC	LC	√	√
8.	Jat Punti	Spotfin Swamp Barb	*Puntius sophore*	Cyprinidae	LC	LC	√	√
9.	Koi	Climbing Perch	*Anabas testudineus*	Anabantidae	LC	DD	√	√
10.	Mola	Mola Carplet	*Amblypharyngodon mola*	Cyprinidae	LC	LC	√	√
11.	Taki	Spotted Snakehead	*Channa punctatus*	Channidae	LC	LC	√	√
12.	Tara Baim	One-stripe Spiny eel	*Macrognathus aculeatus*	Mastacembelidae	NT	LC	√	√
Crustacean								
1.	Chatka Chingri	Monsoon River Prawn	*Macrobrachium malcolmsonii*	Palaemonidae	LC	LC	√	√
2.	Dimua Icha	Dimua River Prawn	*Macrobrachium villosimanus*	Palaemonidae	LC	LC	√	√
3.	Golda Chingri	Giant Freshwater Prawn	*Macrobrachium rosenbergii*	Palaemonidae	LC	LC	√	√
4.	Sada Icha	Prawn	*Macrobrachium sp.*	Palaemonidae	LC	LC	√	√

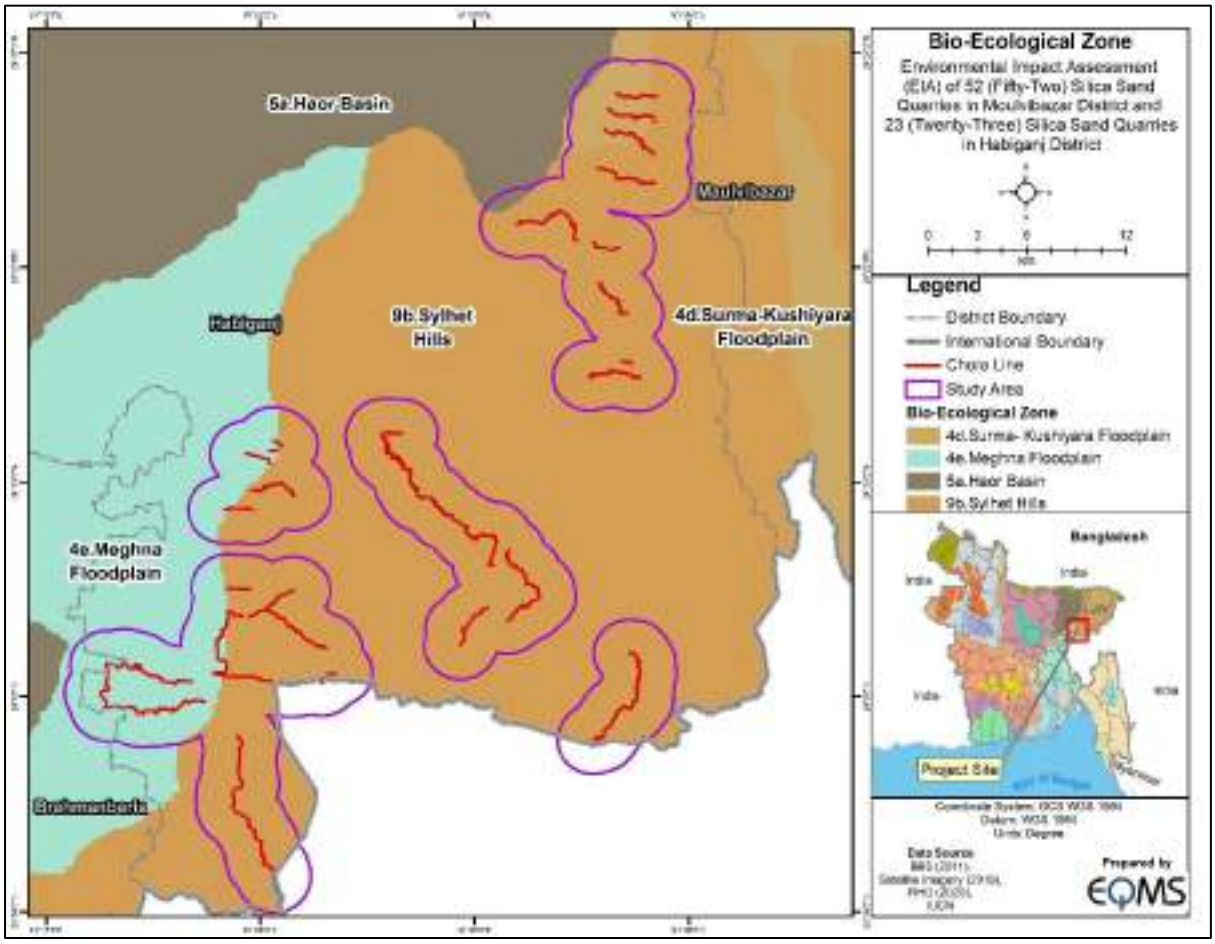
Source: EQMS Field Survey, January 2025

*IUCN Bangladesh. 2015. Red List of Bangladesh Volume 5: Freshwater Fishes;

**IUCN 2025. The IUCN Red List of Threatened Species. Version 2024-2. (https://www.iucnredlist.org/)

Status Code: LC=Least Concern, CR= Critically Endangered, NT=Near Threatened; VU=Vulnerable, EN= Endangered; CR=Critically Endangered, NE=Not Evaluated, DD=Data Deficient

Appendix G-6: Bio-ecological Zones Map of the Project Area



Source: IUCN, 2002

Appendix G-7: Photographs of Different Types of Terrestrial Habitats





Agricultural Land



Homestead Vegetation



Roadside Vegetation

Tea Garden

Source: EQMS Field Survey, January 2025

Appendix G-8: Photographs of Floral Species within the Study Area



Tea *(Camellia sinensis)*



Supari *(Areca catechu)*



Bot *(Ficus benghalensis)*



Khejur *(Phoenix sylvestris)*



Peyara (*Psidium guajava)*



Neem *(Azadirachta indica)*



Sajina *(Moringa oleifera)*



Kathal *(Artocarpus heterophyllus)*



Taal (*Borassus flabellifer*)



Debadaru (*Monoon longifolium*)



Boroi *(Ziziphus mauritiana)*



Mahagony *(Swietenia mahagoni)*

Source: EQMS Field Survey, January 2025

Appendix G-9: Some Observed Avifauna Species within the Project AOI



Taiga Flycatcher *(Ficedula albicilla)*



Red-vented bulbul *(Pycnonotus cafer)*



Indian Pond Heron *(Ardeola grayii)*



Brown Shrike (*Lanius cristatus*)



Spotted dove *(Streptopelia chinensis)*



Long-tailed Shrike (*Lanius schach*)



White-breasted kingfisher *(Halcyon smyrnensis)*



Chestnut-headed Bee-eater (*Merops leschenaulti)*



Red-breasted Parakeet (*Psittacula alexandri*)



Chestnut-tailed starling (*Sturnia malabarica*)



Cattle Egret (*Bubulcus ibis*)



Red-wattled Lapwing (*Vanellus indicus*)

Source: EQMS Field Survey, January 2025

Appendix G-10: Observed Terrestrial Mammal species in the Project AOI



Rhesus Macaque (*Macaca mulatta*)



Phayre's langur (*Trachypithecus phayrei*)



Capped Langur (*Trachypithecus pileatus*)



Pallas's Squirrel (*Callosciurus erythraeus*)

Source: EQMS Field Survey, January 2025

Appendix G-11: Photographs of Different Types of Aquatic Habitats within the project AOI





Aquaculture Pond





Marshland Sonai River

Source: EQMS Field Survey, January 2025

Appendix H: Laboratory Test Report

Ref: EQMS/Ambient Air Quality/ 20250127009

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Ambient Air Quality

Project Name	:	EIA Study of 23 Silica sand Quarries In Habiganj District
Monitoring Activity	:	Ambient Air Quality
Monitoring Personnel	:	Toffazzal Hossain, Consultant, EQMS Consulting Limited
Monitoring Location	:	AAQ1: Toton Mia's House, Mangalpur, Chowmohani, Madhavpur (24° 1'45.35"N 91°21'27.37"E) AAQ2; Sha Alam's House, Vendrroa, Shajahanpur, Madhavpur (24°6'22"N 91°21'35"E) AAQ3; Rofik Choudhury's House, Bonogram, Gazipur, Chunarughat (24°05'46"N 91°34'18"E) AAQ4; Panchash Jame Mosque Area, Chunarughat (24°12'48"N 91°26'52"E) AAQ5; Sodan's House, Pukurpar, Eashidpur (24°18'38"N 91°33'13"E) AAQ6; Nasir Mia's House, Hilalpur, Bahubal (24°22'56"N 91°33'36"E)
Monitoring Date	:	02.01.2025-05.01.2025
Reporting Date	:	27.01.2025

Ref: EQMS/Ambient Air Quality/ 20250123069

Description of Analysis :

Location	Ambient Air Pollutants Concentration (µg/m³)					CO (mg/m3)
	SPM	PM_{10}	$PM_{2.5}$	SO_2	NO_2	
AAQ1	63.6	34.8	18.2	11.7	16.5	0.59
AAQ2	79.4	41.3	26.9	13.5	18.1	0.87
AAQ3	68.3	36.1	24.7	12.8	17.2	0.78
AAQ4	74.7	42.7	23.5	12.6	16.7	0.81
AAQ5	72.4	37.8	22.6	10.3	15.4	0.67
AAQ6	75.2	38.9	25.3	11.4	17.3	0.72
Duration (hr.)	8	24	24	24	24	8
Air Pollution (control) rules, 2022	-	150	65	80	80 (24 Hours)	5
IFC/WHO Standard	--	50	25	20	40 (Annual)	--
Method of Analysis Instrument Use: *Haz-Scanner™ HiM 6000*	*Light Scattering Nephelometer*	*Light Scattering Nephelometer*	*Light Scattering Nephelometer*	*High Sensitivity Electrochemical*	*High Sensitivity Electrochemical*	*High Sensitivity Electrochemical*

Note: Regular Checkup and calibration of the equipment are done by the manufacturers and EQMS Consulting Limited personnel to avoid any error.
Legend: SPM -Suspended Particulate Matter, PM10 -Particulate Matter of a diameter of 10 micron or less, PM2.5 -Particulate Matter of a diameter of 2.5 micron or less, SO2 -Sulphur Di-Oxide, NO2 -Nitrogen Dioxide, CO - Carbon Monoxide.

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Toronto Office: 7 Amort Street, Scarborough Ontario, M1K4B5 Canada

Ref: EQMS/Noise Quality/ 20250127070

EQMS ENVIRONMENTAL LABORATORY

Monitoring Results of Ambient Noise Quality

Project Name	:	EIA Study of 23 Silica sand Quarries_In Habiganj District
Monitoring Activity	:	Noise Level
Monitoring Personnel	:	Syed Galib Shah, Assistant Consultant, EQMS Consulting Limited
Monitoring Location	:	NL1; Ripon Mia's House, Mangalpur, Chowmohani, Madhavpur (24°1'45"N 91°21'28"E) NL2; Almas Uddin's House, Chowmohani, Madhavpur (24°3'43"N 91°21'12"E) NL3; Abul Basgar's House, Orissama, Madhavpur (24°5'53"N 91°19'41"E) NL4; Sha Alam's House, Vendrroa, Shajahanpur, Madhavpur (24°6'22"N 91°21'37"E) NL5; Abul Hamid's House, Panchash, Chunarughat (24°12'46.87"N 91°26'52.85"E) NL6; Abid Mia's House, Shabpur, Madhavpur (24°12'52"N 91°21'24"E) NL7; Chandpur Government Primary School, Chunarughat (24°09'32"N 91°29'52"E) NL8; Asam Para, Dhankin Bazar, Chunarughat (24°05'36"N 91°34'48"E) NL9; Kiron's Pukurpar, Rashidpur (24°18'42.46"N 91°33'13.02"E) NL10; Shahid Mia's House, Doragao, Sreemangal (24°16'38"N 91°33'38"E) NL11; Mohi Uddin's House, Berakhal, Bahubal (24°21'9.03"N 91°31'26.90"E) NL12; Kasu Mia's House, Uttor Bhavani, Bahubal (24°25'23.97"N 91°34'46.16"E)
Monitoring Date	:	02.01.2025-05.01.2025
Reporting Date	:	26.01.2025

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Ref: EQMS/Noise Quality/ 20250127070

Description of Analysis :

Code	Noise Level (dBA)				Location Settings	*Bangladesh Standard		**WHO/IFC Standard	
	Leq_{Day}	Leq_{Night}	L_{max}	L_{min}		Day	Night	Day	Night
NL1	46.71	42.92	74.3	31.6	Residential Area	55	45	55	45
NL2	45.18	39.25	67.8	30.8	Residential Area	55	45	55	45
NL3	46.82	40.12	76.3	31.5	Residential Area	55	45	55	45
NL4	51.56	42.37	80.5	32.7	Residential Area	55	45	55	45
NL5	44.79	39.22	69.3	31.2	Residential Area	55	45	55	45
NL6	53.47	44.59	75.9	32.3	Residential Area	55	45	55	45
NL7	52.73	43.34	78.2	32.5	Silent Zone	50	40	55	45
NL8	58.57	48.36	82.1	33.4	Mixed Area	60	50	-	-
NL9	49.42	40.95	74.5	32.2	Residential Area	55	45	55	45
NL10	51.74	42.36	73.8	33.5	Residential Area	55	45	55	45
NL11	45.23	38.37	66.7	30.8	Residential Area	55	45	55	45
NL12	50.35	40.28	68.5	31.7	Residential Area	55	45	55	45

*The Bangladesh National Ambient Noise Standards have been taken from Schedule 4 (Standards for Sound) of the Environmental Conservation Rules, 1997 amended October 7, 2006.

**Guidelines values are for noise levels measured out of doors. Source: Guidelines for Community Noise, World Health Organization (WHO), 1999. As per IFC EHS noise level guidelines, Noise impacts should not exceed the levels presented in the above table.

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Appendix I: Public Consultation Meeting (PCM)

Three PCMs Picture

PCM in Madhabpur Upazila, Habiganj on 5th April 2026




PCM in Bahubal Upazila, Habiganj on 6th April 2026




PCM in Chunarughat Upazila, Habiganj on 8th April 2026




Meeting Minutes of Three PCMs

সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশগত প্রভাব নিরূপণ (ইআইএ) এর জন্য

জনমত যাচাই সভা

স্থান: চুনারুঘাট উপজেলা পরিষদ সম্মেলন কক্ষ, উপজেলা: চুনারুঘাট, জেলা: হবিগঞ্জ



জনমত যাচাই সভার বিবরণী

৮ এপ্রিল ২০২৬

EQMS CONSULTING LIMITED

www.eqms.com.bd

EQMS

সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশগত প্রভাব নিরূপণ (ইআইএ) এর জন্য জনমত যাচাই সভা

স্থান: চুনারুঘাট উপজেলা পরিষদ সম্মেলন কক্ষ, উপজেলা: চুনারুঘাট, জেলা: হবিগঞ্জ

কেন্দ্র: উপজেলা পরিষদ সম্মেলন কক্ষ, চুনারুঘাট, হবিগঞ্জ

তারিখ: ৮ এপ্রিল ২০২৬ **সময়:** সকাল ১০:০০ ঘটিকা হতে দুপুর ১২:০০ ঘটিকা

সভাপতি: মোঃ জিয়াউর রহমান, উপজেলা নির্বাহী অফিসার

বিশেষ অতিথি: ড মোঃ ইউসুফ আলী, উপ পরিচালক, পরিবেশ অধিদপ্তর

অতিথিবৃন্দ:

১. মোহাম্মদ মাসুক উল নবী, সহকারী পরিচালক, বিএমডি

২. শ্রী হরিপদ চন্দ্র দাশ, পরিদর্শক, পরিবেশ অধিদপ্তর

৩. অধ্যক্ষ জাকত উদ্দীন চৌধুরী, সভাপতি, চুনারুঘাট প্রেসক্লাব

৪. মোঃ নুরে আলম সিদ্দিক, সহকারী কমিশনার কর্মকর্তা

৫. মোঃ নজরুল ইসলাম,চেয়ারম্যান, ৫ নং শলখোলা

৬. স্থানীয় নেতৃবৃন্দ, সাংবাদিক ও সিলিকা বালু কোয়ারীর জনগণ।

১. ভূমিকা

জনমত যাচাই সভা হল এমন একটি প্রক্রিয়া যা জনসাধারণকে প্রকল্পের বিষয়ে তাদের মতামত উপস্থাপন এবং সংশ্লিষ্ট সিদ্ধান্ত গ্রহণের ক্ষেত্রে তাদের মন্তব্য/অভিমত বিবেচনা করার সুযোগ প্রদান করে থাকে। পরিবেশ সংরক্ষণ বিধিমালা ২০২৩ (বিধি ১৬) অনুযায়ী, খসড়া পরিবেশগত প্রভাব নিরূপনের অংশ হিসেবে প্রকল্পের পরিবেশগত প্রভাব এর বিষয়ে স্থানীয় জনগনের কাছে তথ্য উন্মুক্ত করার জন্য এবং সে বিষয়ে তাদের মতামত গ্রহণের জন্য এই জনমত যাচাই সভার আয়োজন করা হয়। বর্ণিত জনমত যাচাই সভাটি গত ৮ এপ্রিল ২০২৬ তারিখে অনুষ্ঠিত হয়। সভায় উক্ত এলাকার বিভিন্ন প্রতিষ্ঠান ও অংশীজন থেকে মোট ৩২ জন প্রতিনিধি উপস্থিত ছিলেন।

২ কার্যপদ্ধতি

পরিবেশ সংরক্ষণ বিধিমালা ২০২৩ (বিধি ১৬ এর উপবিধি ২) অনুসারে, উক্ত জনমত যাচাই সভা আয়োজন করার অনুমতি প্রসঙ্গে খসড়া পরিবেশগত প্রভাব নিরূপণ প্রতিবেদন ও এর বাংলা সারসংক্ষেপসহ একটি আবেদনপত্র পরিবেশ অধিদপ্তরের প্রধান কার্যালয়ে দাখিল করা হয়েছিল এবং এর পরিপ্রেক্ষিতে পরিবেশ অধিদপ্তর কর্তৃক উক্ত সভায় উপস্থিতির জন্য একজন প্রতিনিধির মনোনয়ন দেয়া হয়। গত ০১ এপ্রিল ২০২৬ তারিখে দৈনিক সমকাল নামক বাংলাদেশের একটি জাতীয় সংবাদপত্রে এবং দৈনিক সমাচার নামক একটি স্থানীয় সংবাদপত্রে উল্লেখিত জনমত যাচাই সভার বিজ্ঞপ্তি প্রকাশিত হয়। এছাড়াও, আমন্ত্রণপত্রের মাধ্যমে অংশীদারগণকে আমন্ত্রণ জানানো হয়।

৩. সভার উদ্বোধন

পবিত্র কুরআন তেলাওয়াত পাঠ এবং পরিচিত পর্বের মাধ্যমে আনুষ্ঠানিকভাবে জনমত যাচাই সভার কার্যক্রম শুরু করা হয় এরপর জনাব মোঃ জিয়াউর রহমান, উপজেলা নির্বাহী অফিসার অংশগ্রহণকারীদের স্বাগত জানিয়ে সভা শুরু করেন।

তিনি জানান, বর্তমানে সিলিকা বালুর কোয়ারীর ইজারাদার বন্ধ আছে। তিনি তাঁর বক্তব্যে উল্লেখ করেন যে, প্রকল্পের পরিবেশগত ও সামাজিক প্রভাব মূল্যায়নের অংশ হিসেবে এই জনমত যাচাই সভার আয়োজন করা হয়েছে। এই ধরনের সভার মাধ্যমে স্থানীয় জনগণের মতামত, পরামর্শ এবং উদ্বেগসমূহ সংগ্রহ করা অত্যন্ত গুরুত্বপূর্ণ, যাতে প্রকল্প বাস্তবায়নের সময় পরিবেশ সুরক্ষা এবং স্থানীয় জনগণের স্বার্থ যথাযথভাবে বিবেচনায় নেওয়া যায়। তিনি আরও বলেন, একটি প্রকল্পের ফলে এলাকার অর্থনৈতিক কর্মকাণ্ড বৃদ্ধি, কর্মসংস্থান সৃষ্টি এবং অবকাঠামোগত উন্নয়ন সম্ভব হলেও পরিবেশের ভারসাম্য রক্ষা করা সমানভাবে জরুরি। তাই প্রকল্পের পরিকল্পনা ও বাস্তবায়নের ক্ষেত্রে পরিবেশগত আইন, মানদণ্ড এবং প্রয়োজনীয় প্রশমন ব্যবস্থা যথাযথভাবে অনুসরণ করা হবে বলে তিনি আশাবাদ ব্যক্ত করেন। শেষে তিনি সকল অংশগ্রহণকারীকে সভায় সক্রিয়ভাবে অংশগ্রহণ করে গঠনমূলক মতামত প্রদান করার জন্য আহ্বান জানান এবং আশা প্রকাশ করেন যে সকলের সহযোগিতার মাধ্যমে প্রকল্পটি পরিবেশসম্মত ও টেকসইভাবে বাস্তবায়ন করা সম্ভব হবে।

৪. পরিবেশগত প্রভাব মূল্যায়নের খসড়া প্রতিবেদনের উপর উপস্থাপনা

ইকিউএমএস (EQMS) কনসাল্টিং লিমিটেডের কনসালটেন্ট এবং পরিবেশ বিশেষজ্ঞ জনাব ফাহিম উদ্দীন অংশগ্রহণকারীদের আন্তরিক শুভেচ্ছা জানিয়ে উপস্থাপনা শুরু করেন। তিনি খসড়া পরিবেশগত প্রভাব নিরূপণ প্রতিবেদনের উপর নিম্নলিখিত বিষয়াদি সম্পর্কে একটি উপস্থাপনা প্রদান করেন:

১. জনমতের উদ্দেশ্য
২. প্রকল্পের পটভূমি
৪. প্রকল্পের বর্ণনা
৫. প্রকল্প সংশ্লিষ্ট নমুনা নকশা
৬. পরিবেশগত বেসলাইন ডেটা
৭. পরিবেশগত এবং সামাজিক প্রভাব মূল্যায়ন
৮. পরিবেশ ব্যবস্থাপনা পরিকল্পনা
৯. পরিবেশ পর্যবেক্ষণ পরিকল্পনা
১০. উপসংহার এবং সুপারিশ।

জনমত যাচাই সভার উপস্থাপনা, উপস্থিতি শীট এবং জনমত যাচাই সভার ছবি পরিশিষ্ট- এ উপস্থাপন করা হয়েছে।

৫. মুক্ত আলোচনা এবং প্রতিক্রিয়া

উপস্থাপনার পরে, একটি প্রশ্নোত্তর পর্ব ও মুক্ত আলোচনা অনুষ্ঠিত হয়, যা টেবিল-১ এ উপস্থাপন করা হয়েছে। ইকিউএমএস কনসালটিং লিমিটেডের পরিবেশ বিশেষজ্ঞ জনাব ফাহিম উদ্দীন, নিএমডির পক্ষে জনাব মসুক উন নবী, সহকারী পরিচালক, পরিবেশ অধিদপ্তর এর পক্ষে জনাব ড ইউসুফ আলী, উপ পরিচালক প্রশ্নগুলোর উত্তর প্রদান করেন।

EQMS BMD

টেবিল ১- জনমত সভার প্রশ্ন উত্তর পর্বের বিবরন

ক্রঃ নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
১	ওয়াহেদ আলী, চেয়ারম্যান, ৪ নং পইকপাড়া	রঘুনন্দনপুর রিজার্ভ ফরেস্ট এলাকার সাহাপুর ছড়াটি একটি অত্যন্ত সংবেদনশীল বনাঞ্চলের অন্তর্ভুক্ত। এখানে বালু উত্তোলন করলে বনভূমির প্রাকৃতিক ভারসাম্য নষ্ট হবে, বন্যপ্রাণীর আবাসস্থল ধ্বংস হবে এবং পাহাড়ি ঢলের স্থিতিশীলতা কমে গিয়ে ভূমিধসের ঝুঁকি সৃষ্টি হতে পারে। স্থানীয় জনগণও পরিবেশগত বিপর্যয়ের সম্মুখীন হবে, তাই এই এলাকায় কোনোভাবেই বালু উত্তোলন করা উচিত নয়।	সংরক্ষিত বনাঞ্চলে খনন কার্যক্রম সম্পূর্ণরূপে সীমিত বা নিষিদ্ধ রাখার বিষয়টি গুরুত্বসহকারে বিবেচনা করা হবে এবং পরিবেশগত সংবেদনশীলতা অনুযায়ী সিদ্ধান্ত গ্রহণ করা হবে।
২	মোঃ মিজানুর রহমান, সমাজসেবক ও ব্যবসায়ী	ফুলপুর, উজানিপুল, গাজীপুর ও লস্করপুর চা বাগান এলাকায় সুতাং নদীর "খ" অংশ থেকে বালু উত্তোলন করলে চা বাগানের জমি ক্ষতিগ্রস্ত হবে এবং নদীর স্বাভাবিক প্রবাহ ব্যাহত হবে। এতে করে কৃষি, চা উৎপাদন এবং স্থানীয় অর্থনীতি মারাত্মকভাবে ক্ষতির সম্মুখীন হবে। এছাড়া এই এলাকায় নদীয় প্রভাব বিস্তার নিয়ে সংঘর্ষের সম্ভাবনাও রয়েছে।	চা বাগান ও কৃষিজমির সুরক্ষাকে অগ্রাধিকার দিয়ে প্রকল্প এলাকা নির্বাচন করা হবে এবং উচ্চ ঝুঁকিপূর্ণ এলাকাগুলোতে বালু উত্তোলন সীমিত বা বন্ধ রাখার বিষয়টি বিবেচনায় নেওয়া হবে।
৩	সইফুজ্জামান চৌধুরী, প্রধান শিক্ষক	চলিহার ও মহিমভিড়া এলাকায় সুতাং নদীর "ক" অংশে খনন কার্যক্রম পরিচালিত হলে নদীর তীর ভাঙন বৃদ্ধি পাবে এবং আশপাশের বসতবাড়ি ঝুঁকির মুখে পড়বে। শিক্ষা প্রতিষ্ঠান ও জনবসতির নিকটবর্তী এলাকায় এই ধরনের কার্যক্রম ভবিষ্যৎ প্রজন্মের জন্যও হুমকি সৃষ্টি করবে।	বসতবাড়ি ও গুরুত্বপূর্ণ অবকাঠামোর নিকটবর্তী এলাকায় Buffer Zone বজায় রাখা হবে এবং ঝুঁকিপূর্ণ স্থানে খনন কার্যক্রম এড়িয়ে চলা হবে।
৪	আবদালুর রহমান, চেয়ারম্যান, ৪ নং পইকপাড়া	চান্দুর ও এনাতাবাদ এলাকায় সুতাং নদীর "গ" অংশে বালু উত্তোলনের ফলে ছড়ার গতিপথ পরিবর্তিত হতে পারে, যা দীর্ঘমেয়াদে বন্যা ও জলাবদ্ধতার সমস্যা সৃষ্টি করবে। এছাড়া স্থানীয় জনগণের মধ্যে জমি ও সম্পদ নিয়ে বিরোধ বাড়বে।	নদীর স্বাভাবিক প্রবাহ ও গতিপথ সংরক্ষণে বিশেষ গুরুত্ব দেওয়া হবে এবং সামাজিক সংঘাত এড়াতে যথাযথ পরিকল্পনা ও প্রশাসনিক তদারকি নিশ্চিত করা হবে।

EQMS BMD

৫	নুরা আলম সিদ্দিক, সহকারী মৎস্য কর্মকর্তা, চুনারুঘাট	কামলপুর এলাকার দেওছড়ায় বালু উত্তোলন করলে জলজ জীববৈচিত্র্য মারাত্মকভাবে ক্ষতিগ্রস্ত হবে। মাছের প্রজনন ক্ষেত্র নষ্ট হবে এবং স্থানীয় মৎস্য সম্পদ হ্রাস পাবে, যা জেলেদের জীবিকায় সরাসরি প্রভাব ফেলবে।	মৎস্য সম্পদ সংরক্ষণে সংবেদনশীল এলাকাগুলোতে খনন কার্যক্রম সীমিত রাখা হবে এবং প্রজনন মৌসুমে উত্তোলন বন্ধ রাখার বিষয়টি বিবেচনা করা হবে।
৬	আবদুল্লাহ আল মামুন, ইউনিয়ন সহকারী ভূমি কর্মকর্তা	বিভিন্ন ছড়া ও নদীতে অনিয়ন্ত্রিত বালু উত্তোলনের ফলে ভূমির শ্রেণি পরিবর্তন হচ্ছে এবং ভূমি ব্যবস্থাপনায় জটিলতা সৃষ্টি হচ্ছে। এতে সরকারি জমি দখল ও অবৈধ ব্যবহার বৃদ্ধির ঝুঁকি রয়েছে।	ভূমি ব্যবস্থাপনার সাথে সমন্বয় রেখে নির্ধারিত সীমানার মধ্যে খনন কার্যক্রম পরিচালনা করা হবে এবং অবৈধ দখল প্রতিরোধে ব্যবস্থা নেওয়া হবে।
৭	সৈয়দ মাহমুদুর রহমান, ইউপি মেম্বার, শালুকুলা	চন্ডীছড়া এলাকার রামগঙ্গা চন্ডীছড়ায় বালু উত্তোলন করলে এলাকার প্রাকৃতিক সৌন্দর্য ও পরিবেশগত ভারসাম্য নষ্ট হবে। এতে পর্যটন সম্ভাবনাও ক্ষতিগ্রস্ত হতে পারে এবং স্থানীয় জনগণের জীবনযাত্রায় নেতিবাচক প্রভাব পড়বে।	পরিবেশগত ও নান্দনিক মূল্য বিবেচনা করে সংবেদনশীল এলাকাগুলোতে খনন কার্যক্রম সীমিত রাখা হবে এবং বিকল্প পরিকল্পনা গ্রহণ করা হবে।
৮	মোহাম্মদ কবির মিয়া, মেম্বার, ১ নং গাজীপুর	সামগ্রিকভাবে দেখা যাচ্ছে যে অধিকাংশ বালুমহল পরিবেশগতভাবে অত্যন্ত ঝুঁকিপূর্ণ এবং এখানে বালু উত্তোলন করলে স্থানীয় জনগণের ক্ষতি হবে। এছাড়া বিভিন্ন গ্রুপের মধ্যে দ্বন্দ্ব ও সংঘর্ষের আশঙ্কাও রয়েছে, যা আইন-শৃঙ্খলা পরিস্থিতির অবনতি ঘটাতে পারে।	সামগ্রিক ঝুঁকি ও আইন-শৃঙ্খলা পরিস্থিতি বিবেচনায় নিয়ে প্রকল্প বাস্তবায়নের পূর্বে বিস্তারিত মূল্যায়ন করা হবে এবং প্রয়োজনীয় নিয়ন্ত্রণ ব্যবস্থা গ্রহণ করা হবে।
৯	রফিকুল ইসলাম, স্থানীয় কৃষক	ভাদুলিয়া চা বাগান ও গাজীপুর চা বাগান এলাকায় অবস্থিত ইছলিয়া ছড়ায় যদি সম্পূর্ণ নিয়ন্ত্রিত ও বৈজ্ঞানিক পদ্ধতিতে বালু উত্তোলন করা হয়, তাহলে স্থানীয়ভাবে কর্মসংস্থান সৃষ্টি হবে এবং সরকারও রাজস্ব আয় করতে পারবে। তবে এটি অবশ্যই সঠিক ব্যবস্থাপনার আওতায় হতে হবে।	ইছলিয়া ছড়ায় সীমিত পরিসরে বৈজ্ঞানিক Mining Plan অনুসরণ করে বালু উত্তোলনের সম্ভাবনা বিবেচনা করা হবে এবং পরিবেশগত ক্ষতি কমানোর জন্য প্রয়োজনীয় ব্যবস্থা নেওয়া হবে।

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৬. বিশেষ অতিথির বক্তব্য

বিশেষ অতিথি হিসেবে বক্তব্য প্রদানকালে পরিবেশ অধিদপ্তর, হবিগঞ্জ-এর উপ পরিচালক জনাব ড. মোঃ ইউসুফ আলী সভার শুরুতেই উপস্থিত সকল অংশীজনকে জনমত যাচাই সভায় সক্রিয় অংশগ্রহণ এবং তাদের সুচিন্তিত ও গঠনমূলক মতামত প্রদানের জন্য আন্তরিক ধন্যবাদ জানান। তিনি আয়োজক সংস্থাকেও পরিবেশগত প্রভাব নিরূপণ (EIA) এর খসড়া প্রতিবেদন সুন্দর ও সুশৃঙ্খলভাবে উপস্থাপনের জন্য প্রশংসা করেন।

তিনি তার বক্তব্যে আরও বলেন যে, পরিবেশ অধিদপ্তরের পক্ষ থেকে ১৭/০৬/২০২৫ তারিখে সদর দপ্তরে প্রেরিত মতামতে উল্লেখ করা হয়েছে এই কোয়ারীগুলো থেকে বালু উত্তোলনের ফলে নদীর স্বাভাবিক গতিপথ পরিবর্তিত হতে পারে, পাহাড় বা টিলা ধসের ঝুঁকি বৃদ্ধি পেতে পারে এবং সামগ্রিকভাবে পরিবেশ ও জনজীবনে বিরূপ প্রভাব সৃষ্টি হতে পারে। এসব বিষয় বিবেচনায় নিয়ে তিনি মত দেন যে, উপরোক্ত কোয়ারীগুলোতে বালু উত্তোলনের জন্য অবস্থানগত ছাড়পত্র প্রদান করা সমীচীন নয় বলে প্রতীয়মান হয়।

তিনি আরও উল্লেখ করেন যে, Bangladesh Environmental Lawyers Association (BELA)-এর "Demand for Justice"-এর প্রেক্ষিতে জানানো হয়েছে যে, হবিগঞ্জ জেলার ২৩টি সিলিকা বালুর অবস্থান খাল, ছড়া, নদী, চা বাগান, গ্রামাঞ্চল, বনাঞ্চল, বসতভিটা, শিক্ষা প্রতিষ্ঠান, ধর্মীয় স্থাপনা, রাস্তা এবং পাহাড়ি টিলা সংলগ্ন এলাকায় অবস্থিত। এসব পরিবেশগতভাবে সংবেদনশীল এলাকায় খনন কার্যক্রম পরিচালিত হলে পরিবেশ ও প্রতিবেশের ওপর গুরুতর নেতিবাচক প্রভাব পড়ার আশঙ্কা রয়েছে।

তিনি তার বক্তব্যে অংশীজন মতবিনিময় সভার গুরুত্ব তুলে ধরে বলেন যে, এ ধরনের জনসম্পৃক্ততা প্রকল্পের বাস্তবায়নের পূর্বে সম্ভাব্য পরিবেশগত ও সামাজিক প্রভাবসমূহ সঠিকভাবে চিহ্নিত করতে গুরুত্বপূর্ণ ভূমিকা পালন করে। তিনি উল্লেখ করেন যে, প্রস্তাবিত সিলিকা বালু কোয়ারীগুলো পরিবেশগতভাবে অত্যন্ত সংবেদনশীল এলাকায় অবস্থিত, যেখানে যেকোনো বালু উত্তোলন কার্যক্রম সরাসরি পানি, মাটি, বায়ু, জীববৈচিত্র্য এবং স্থানীয় মানুষের জীবন-জীবিকার উপর প্রভাব ফেলতে পারে। তাই প্রকল্প বাস্তবায়নের পূর্বে যথাযথভাবে পরিবেশগত প্রভাব নিরূপণ (EIA) সম্পন্ন করা এবং তা বিদ্যমান আইন ও বিধিমালার আলোকে মূল্যায়ন করা অত্যন্ত জরুরি। উল্লেখ্য যে, গত ০৮.০৪.২০২৬ তারিখে চুনারুঘাট উপজেলায় অনুষ্ঠিত এই বিষয়ক গণশুনানিকালে স্থানীয় জনগণ জানান যে, চুনারুঘাটের ৭টি সিলিকা বালু কোয়ারি থেকে বালু উত্তোলন করা হলে সরকার যে পরিমাণ রাজস্ব পাবে, তার তুলনায় আর্থিক ও পরিবেশগত ক্ষতির পরিমাণ অধিক হবে। এ প্রেক্ষিতে তারা লেজেট সংশোধনের দাবি জানান।

এক্ষেত্রে হবিগঞ্জ জেলার ২৩ টি সিলিকা বালুর কোয়ারীর তালিকা সংক্রান্ত খনিজ সম্পদ বুরো কর্তৃক প্রকাশিত গেজেট সংশোধন করা যেতে পারে।

সবশেষে তিনি জোর দিয়ে বলেন যে, উন্নয়ন কার্যক্রম অবশ্যই পরিবেশগত সুরক্ষা ও টেকসই অবস্থাপনার সাথে সমঞ্জস্যপূর্ণ হতে হবে। তাই প্রকল্প বাস্তবায়নের ক্ষেত্রে পরিবেশগত সংবেদনশীলতা, স্থানীয় জনগণের মতামত এবং বৈজ্ঞানিক বিশ্লেষণকে সর্বোচ্চ গুরুত্ব দিয়ে সিদ্ধান্ত গ্রহণ করা উচিত।

৭. সভাপতির বক্তব্য

মতবিনিময় সভায় প্রধান অতিথি হিসেবে বক্তব্য প্রদানকালে উপজেলা নির্বাহী অফিসার জনাব মোঃ জিয়াউর রহমান সিলিকা বালু কোয়ারী প্রকল্পের সার্বিক বাস্তবায়ন প্রক্রিয়া, গণশুনানি মান নিশ্চিতকরণ এবং পরিবেশগত সুরক্ষার বিষয়টি অত্যন্ত গুরুত্বের সাথে তুলে ধরেন। তিনি বলেন যে, এই প্রকল্পটি শুধু একটি উন্নয়নমূলক কার্যক্রম নয়, বরং এটি সরাসরি স্থানীয় জনগণের জীবনযাত্রা, কৃষি উৎপাদন ব্যবস্থা, পানি সম্পদ ব্যবস্থাপনা এবং সামগ্রিক পরিবেশের উপর গভীর প্রভাব ফেলতে সক্ষম। সে কারণে প্রকল্পের প্রতিটি ধাপ অত্যন্ত সতর্কতা, দায়িত্বশীলতা এবং পেশাদারিত্বের সাথে বাস্তবায়ন করা অপরিহার্য। তিনি বিশেষভাবে উল্লেখ করেন যে চুনারুঘাট উপজেলার প্রস্তাবিত ৭টি সিলিকা বালু কোয়ারী নিয়ে স্থানীয়

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জনগণের মধ্যে কিছুটা বিরূপ মনোভাব ও উদ্বেগ বিদ্যমান রয়েছে। এই প্রেক্ষিতে তিনি প্রকল্প কর্তৃপক্ষকে আরও বিস্তৃত ও গভীরতর পরিবেশগত এবং সামাজিক সমীক্ষা (detailed study) পরিচালনার পরামর্শ দেন, যাতে প্রকল্পের সম্ভাব্য ইতিবাচক ও নেতিবাচক প্রভাবসমূহ সুস্পষ্টভাবে চিহ্নিত করা যায়। একই সাথে তিনি জোর দিয়ে বলেন যে, স্থানীয় জনগণের দাবি, মতামত ও সমস্যাগুলোকে যথাযথ গুরুত্ব দিয়ে বিবেচনা করা না হলে প্রকল্প বাস্তবায়নে দীর্ঘমেয়াদে জটিলতা সৃষ্টি হতে পারে।

উপজেলা নির্বাহী অফিসার আরও উল্লেখ করেন যে, প্রকল্প এলাকায় কাজ শুরুর পূর্বে সংশ্লিষ্ট এলাকার ভৌগোলিক অবস্থা, কৃষিজমির বিস্তৃতি, স্থানীয় যোগাযোগ ব্যবস্থা, বসতবাড়ির অবস্থান এবং প্রাকৃতিক পানি প্রবাহের ধরণ সম্পর্কে বিস্তারিত বিশ্লেষণ করা অত্যন্ত প্রয়োজন। তিনি বলেন, অপরিকল্পিত খনন বা বালু উত্তোলন কার্যক্রমের ফলে নদী বা ছড়ার স্বাভাবিক প্রবাহ ব্যাহত হলে তা জলাবদ্ধতা, ভাঙন বা পানির সংকটের মতো সমস্যা সৃষ্টি করতে পারে, যা স্থানীয় জনগণের জীবনমানের উপর নেতিবাচক প্রভাব ফেলবে। পরিবেশগত সুরক্ষার বিষয়ে তিনি দৃঢ় অবস্থান ব্যক্ত করে বলেন যে, প্রকল্পের প্রতিটি ধাপে জাতীয় পরিবেশগত মানদণ্ড এবং প্রাসঙ্গিক আইন-কানুন কঠোরভাবে অনুসরণ করতে হবে। তিনি আরও যোগ করেন যে, Environmental Impact Assessment (EIA) এবং Environmental and Social Management Plan (ESMP)-এ উল্লেখিত নির্দেশনাগুলো যথাযথভাবে বাস্তবায়ন নিশ্চিত করতে হবে। প্রকল্প চলাকালে ধূলাবালি নিয়ন্ত্রণ, শব্দ দূষণ হ্রাস, নিরাপদ যানবাহন চলাচল নিশ্চিতকরণ এবং খনন কার্যক্রমের কারণে সম্ভাব্য জোগান্তি কমাতে কার্যকর ও বাস্তবসম্মত পদক্ষেপ গ্রহণ করতে হবে।

তিনি কমিউনিটির উদ্দেশ্যে আশ্বস্ত করে বলেন যে, পরিবেশের কোনো ধরনের স্থায়ী বা অপূরণীয় ক্ষতি যাতে না হয়, সে বিষয়টি সর্বোচ্চ অগ্রাধিকার দিয়ে দেখা হবে। এজন্য প্রকল্প বাস্তবায়নের প্রতিটি পর্যায়ে নিয়মিত পরিবেশগত মনিটরিং, মূল্যায়ন এবং প্রয়োজনীয় প্রশমন (mitigation) ব্যবস্থা গ্রহণ করা হবে। এছাড়া তিনি উল্লেখ করেন যে, স্থানীয় জনগণের উত্থাপিত অভিযোগ ও সমস্যাগুলো দ্রুত সমাধানের জন্য একটি কার্যকর grievance redress mechanism (GRM) চালু রাখা হবে।

সবশেষে, তিনি উপজেলা প্রশাসনের পক্ষ থেকে প্রতিশ্রুতি দিয়ে বলেন যে, প্রকল্প বাস্তবায়ন কার্যক্রমের উপর নিয়মিত তদারকি করা হবে এবং যাতে উন্নয়নকাজের গণগত মান বজায় থাকে ও কোনো ধরনের অনিয়ম না ঘটে, সে বিষয়ে কঠোর নজরদারি রাখা হবে। তিনি সংশ্লিষ্ট সকল পক্ষকে সমন্বিতভাবে কাজ করার আহ্বান জানান, যাতে উন্নয়ন ও পরিবেশ সুরক্ষার মধ্যে একটি ভারসাম্য বজায় রেখে প্রকল্পটি সফলভাবে বাস্তবায়ন করা সম্ভব হয়।

৯. জনমত যাচাই সভার সারাংশ

প্রস্তাবিত সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশ এবং সামাজিক প্রভাব মূল্যায়ন (EIA) প্রক্রিয়ার অংশ হিসেবে একটি খসড়া EIA রিপোর্ট প্রস্তুত করা হয় এবং ৬ এপ্রিল ২০২৬ তারিখে মাধবপুর উপজেলা পরিষদ সম্মেলন কক্ষে অনুষ্ঠিত অংশীজন পরামর্শ সভায় উপস্থাপন করা হয়। সভায় মোট ২৬ জন অংশগ্রহণ করেন, যার মধ্যে সরকারি দপ্তরের প্রতিনিধি, স্থানীয় নির্বাচিত কর্মকর্তা, সাংবাদিক, এবং প্রকল্প এলাকার স্থানীয় সম্প্রদায়ের সদস্যরা ছিলেন। সভায় প্রকল্পের পটভূমি, লক্ষ্য, সম্ভাব্য প্রকৌশল কাঠামো, পরিবেশগত ভিত্তি অবস্থান এবং প্রকল্পের প্রত্যাশিত পরিবেশ ও সামাজিক প্রভাব সম্পর্কে বিস্তারিত উপস্থাপনা দেওয়া হয়। অংশগ্রহণকারীরা সর্বসম্মতভাবে উল্লেখ করেন যে চুনারুঘাটের সিলিকা বালুমহলসমূহ, বিশেষ করে রঘুনন্দপুর রিজার্ভ ফরেস্ট, সুতাং নদী এবং বিভিন্ন চা বাগান সংলগ্ন এলাকা অত্যন্ত সংবেদনশীল। এসব এলাকায় বালু উত্তোলন করা হলে বনভূমির ক্ষয়, জীববৈচিত্র্য ধ্বংস, নদীর স্বাভাবিক প্রবাহ ব্যাহত হওয়া, ভূমিধস, তীর ভাঙন এবং জলাবদ্ধতার মতো গুরুতর পরিবেশগত সমস্যা সৃষ্টি হতে পারে। বিশেষ করে সংরক্ষিত বনাঞ্চল ও ছড়াগুলোতে খনন কার্যক্রম পরিবেশগত ভারসাম্যের জন্য বড় হুমকি হিসেবে চিহ্নিত করা হয়।

সামাজিক দৃষ্টিকোণ থেকে অংশগ্রহণকারীরা উদ্বেগ প্রকাশ করেন যে, অপরিকল্পিত বালু উত্তোলন স্থানীয় জনগণের জীবনযাত্রা, কৃষি উৎপাদন, চা শিল্প এবং মৎস্য সম্পদের উপর নেতিবাচক প্রভাব ফেলতে পারে। পাশাপাশি ভূমি ও সম্পদ

EQMS BMD

সংক্রোন্ত বিরোধ, সামাজিক দ্বন্দ্ব এবং আইন-শৃঙ্খলা পরিস্থিতির অবনতির সম্ভাবনাও সভায় গুরুত্ব সহকারে আলোচনা করা হয়। শিক্ষা প্রতিষ্ঠান ও জনবসতির নিকটবর্তী এলাকায় ধুলা, শব্দ দূষণ এবং যানবাহনের চাপ বৃদ্ধি পাওয়ার ঝুঁকিও উল্লেখ করা হয়।

অর্থনৈতিক দিক থেকে কিছু অংশীজন নিয়ন্ত্রিত ও বৈজ্ঞানিক পদ্ধতিতে নির্দিষ্ট এলাকায় (যেমন ইছালিয়া ছড়া) সীমিত বালু উত্তোলনের মাধ্যমে কর্মসংস্থান সৃষ্টি ও সরকারি রাজস্ব বৃদ্ধির সম্ভাবনার কথা তুলে ধরেন। তবে তারা এক্ষেত্রে কঠোর পরিবেশগত ব্যবস্থাপনা ও সঠিক পরিকল্পনার উপর গুরুত্ব আরোপ করেন।

অংশগ্রহণকারীরা বিশেষভাবে জোর দেন যে, প্রকল্প বাস্তবায়নের পূর্বে বিস্তারিত পরিবেশগত ও সামাজিক প্রভাব মূল্যায়ন (EIA/ESIA) সম্পন্ন করা অত্যন্ত জরুরি। সংবেদনশীল এলাকা চিহ্নিতকরণ, buffer zone নির্ধারণ, নদীর স্বাভাবিক প্রবাহ সংরক্ষণ, এবং প্রজনন মৌসুমে খনন কার্যক্রম বন্ধ রাখার মতো ব্যবস্থা গ্রহণের প্রয়োজনীয়তা তুলে ধরা হয়। একই সাথে ভূমি ব্যবস্থাপনায় স্বচ্ছতা, ডিজিটাল সীমানা নির্ধারণ এবং অবৈধ দখল প্রতিরোধের বিষয়েও গুরুত্ব দেওয়া হয়।

সভায় উপস্থিত বিশেষ অতিথি পরিবেশ অধিদপ্তরের প্রতিনিধি এবং উপজেলা নির্বাহী অফিসার প্রকল্পের পরিবেশগত গুরুত্ব ও সংবেদনশীলতা তুলে ধরেন। তারা উল্লেখ করেন যে, সিলিকা বালু কোয়ারী এলাকাগুলো অত্যন্ত ঝুঁকিপূর্ণ হওয়ায় যেকোনো কার্যক্রম শুরুর আগে যথাযথ EIA এবং ESMP বাস্তবায়ন বাধ্যতামূলক। তারা আরও বলেন, স্থানীয় জনগণের মতামতকে সর্বোচ্চ গুরুত্ব দিতে হবে এবং সকল প্রভাব বিশ্লেষণ করে সিদ্ধান্ত গ্রহণ করতে হবে। পরিবেশ, পানি, মাটি, জীববৈচিত্র্য এবং মানুষের জীবন-জীবিকার সুরক্ষা নিশ্চিত করাই হবে প্রধান অগ্রাধিকার।

সভাপতির বক্তব্যে উপজেলা নির্বাহী অফিসার প্রকল্প বাস্তবায়নে সতর্কতা, দায়িত্বশীলতা এবং পরিবেশগত মানদণ্ড অনুসরণের উপর বিশেষ গুরুত্ব আরোপ করেন। তিনি উল্লেখ করেন যে প্রকল্পের প্রতিটি ধাপে নিয়মিত পরিবেশগত মনিটরিং, ধুলা ও শব্দ নিয়ন্ত্রণ, নিরাপদ পরিবহন ব্যবস্থা এবং grievance redress mechanism চালু থাকবে। তিনি আরও বলেন, উন্নয়ন ও পরিবেশ সুরক্ষার মধ্যে ভারসাম্য বজায় রেখেই প্রকল্প বাস্তবায়ন করতে হবে।

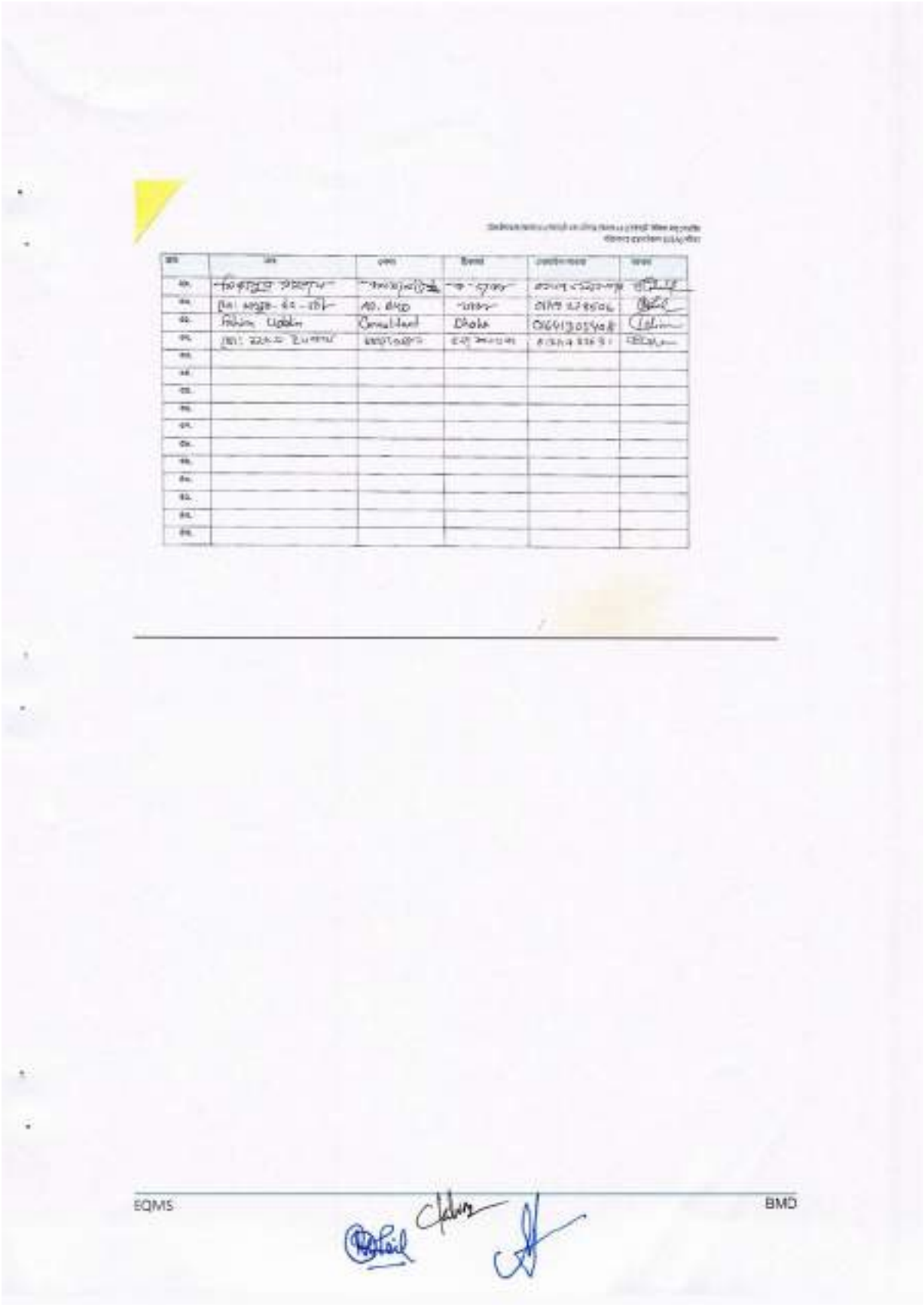
EQMS BMD



EQMS BMD

অংশীজন মতবিনিময় সভার উপস্থিতির তালিকা





EQMS BMD

অংশীজন মতবিনিময় সভার ছবি



EQMS BMD

অংশীজন মতবিনিময় সভার পত্রিকা প্রকাশের ছবি



৪ | খবর

সমকাল

শরীরে আঘাতের চিহ্ন নিয়ে ফিরলেন ১৪ জেলে

লিবিয়ায় জিম্মিদশা থেকে মুক্ত সুজন এখন চক্রের হোতা

ব্রাসফায়ারের সঙ্গে জড়িতদের বিচার হবে

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হবিগঞ্জ জেলা পরিষদের প্রশাসক হলেন আহমেদ আলী মুকিব

মহান মে দিবস পালনে প্রস্তুতি সভা

বানিয়াচংয়ে মসজিদের হিসাব নিয়ে সংঘর্ষের জেরে প্রতিপক্ষের বাড়ি-ঘরে হামলা, ভাংচুর

চাঁদা না দেয়ায় পাইপ চুরির অভিযোগ

নবীগঞ্জে এক সংবাদপত্র পরিবারে চুরি জন্ম দিবসে ঢেউ সিরিজ লেখা শহীদ ও তার অনুসারীদের

বানিয়াচংয়ে প্রতিপক্ষের লোকজনকে ফাঁসাতে বৃদ্ধাকে হত্যার অভিযোগ

বাড়িঘরে কয়েক দফায় হামলা, ভাংচুর ও লুটপাট

বানিয়াচংয়ের ঘাঙ্গাকান্দে স্কুলশিক্ষিকের দেহে তদন্ত করে দ্রুত প্রতিবেদন দেয়ার নির্দেশ জেলা প্রশাসকের

নবীগঞ্জে চাঁদা না পেয়ে গ্যারেজ মালিকের উপর হামলার অভিযোগ

ব্যারিস্টার হলেন হবিগঞ্জের কৃতি সন্তান অ্যাডভোকেট নিগার সুলতানা

রক্তদান সংগঠন 'ব্লাড সেল ইন বাংলাদেশ'-এর কেন্দ্রীয় ও প্রবাসী নতুন কমিটি গঠন

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সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশগত প্রভাব নিরূপণ (ইআইএ) এর জন্য জনমত যাচাই সভা

স্থান: বাহুবল উপজেলা পরিষদ সম্মেলন কক্ষ, উপজেলা: বাহুবল, জেলা: হবিগঞ্জ



জনমত যাচাই সভার বিবরণী

৬ এপ্রিল ২০২৬

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সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশগত প্রভাব নিরূপণ (ইআইএ) এর জন্য জনমত যাচাই সভা

স্থান: বাহুবল উপজেলা পরিষদ সম্মেলন কক্ষ, উপজেলা: বাহুবল , জেলা: হবিগঞ্জ

কেন্দ্র: উপজেলা পরিষদ সম্মেলন কক্ষ, বাহুবল, হবিগঞ্জ

তারিখ: ৬ এপ্রিল ২০২৬ **সময়:** সকাল ১০:০০ ঘটিকা হতে দুপুর ১২:০০ ঘটিকা

সভাপতি: উজ্জ্বল রায়, উপজেলা নির্বাহী অফিসার

বিশেষ অতিথি: ড মোঃ ইউসুফ আলী, উপ পরিচালক, পরিবেশ অধিদপ্তর

অতিথিবৃন্দ:

১. মোহাম্মদ মাসুক উল নবী, সহকারী পরিচালক, বিএমডি

২. গোলাম সামদানী , পরিদর্শক, পরিবেশ অধিদপ্তর

৩. সাইফউন রেজা আসিফ, উপজেলা মৎস্য অফিসার বাহুবল

৪. বি এম সাব্বাম হোসেন, ওসি, বাহুবল থানা

৫. হাজী মোঃ শামছুল আলম, সাধারণ সম্পাদক, উপজেলা বিএনপি

৬. স্থানীয় নেতৃবৃন্দ, সাংবাদিক ও সিলিকা বালু কোয়ারীর জনগণ।

১. ভূমিকা

জনমত যাচাই সভা হল এমন একটি প্রক্রিয়া যা জনসাধারণকে প্রকল্পের বিষয়ে তাদের মতামত উপস্থাপন এবং সংশ্লিষ্ট সিদ্ধান্ত গ্রহণের ক্ষেত্রে তাদের মন্তব্য/অভিমত বিবেচনা করার সুযোগ প্রদান করে থাকে। পরিবেশ সংরক্ষণ বিধিমালা ২০২৩ (বিধি ১৬) অনুযায়ী, খসড়া পরিবেশগত প্রভাব নিরূপনের অংশ হিসেবে প্রকল্পের পরিবেশগত প্রভাব এর বিষয়ে স্থানীয় জনগনের কাছে তথ্য উন্মুক্ত করার জন্য এবং সে বিষয়ে তাদের মতামত গ্রহণের জন্য এই জনমত যাচাই সভার আয়োজন করা হয়। বর্ণিত জনমত যাচাই সভাটি গত ৬ এপ্রিল ২০২৬ তারিখে অনুষ্ঠিত হয়। সভায় উক্ত এলাকার বিভিন্ন প্রতিষ্ঠান ও অংশীজন থেকে মোট ২৬ জন প্রতিনিধি উপস্থিত ছিলেন।

২ কার্যপদ্ধতি

পরিবেশ সংরক্ষণ বিধিমালা ২০২৩ (বিধি ১৬ এর উপবিধি ২) অনুসারে, উক্ত জনমত যাচাই সভা আয়োজন করার অনুমতি প্রসঙ্গে খসড়া পরিবেশগত প্রভাব নিরূপণ প্রতিবেদন ও এর বাংলা সারসংক্ষেপসহ একটি আবেদনপত্র পরিবেশ অধিদপ্তরের প্রধান কার্যালয়ে দাখিল করা হয়েছিল এবং এর পরিপ্রেক্ষিতে পরিবেশ অধিদপ্তর কর্তৃক উক্ত সভায় উপস্থিতির জন্য একজন প্রতিনিধির মনোনয়ন দেয়া হয়। গত ০১ এপ্রিল ২০২৬ তারিখে দৈনিক সমকাল নামক বাংলাদেশের একটি জাতীয় সংবাদপত্রে এবং দৈনিক সমাচার নামক একটি স্থানীয় সংবাদপত্রে উল্লেখিত জনমত যাচাই সভার বিজ্ঞপ্তি প্রকাশিত হয়। এছাড়াও, আমন্ত্রণপত্রের মাধ্যমে অংশীজনগণকে আমন্ত্রণ জানানো হয়।

৩. সভার উদ্বোধন

পবিত্র কুরআন তেলাওয়াত পাঠ এবং পরিচিত পর্বের মাধ্যমে আনুষ্ঠানিকভাবে জনমত যাচাই সভার কার্যক্রম শুরু করা হয় এরপর জনাব উজ্জ্বল রায়, উপজেলা নির্বাহী অফিসার অংশগ্রহণকারীদের স্বাগত জানিয়ে সভা শুরু করেন। তিনি

জনাব, বর্তমানে সিলিকা বালুর কোয়ারীর ইজারাদার বক্স আছে। তিনি তাঁর বক্তব্যে উল্লেখ করেন যে, প্রকল্পের পরিবেশগত ও সামাজিক প্রভাব মূল্যায়নের অংশ হিসেবে এই জনমত যাচাই সভার আয়োজন করা হয়েছে। এই ধরনের সভার মাধ্যমে স্থানীয় জনগণের মতামত, পরামর্শ এবং উদ্বেগসমূহ সংগ্রহ করা অত্যন্ত গুরুত্বপূর্ণ, যাতে প্রকল্প বাস্তবায়নের সময় পরিবেশ সুরক্ষা এবং স্থানীয় জনগণের স্বার্থ যথাযথভাবে বিবেচনায় নেওয়া যায়। তিনি আরও বলেন, একটি প্রকল্পের ফলে এলাকার অর্থনৈতিক কর্মকাণ্ড বৃদ্ধি, কর্মসংস্থান সৃষ্টি এবং অবকাঠামোগত উন্নয়ন সম্ভব হলেও পরিবেশের ভারসাম্য রক্ষা করা সমানভাবে জরুরি। তাই প্রকল্পের পরিকল্পনা ও বাস্তবায়নের ক্ষেত্রে পরিবেশগত আইন, মানদণ্ড এবং প্রয়োজনীয় প্রশমন ব্যবস্থা যথাযথভাবে অনুসরণ করা হবে বলে তিনি আশ্বাস ব্যক্ত করেন। শেষে তিনি সকল অংশগ্রহণকারীকে সভায় সক্রিয়ভাবে অংশগ্রহণ করে গঠনমূলক মতামত প্রদান করার জন্য আহ্বান জানান এবং আশা প্রকাশ করেন যে সকলের সহযোগিতার মাধ্যমে প্রকল্পটি পরিবেশসম্মত ও টেকসইভাবে বাস্তবায়ন করা সম্ভব হবে।

৪. পরিবেশগত প্রভাব মূল্যায়নের খসড়া প্রতিবেদনের উপর উপস্থাপনা

ইকিউএমএস (EQMS) কনসালটিং লিমিটেডের কনসালটেন্ট এবং পরিবেশ বিশেষজ্ঞ জনাব ফাহিম উদ্দীন অংশগ্রহণকারীদের আন্তরিক শুভেচ্ছা জানিয়ে উপস্থাপনা শুরু করেন। তিনি খসড়া পরিবেশগত প্রভাব নিরূপণ প্রতিবেদনের উপর নিম্নলিখিত বিষয়গুলি সম্পর্কে একটি উপস্থাপনা প্রদান করেন:

১. জনমতের উদ্দেশ্য
২. প্রকল্পের পটভূমি
৪. প্রকল্পের বর্ণনা
৫. প্রকল্প সংশ্লিষ্ট নমুনা নকশা
৬. পরিবেশগত বেসলাইন ডেটা
৭. পরিবেশগত এবং সামাজিক প্রভাব মূল্যায়ন
৮. পরিবেশ ব্যবস্থাপনা পরিকল্পনা
৯. পরিবেশ পর্যবেক্ষণ পরিকল্পনা
১০. উপসংহার এবং সুপারিশ।

জনমত যাচাই সভার উপস্থাপনা, উপস্থিতি শীট এবং জনমত যাচাই সভার ছবি পরিশিষ্ট- এ উপস্থাপন করা হয়েছে।

৫. মুক্ত আলোচনা এবং প্রতিক্রিয়া

উপস্থাপনার পরে, একটি প্রশ্নোত্তর পর্ব ও মুক্ত আলোচনা অনুষ্ঠিত হয়, যা টেবিল-১ এ উপস্থাপন করা হয়েছে। ইকিউএমএস কনসালটিং লিমিটেডের পরিবেশ বিশেষজ্ঞ জনাব ফাহিম উদ্দীন, বিএমডির পক্ষে জনাব মাসুক উল নবী, সহকারী পরিচালক, পরিবেশ অধিদপ্তর এর পক্ষে জনাব ড ইউসুফ আলী, উপ পরিচালক প্রশ্নগুলোর উত্তর প্রদান করেন।

EQMS BMD

টেবিল ১- জনমত সভার প্রশ্ন উত্তর পর্বের বিবরন

ক্রম নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
১	এ কে এম মহিউদ্দিন চৌধুরী, USSO, বাহুবল	বাহুবল উপজেলার বিভিন্ন ছড়া ও নদীভিত্তিক সিলিকা বালুমহলগুলোতে দীর্ঘদিন ধরে অনিয়ন্ত্রিত ও অবৈধ বালু উত্তোলন কার্যক্রম পরিচালিত হচ্ছে। এর ফলে প্রাকৃতিক ড্রেনেজ ব্যবস্থা মারাত্মকভাবে ব্যাহত হচ্ছে, যা বর্ষা মৌসুমে জলাবদ্ধতা সৃষ্টি করছে এবং কৃষিজমির উৎপাদনশীলতা হ্রাস করছে। পাশাপাশি বসতবিটা ক্ষতিগ্রস্ত হচ্ছে। বিশেষ করে শ্মশানছড়া ও দিগম্বর ছড়ায় খননের গভীরতা ও বিস্তৃতি যথাযথভাবে নিয়ন্ত্রন না করা হলে ভবিষ্যতে স্রোত কাঠামো ও পরিবেশের উপর গুরুতর নেতিবাচক প্রভাব পড়তে পারে।	এ বিষয়ে প্রকল্প কর্তৃপক্ষ উল্লেখ করে যে, একটি বৈজ্ঞানিক ও পরিবেশসম্মত Mining Plan প্রণয়ন ও বাস্তবায়ন করা হবে, যেখানে নির্দিষ্ট গভীরতা ও খনন এলাকা নির্ধারণ থাকবে। প্রাকৃতিক ড্রেনেজ ব্যবস্থা সংরক্ষণের জন্য বিশেষ ব্যবস্থা গ্রহণ করা হবে এবং অবৈধ বালু উত্তোলন প্রতিরোধে স্থানীয় প্রশাসনের সাথে সমন্বয় করে কঠোর তদারকি নিশ্চিত করা হবে।
২	খালেদ আহমেদ আবির, সাংবাদিক	স্থানীয়ভাবে প্রভাবশালী কিছু গোষ্ঠী নিয়ম বহির্ভূতভাবে বিভিন্ন ছড়া থেকে বালু উত্তোলন করছে, যা শুধু পরিবেশের ক্ষতিই করছে না, বরং স্থানীয় জনগণের নিরাপত্তার জন্যও হুমকি তৈরি করছে। এ বিষয়ে বিভিন্ন গণমাধ্যমে প্রতিবেদন প্রকাশিত হলেও অনেক ক্ষেত্রে কার্যকর প্রতিকারমূলক ব্যবস্থা গ্রহণ করা হচ্ছে না।	প্রকল্পের আওতায় স্বচ্ছতা ও জবাবদিহিতা নিশ্চিত করা হবে। স্থানীয় প্রশাসন, আইনশৃঙ্খলা বাহিনী এবং গণমাধ্যমের সাথে সমন্বয়ের মাধ্যমে একটি নিয়মিত মনিটরিং ও রিপোর্টিং ব্যবস্থা গড়ে তোলা হবে, যাতে অনিয়ম দ্রুত শনাক্ত ও প্রতিরোধ করা যায়।
৩	সিদ্দিকুর রহমান মামুন, সাংবাদিক, দৈনিক যুগান্তর	কবাদী নদী ও আশেপাশের ছড়াগুলোতে অতিরিক্ত বালু উত্তোলনের কারণে নদীর স্বাভাবিক প্রবাহ ব্যাহত হচ্ছে। এর ফলে নদী ভাঙন ও পাড় ক্ষয়ের ঝুঁকি বেড়ে যাচ্ছে, যা ভবিষ্যতে সড়ক, সেতু এবং অন্যান্য অবকাঠামোর জন্য হুমকি হয়ে দাঁড়াতে পারে।	নদীর স্বাভাবিক প্রবাহ বজায় রাখার জন্য নিয়ন্ত্রিত ও সীমিত পরিমাণে বালু উত্তোলন করা হবে। পাশাপাশি নদীতীর সংরক্ষণে প্রয়োজনীয় প্রতিরোধমূলক ব্যবস্থা গ্রহণ করা হবে এবং নিয়মিত গ্রাউন্ডস্লোপিজিক্যাল মনিটরিং পরিচালনা করা হবে।

EQMS BMD

ক্রঃ নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
৪	সজিদুর রহমান, সাংবাদিক, প্রেসক্লাব বাহুবল	বালু পরিবহনের সময় অতিরিক্ত ওজনবাহী ট্রাক চলাচলের কারণে স্থানীয় সড়ক দ্রুত ক্ষতিগ্রস্ত হচ্ছে এবং সাধারণ মানুষের চলাচলে ভোগান্তি তৈরি হচ্ছে।	এ সমস্যার সমাধানে নির্দিষ্ট পরিবহন রুট নির্ধারণ করা হবে এবং ট্রাকের ওজন নিয়ন্ত্রণের জন্য কঠোর ব্যবস্থা গ্রহণ করা হবে। এছাড়া সড়ক রক্ষণাবেক্ষণের জন্য সংশ্লিষ্ট কর্তৃপক্ষের সাথে সমন্বয় করে প্রয়োজনীয় উদ্যোগ নেওয়া হবে।
৫	মোহাম্মদ রবিউল ইসলাম, UPIO, বাহুবল	তথ্যের অভাব এবং যথাযথ যোগাযোগ না থাকার কারণে অনেক সময় স্থানীয় জনগণ প্রকল্পের উদ্দেশ্য ও কার্যক্রম সম্পর্কে ভুল ধারণা পোষণ করে, যা সামাজিক বিরোধ সৃষ্টি করতে পারে।	জনসচেতনতা বৃদ্ধির জন্য নিয়মিত stakeholder consultation, তথ্য প্রচার কার্যক্রম এবং একটি কার্যকর grievance redress mechanism (GRM) চালু করা হবে, যাতে জনগণের অভিযোগ দ্রুত সমাধান করা যায়।
৬	মোহাম্মদ সামিউল রেজা আসিফ, উপজেলা মৎস্য কর্মকর্তা, বাহুবল	অতিরিক্ত খননের ফলে ছড়া ও নদীতে জলজ প্রাণীর আবাসস্থল ধ্বংস হচ্ছে এবং মাছের প্রজনন প্রক্রিয়া ব্যাহত হচ্ছে, যা স্থানীয় মৎস্য সম্পদের জন্য মারাত্মক ক্ষতিকর।	সংবেদনশীল ও গুরুত্বপূর্ণ মৎস্য আবাসস্থলগুলো চিহ্নিত করে সেখানে খনন কার্যক্রম সীমিত করা হবে। এছাড়া মাছের প্রজনন মৌসুমে বালু উত্তোলন নিয়ন্ত্রণ বা সাময়িকভাবে বন্ধ রাখা হবে।
৭	মোহাম্মদ নুরুল আমিন, রাজনীতিবিদ	বালুমহাল স্থানীয় অর্থনীতিতে অবদান রাখলেও অনিয়ন্ত্রিত কার্যক্রমের কারণে সাধারণ জনগণ ক্ষতিগ্রস্ত হচ্ছে। তাই সরকারকে কঠোর নিয়ন্ত্রণ ব্যবস্থা গ্রহণ করতে হবে।	সরকার অনুমোদিত নীতিমালার আওতায় স্বচ্ছ ও প্রতিযোগিতামূলক ইজারা পদ্ধতি বাস্তবায়ন করা হবে এবং সকল কার্যক্রম আইনগত কাঠামোর মধ্যে পরিচালিত হবে।
৮	এনামুল হক এনাম, রাজনীতিবিদ	স্থানীয় জনগণের স্বার্থ উপেক্ষা করে কোনো উন্নয়ন প্রকল্প গ্রহণ করা উচিত নয়। ক্ষতিগ্রস্ত জনগণের যথাযথ ক্ষতিপূরণ ও পুনর্বাসন নিশ্চিত করা জরুরি।	ক্ষতিগ্রস্তদের জন্য একটি সমন্বিত Resettlement and Compensation Plan প্রণয়ন করা হবে, যেখানে ক্ষতিপূরণ, পুনর্বাসন এবং বিকল্প জীবিকার সুযোগ অন্তর্ভুক্ত থাকবে।

EQMS BMD

ক্রঃ নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
৯	মোহাম্মদ মহিবুল রহমান, সিনিয়র অফিসার, পল্লী সঞ্চয় ব্যাংক, বাহুবল	ঋণ উত্তোলনের মাধ্যমে স্বল্পমেয়াদে অর্থনৈতিক কার্যক্রম বৃদ্ধি পেলেও দীর্ঘমেয়াদে পরিবেশগত ক্ষতির কারণে অর্থনৈতিক ক্ষতির ঝুঁকি রয়েছে, যা টেকসই উন্নয়নের পথে বাধা সৃষ্টি করতে পারে।	ESG (Environmental, Social and Governance) ভিত্তিক ব্যবস্থাপনা পদ্ধতি অনুসরণ করে অর্থনৈতিক উন্নয়ন ও পরিবেশ সংরক্ষণের মধ্যে ভারসাম্য বজায় রাখা হবে।
১০	ডাঃ জাহেদ খান, কনসালটেন্ট	বাহুবল উপজেলার বিভিন্ন বালুমহলের জন্য একটি সমন্বিত ও বৈজ্ঞানিক পরিকল্পনা অত্যন্ত প্রয়োজন, যাতে cumulative impact বিবেচনায় এনে দীর্ঘমেয়াদি টেকসই ব্যবস্থাপনা নিশ্চিত করা যায়।	একটি সমন্বিত Sustainable Mining Plan প্রণয়ন করা হবে, যেখানে cumulative impact assessment অন্তর্ভুক্ত থাকবে এবং নিয়মিত পরিবেশগত ও সামাজিক মনিটরিংয়ের মাধ্যমে পরিকল্পনার কার্যকর বাস্তবায়ন নিশ্চিত করা হবে।

EQMS BMD

৬. বিশেষ অতিথির বক্তব্য

বিশেষ অতিথি হিসেবে বক্তব্য প্রদানকালে পরিবেশ অধিদপ্তর, হবিগঞ্জ-এর উপ পরিচালক জনাব ড. মোঃ ইউসুফ আলী সভার শুরুতেই উপস্থিত সকল অংশীজনকে জনমত যাচাই সভায় সক্রিয় অংশগ্রহণ এবং তাদের সুচিন্তিত ও গঠনমূলক মতামত প্রদানের জন্য আন্তরিক ধন্যবাদ জানান। তিনি আয়োজক সংস্থাকেও পরিবেশগত প্রভাব নিরূপণ (EIA) এর খসড়া প্রতিবেদন সুন্দর ও সুশৃঙ্খলভাবে উপস্থাপনের জন্য প্রশংসা করেন।

তিনি তার বক্তব্যে আরও বলেন যে, পরিবেশ অধিদপ্তরের পক্ষ থেকে ১৭/০৬/২০২৫ তারিখে সদর দপ্তরে প্রেরিত মতামতে উল্লেখ করা হয়েছে এই কোয়ারীগুলো থেকে বালু উত্তোলনের ফলে নদীর স্বাভাবিক গতিপথ পরিবর্তিত হতে পারে, পাহাড় বা টিলা ধসের ঝুঁকি বৃদ্ধি পেতে পারে এবং সামগ্রিকভাবে পরিবেশ ও জনজীবনে বিরূপ প্রভাব সৃষ্টি হতে পারে। এসব বিষয় বিবেচনায় নিয়ে তিনি মত দেন যে, উপরোক্ত কোয়ারীগুলোতে বালু উত্তোলনের জন্য অবস্থানগত ছাড়পত্র প্রদান করা সমীচীন নয় বলে প্রতীয়মান হয়।

তিনি আরও উল্লেখ করেন যে, Bangladesh Environmental Lawyers Association (BELA)-এর "Demand for Justice"-এর প্রেক্ষিতে জানানো হয়েছে যে, হবিগঞ্জ জেলার ২৩টি সিলিকা বালুর অবস্থান খাদ, ছড়া, নদী, চা বাগান, গ্রামাঞ্চল, বনাঞ্চল, বসতভিটা, শিক্ষা প্রতিষ্ঠান, ঐতিহ্য স্থাপনা, রাস্তা এবং পাহাড়ি টিলা সংলগ্ন এলাকায় অবস্থিত। এসব পরিবেশগতভাবে সংবেদনশীল এলাকায় খনন কার্যক্রম পরিচালিত হলে পরিবেশ ও প্রতিবেশের ওপর গুরুতর নেতিবাচক প্রভাব পড়ার আশঙ্কা রয়েছে।

তিনি তার বক্তব্যে অংশীজন মতবিনিময় সভার গুরুত্ব তুলে ধরে বলেন যে, এ ধরনের জনসম্পৃক্ততা প্রকল্পের বাস্তবায়নের পূর্বে সম্ভাব্য পরিবেশগত ও সামাজিক প্রভাবসমূহ সঠিকভাবে চিহ্নিত করতে গুরুত্বপূর্ণ ভূমিকা পালন করে। তিনি উল্লেখ করেন যে, প্রস্তাবিত সিলিকা বালু কোয়ারীগুলো পরিবেশগতভাবে অত্যন্ত সংবেদনশীল এলাকায় অবস্থিত, যেখানে যেকোনো বালু উত্তোলন কার্যক্রম সরাসরি পানি, মাটি, বায়ু, জীববৈচিত্র্য এবং স্থানীয় মানুষের জীবন-জীবিকার উপর প্রভাব ফেলতে পারে। তাই প্রকল্প বাস্তবায়নের পূর্বে যথাযথভাবে পরিবেশগত প্রভাব নিরূপণ (EIA) সম্পন্ন করা এবং তা বিদ্যমান আইন ও বিধিমালার আলোকে মূল্যায়ন করা অত্যন্ত জরুরি।

এক্ষেত্রে হবিগঞ্জ জেলার ২৩ টি সিলিকা বালুর কোয়ারীর তালিকা সংক্রান্ত খনিজ সম্পদ বুরো কর্তৃক প্রকাশিত থেকেট সমাশোধন করা যেতে পারে।

সর্বশেষে তিনি জোর দিয়ে বলেন যে, উন্নয়ন কার্যক্রম অবশ্যই পরিবেশগত সুরক্ষা ও টেকসই ব্যবস্থাপনার সাথে সামঞ্জস্যপূর্ণ হতে হবে। তাই প্রকল্প বাস্তবায়নের ক্ষেত্রে পরিবেশগত সংবেদনশীলতা, স্থানীয় জনগণের মতামত এবং বৈজ্ঞানিক বিশ্লেষণকে সর্বোচ্চ গুরুত্ব দিয়ে সিদ্ধান্ত গ্রহণ করা উচিত।

৭. সভাপতির বক্তব্য

উজ্জ্বল রায়, উপজেলা নির্বাহী অফিসার মতবিনিময় সভায় সিলিকা বালু কোয়ারী প্রকল্পের বাস্তবায়ন প্রক্রিয়া, প্রকল্পকাজের মান বজায় রাখা এবং পরিবেশ সুরক্ষার গুরুত্ব তুলে ধরেন। তিনি বলেন, প্রকল্পের প্রতিটি কার্যক্রম স্থানীয় জনগণের জীবনযাত্রা, কৃষি, পানি ব্যবস্থাপনা এবং পরিবেশের উপর সরাসরি প্রভাব ফেলে, তাই সব কাজ অত্যন্ত সতর্কতা ও দায়িত্বশীলতার সঙ্গে বাস্তবায়ন করা হবে। তিনি আরও জানান, প্রকল্প এলাকায় কাজের সময় পরিবেশগত মানদণ্ড, সামাজিক নিরাপত্তা এবং প্রাকৃতিক পানি প্রবাহের স্বাভাবিকতা রক্ষায় সর্বোচ্চ গুরুত্ব দেওয়া হবে। যেকোনো প্রকল্প শুরু করার আগে এলাকার জনগণের অবস্থান, কৃষিজমি, যোগাযোগব্যবস্থা ও পানি প্রবাহ সম্পর্কিত বিষয়গুলো বিশ্লেষণ করে কাজ শুরু করা হবে।

EQMS BMD

এছাড়া তিনি কমিউনিটিকে আশ্বস্ত করে বলেন যে, পরিবেশের কোনো ধরনের ক্ষতি যাতে না হয়, সে বিষয়টি সর্বোচ্চ অগ্রাধিকার দিয়ে প্রতিটি ধাপে পরিবেশগত প্রভাব মূল্যায়ন ও প্রয়োজনীয় প্রশমন ব্যবস্থা গ্রহণ করা হবে। প্রকল্প চলাকালে ধূলাবালি, শব্দদূষণ, যানবাহন চলাচল এবং খননজনিত ভোগান্তি কমাতে বিশেষ ব্যবস্থা নেওয়া হবে। তিনি আরও উল্লেখ করেন যে স্থানীয় জনগণের উত্থাপিত সমস্যাগুলো বাস্তবায়ন পর্যায়ে বিবেচনায় নেওয়া হবে এবং উপজেলা প্রশাসন নিয়মিত তদারকির মাধ্যমে উদ্যোক্তাদের গৃহীত মান নিশ্চিত করবে।

৯. জনমত যাচাই সভার সারাংশ

প্রস্তাবিত সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশ এবং সামাজিক প্রভাব মূল্যায়ন (EIA) প্রক্রিয়ার অংশ হিসেবে একটি খসড়া EIA রিপোর্ট প্রস্তুত করা হয় এবং ৬ এপ্রিল ২০২৬ তারিখে মাধবপুর উপজেলা পরিষদ সম্মেলন কক্ষে অনুষ্ঠিত অংশীজন পরামর্শ সভার উপস্থাপন করা হয়। সভায় মোট ২৬ জন অংশগ্রহণ করেন, যার মধ্যে সরকারি দপ্তরের প্রতিনিধি, স্থানীয় নির্বাচিত কর্মকর্তা, সাংবাদিক, এবং প্রকল্প এলাকার স্থানীয় সম্প্রদায়ের সদস্যরা ছিলেন। সভায় প্রকল্পের পটভূমি, লক্ষ্য, সম্ভাব্য প্রকৌশল কাঠামো, পরিবেশগত ভিত্তি অবস্থান এবং প্রকল্পের প্রত্যাশিত পরিবেশ ও সামাজিক প্রভাব সম্পর্কে বিস্তারিত উপস্থাপনা দেওয়া হয়। আলোচনায় সর্বাধিক গুরুত্ব পেয়েছে অনিয়ন্ত্রিত ও অবৈধ বালু উত্তোলনের ফলে প্রাকৃতিক ড্রেনেজ ব্যবস্থা ব্যাহত হওয়া, নদীর স্বাভাবিক প্রবাহে বিঘ্ন সৃষ্টি, ভাঙন ও পাড় ধস বৃদ্ধি, কৃষিজমি ও বসতভিটার ক্ষতি এবং জীববৈচিত্র্যের উপর নেতিবাচক প্রভাব। বিশেষ করে শশানছড়া, দিগদর ছড়া এবং করাংগী নদীর ক্ষেত্রে অতিরিক্ত খননের কারণে ভবিষ্যতে পরিবেশগত ঝুঁকি আরও বাড়তে পারে বলে মতামত প্রদান করা হয়। এছাড়া প্রতিরিক্ত ওজনবাহী ট্রাক চলাচলের কারণে সড়ক অবকাঠামোর ক্ষতি এবং জলনুর্ঝোণের বিষয়টিও গুরুত্ব সহকারে আলোচিত হয়।

সামাজিক দিক থেকে অংশগ্রহণকারীরা উল্লেখ করেন যে, তথ্যের স্বল্পতা ও যথাযথ যোগাযোগের অভাবে স্থানীয় জনগণের মধ্যে ভুল ধারণা ও বিরোধ সৃষ্টি হতে পারে। পাশাপাশি প্রভাবশালী গোষ্ঠীর মাধ্যমে অবৈধ বালু উত্তোলন এবং তার ফলে স্থানীয় জনগণের নিরাপত্তা ঝুঁকি নিয়েও উদ্বেগ প্রকাশ করা হয়। মৎস্য সম্পদের উপর প্রভাবের বিষয়টিও বিশেষভাবে উঠে আসে, যেখানে অতিরিক্ত খননের ফলে মাছের আবাসস্থল ধ্বংস ও প্রজনন ব্যাহত হওয়ার বিষয়টি উল্লেখ করা হয়।

অর্থনৈতিকভাবে বালুমহল স্থানীয় অর্থনীতিতে ইতিবাচক ভূমিকা রাখলেও, দীর্ঘমেয়াদে পরিবেশগত ক্ষতির কারণে সম্ভাব্য অর্থনৈতিক ঝুঁকির বিষয়টি অংশগ্রহণকারীরা তুলে ধরেন। একই সাথে ক্ষতিগ্রস্ত জনগণের যথাযথ ক্ষতিপূরণ, পুনর্বাসন এবং বিকল্প জীবিকার সুযোগ নিশ্চিত করার প্রয়োজনীয়তার ওপর জোর দেওয়া হয়।

উত্তরে প্রকল্প কর্তৃপক্ষ জানায় যে, একটি বৈজ্ঞানিক ও সমন্বিত Sustainable Mining Plan প্রণয়ন করা হবে, যেখানে নির্দিষ্ট গভীরতা ও খনন এলাকা নির্ধারণ, প্রাকৃতিক ড্রেনেজ সংরক্ষণ, নদীর স্বাভাবিক প্রবাহ বজায় রাখা এবং সংবেদনশীল এলাকাগুলোতে খনন সীমিত করার বিষয়গুলো অন্তর্ভুক্ত থাকবে। অবৈধ বালু উত্তোলন প্রতিরোধে প্রশাসনিক তদারকি জোরদার করা হবে এবং স্বচ্ছতা ও জবাবদিহিতা নিশ্চিত করতে নিয়মিত মনিটরিং ও রিপোর্টিং ব্যবস্থা গড়ে তোলা হবে।

এছাড়া জনসচেতনতা বৃদ্ধির জন্য নিয়মিত অংশীজন সভা, তথ্য প্রচার এবং কার্যকর grievance redress mechanism (GRM) চালুর পরিকল্পনা উল্লেখ করা হয়। ক্ষতিগ্রস্তদের জন্য ক্ষতিপূরণ ও পুনর্বাসন ব্যবস্থা গ্রহণ এবং ESG ভিত্তিক ব্যবস্থাপনার মাধ্যমে পরিবেশ ও অর্থনীতির মধ্যে ভারসাম্য রক্ষা করার প্রতিশ্রুতি দেওয়া হয়।

বিশেষ অতিথি তার বক্তব্যে উল্লেখ করেন যে সিলিকা বালু কোয়ারী এলাকা পরিবেশগতভাবে সংবেদনশীল হওয়ায় এখানে যেকোনো ধরনের বালু উত্তোলন কার্যক্রম অত্যন্ত সতর্কতার সাথে পরিচালনা করতে হবে। তিনি EIA প্রক্রিয়ার গুরুত্ব তুলে ধরে বলেন যে প্রকল্প বাস্তবায়নের পূর্বে যথাযথ পরিবেশগত মূল্যায়ন এবং আইনগত কাঠামো অনুসরণ করা অত্যন্ত জরুরি।

সভাপতি তার বক্তব্যে প্রকল্প বাস্তবায়নের ক্ষেত্রে পরিবেশ সংরক্ষণ, সামাজিক নিরাপত্তা এবং স্থানীয় জনগণের স্বার্থকে সর্বোচ্চ গুরুত্ব দেওয়ার ওপর জোর দেন। তিনি আশ্বস্ত করেন যে প্রকল্পের প্রতিটি ধাপে পরিবেশগত মানদণ্ড অনুসরণ

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করা হবে এবং স্থানীয় জনগণের উত্থাপিত সমস্যা ও সুপারিশসমূহ যথাযথভাবে বিবেচনায় নেওয়া হবে। উপজেলা প্রশাসনের নিয়মিত তদারকির মাধ্যমে প্রকল্পের গুণগত মান ও পরিবেশগত সুরক্ষা নিশ্চিত করা হবে বলেও তিনি উল্লেখ করেন।

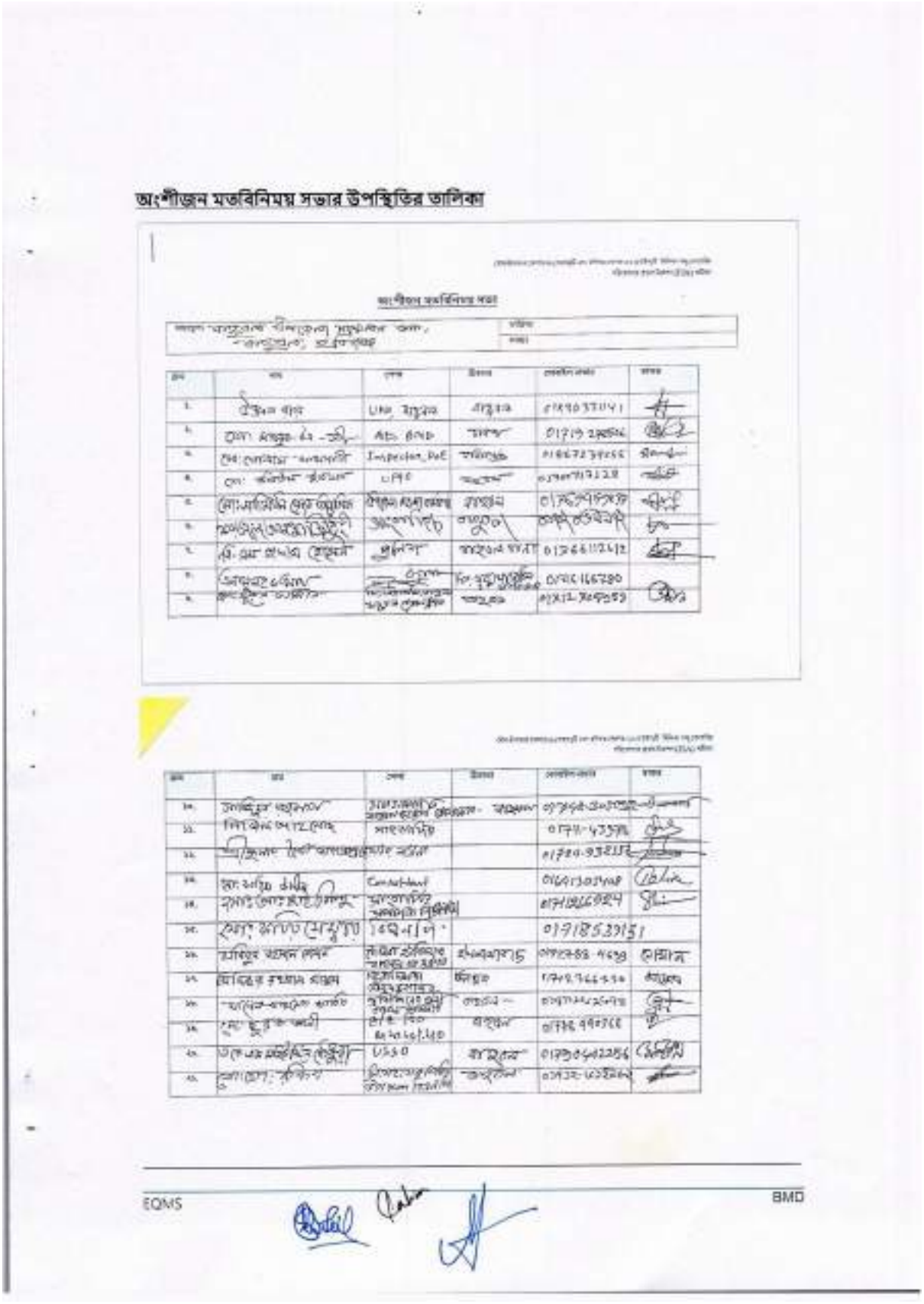
সার্বিকভাবে, অংশীজনরা একমত হন যে প্রকল্পটি যদি স্বচ্ছতা, জবাবদিহিতা, পরিবেশবান্ধব ব্যবস্থাপনা এবং স্থানীয় জনগণের সক্রিয় অংশগ্রহণের মাধ্যমে বাস্তবায়ন করা হয়, তবে এটি অবৈধ বালু উত্তোলন নিয়ন্ত্রণ, পরিবেশ সুরক্ষা, এবং স্থানীয় অর্থনৈতিক উন্নয়নে গুরুত্বপূর্ণ ভূমিকা রাখতে সক্ষম হবে।

উপসংহারে বলা যায় যে, জনমত যাচাই সভায় প্রাপ্ত মতামত, উদ্বেগ এবং সুপারিশসমূহ বিবেচনায় নিয়ে প্রস্তাবিত সিলিকা বালু কোয়ারী প্রকল্প বাস্তবায়ন করা হলে এটি পরিবেশগত ভারসাম্য রক্ষা এবং স্থানীয় জনগণের জীবিকা ও নিরাপত্তা নিশ্চিত করার পাশাপাশি একটি টেকসই ও সুশাসিত সম্পদ ব্যবস্থাপনার মডেল হিসেবে প্রতিষ্ঠিত হতে পারে।

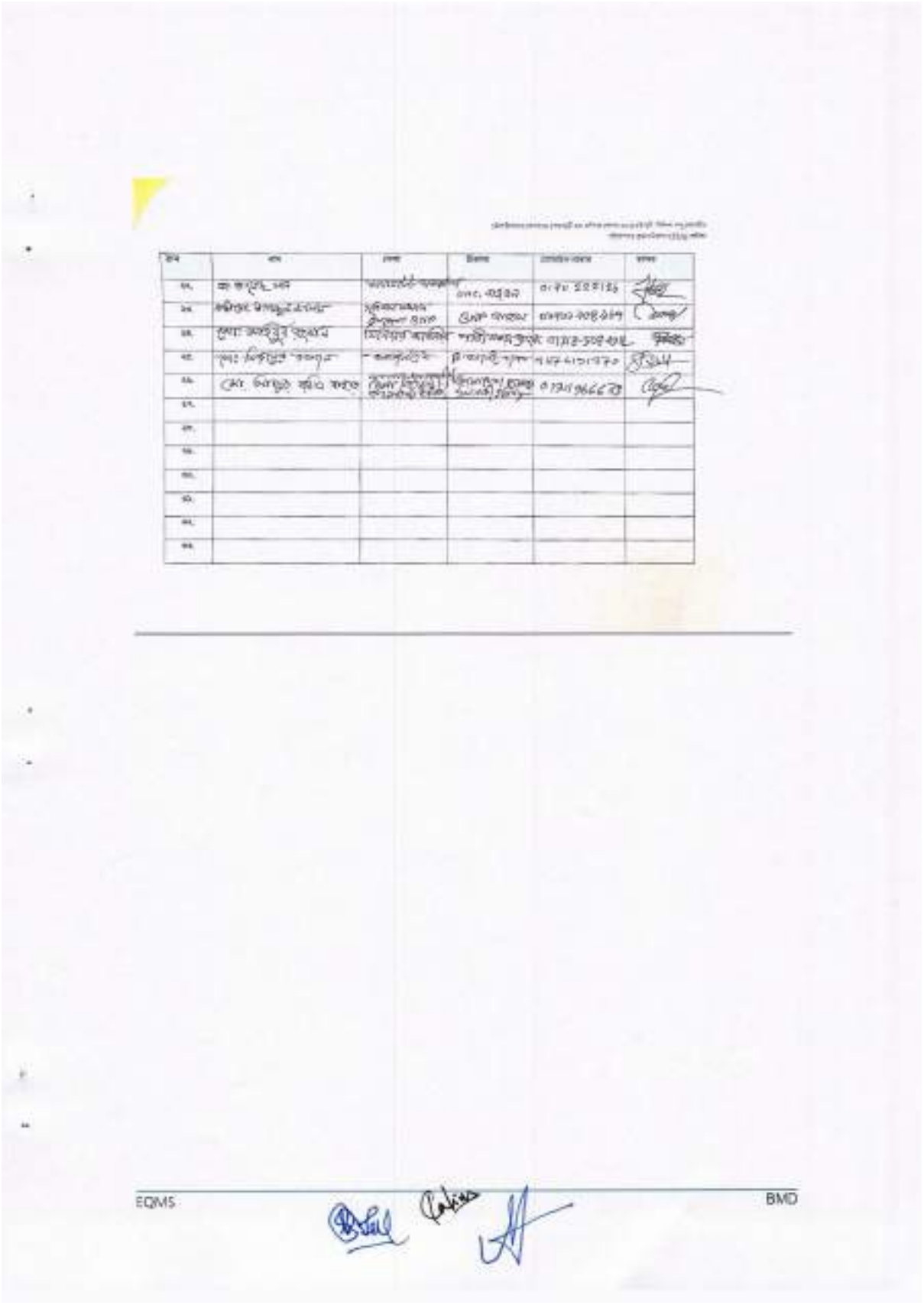
মোহাম্মদ মাসুক উল গণী	**ফাহিম উদ্দীন**	**ড মোঃ ইউসুফ আলী**
সহকারী পরিচালক, বিএমডি	কনসালটেন্ট	উপ পরিচালক
ইমেইলঃ adgeophy@bomd.gov.bd	ইকিউএমএস কনসালটিং লিমিটেড	পরিবেশ অধিদপ্তর, হবিগঞ্জ
মোবাইলঃ ০১৭১৯২৭৮৫০৬	ইমেইলঃ fahim.uddin@eqms.com.bd	ইমেইলঃ yousufdoe@gmail.com
	মোবাইলঃ ০১৯৪৩৬৫৫৪০৮	মোবাইলঃ ০১৭১৭৪৯১৫২৩

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হবিগঞ্জ জেলা পরিষদের প্রশাসক হলেন আহমেদ আলী মুকিব

মহান মে দিবস পালনে প্রস্তুতি সভা

বানিয়াচংয়ে মসজিদের হিসাব নিয়ে সংঘর্ষের জেরে প্রতিপক্ষের বাড়ি-ঘরে হামলা, ভাংচুর নগদ টাকা ও ফার্নিচার লুটপাট ১ এলাকায় ক্ষোভ

চাঁদা না দেয়ায় পাইপ চুরির অভিযোগে নবীগঞ্জে বালু উত্তোলনে জোগাড়ি চালাবাজদের অত্যাচারে অতিষ্ট ব্যবসায়ীরা

নবীগঞ্জ এক সংবাদপত্র পরিবারে ভূমি জরিপ দপ্তরে চেরী ডিএলপি নেয়া শহীদ ও তার অনুসরীদের

বানিয়াচংয়ে প্রতিপক্ষের লোকজনকে ফাঁসাতে বৃদ্ধাকে হত্যার অভিযোগ

বাড়িঘরে কয়েক দফায় হামলা, ভাংচুর ও লুটপাট

বানিয়াচংয়ের হাওরাঞ্চলে জলাবদ্ধতা জেলার সংকট তদন্ত করে দ্রুত প্রত্যয়ন পত্র দেয়ার নির্দেশ জেলা প্রশাসকের

নবীগঞ্জে চাঁদা না পেয়ে গ্যারেজ মালিকের উপর হামলার অভিযোগ

ব্যারিস্টার হলেন হবিগঞ্জের কৃতি সন্তান অ্যাডভোকেট নিগার সুলতানা

রক্তদান সংগঠন 'ব্লাড সেল ইন বাংলাদেশ'-এর কেন্দ্রীয় ও প্রবাসী নতুন কমিটি গঠন

আহমেদ আলী মুকিব
প্রশাসক
আন্তরিক শুভেচ্ছা

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সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশগত প্রভাব নিরূপণ (ইআইএ) এর জন্য

জনমত যাচাই সভা

স্থান: মাধবপুর উপজেলা পরিষদ সম্মেলন কক্ষ, উপজেলা: মাধবপুর, জেলা: হবিগঞ্জ



জনমত যাচাই সভার বিবরণী

৫ এপ্রিল ২০২৬

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সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশগত প্রভাব নিরূপণ (ইআইএ) এর জন্য জনমত যাচাই সভা

স্থান: মাধবপুর উপজেলা পরিষদ সম্মেলন কক্ষ, উপজেলা: মাধবপুর, জেলা: হবিগঞ্জ

কেন্দ্র: উপজেলা পরিষদ সম্মেলন কক্ষ, মাধবপুর, হবিগঞ্জ

তারিখ: ৫ এপ্রিল ২০২৬ **সময়:** বিকাল ০৩:০০ ঘটিকা হতে বিকাল ০৫:০০ ঘটিকা

সভাপতি: মোঃ মুজিবুল ইসলাম, উপজেলা ভূমি কর্মকর্তা ও সহকারী কমিশনার (ভূমি)

বিশেষ অতিথি: ড মোঃ ইউসুফ আলী, উপ পরিচালক, পরিবেশ অধিদপ্তর

অতিথিবৃন্দ:

১. মোহাম্মদ মাসুক উন নবী, সহকারী পরিচালক, বিএমডি

২. গোলাম সমদানী , পরিদর্শক, পরিবেশ অধিদপ্তর

৩. শহীদুল ইসলাম, সার্ভেয়ার, মাধবপুর

৪. শেখ সাইফুর রহমান সিটন, মেম্বার, শহজাহানপুর ইউনিয়ন

৫. পারভেজ হোসেন চৌধুরী, চেয়ারম্যান, ৬ নং শহজাহানপুর ইউনিয়ন

৬. স্থানীয় নেতৃবৃন্দ, সাংবাদিক ও সিলিকা বালু কোয়ারীর জনগণ।

১. ভূমিকা

জনমত যাচাই সভা হল এমন একটি প্রক্রিয়া যা জনসাধারণকে প্রকল্পের বিষয়ে তাদের মতামত উপস্থাপন এবং সংশ্লিষ্ট সিদ্ধান্ত গ্রহণের ক্ষেত্রে তাদের মন্তব্য/অভিমত বিবেচনা করার সুযোগ প্রদান করে থাকে। পরিবেশ সংরক্ষণ বিধিমালা ২০২৩ (বিধি ১৬) অনুযায়ী, খসড়া পরিবেশগত প্রভাব নিরূপনের অংশ হিসেবে প্রকল্পের পরিবেশগত প্রভাব এর বিষয়ে স্থানীয় জনগনের কাছে তথ্য উন্মুক্ত করার জন্য এবং সে বিষয়ে তাদের মতামত গ্রহণের জন্য এই জনমত যাচাই সভার আয়োজন করা হয়। বর্ণিত জনমত যাচাই সভাটি গত ৫ এপ্রিল ২০২৬ তারিখে অনুষ্ঠিত হয়। সভায় উক্ত এলাকার বিভিন্ন প্রতিষ্ঠান ও অংশীজন থেকে মোট ৪০ জন প্রতিনিধি উপস্থিত ছিলেন।

২ কার্যপদ্ধতি

পরিবেশ সংরক্ষণ বিধিমালা ২০২৩ (বিধি ১৬ এর উপবিধি ২) অনুসারে, উক্ত জনমত যাচাই সভা আয়োজন করার অনুমতি প্রসঙ্গে খসড়া পরিবেশগত প্রভাব নিরূপণ প্রতিবেদন ও এর বাংলা সারসংক্ষেপসহ একটি আবেদনপত্র পরিবেশ অধিদপ্তরের প্রধান কার্যালয়ে দাখিল করা হয়েছিল এবং এর পরিপ্রেক্ষিতে পরিবেশ অধিদপ্তর কর্তৃক উক্ত সভায় উপস্থিতির জন্য একজন প্রতিনিধির মনোনয়ন দেয়া হয়। গত ০১ এপ্রিল ২০২৬ তারিখে দৈনিক সমকাল নামক বাংলাদেশের একটি জাতীয় সংবাদপত্রে এবং দৈনিক সমাচার নামক একটি স্থানীয় সংবাদপত্রে উল্লেখিত জনমত যাচাই সভার বিজ্ঞপ্তি প্রকাশিত হয়। এছাড়াও, আমন্ত্রণপত্রের মাধ্যমে অংশীদারগণকে আমন্ত্রণ জানানো হয়।

৩. সভার উদ্বোধন

পবিত্র কুরআন তেলাওয়াত পাঠ এবং পরিচিত পর্বের মাধ্যমে আনুষ্ঠানিকভাবে জনমত যাচাই সভার কার্যক্রম শুরু করা হয় এরপর জনাব মোঃ মুজিবুল ইসলাম, উপজেলা ভূমি প্রশিসনার অংশগ্রহণকারীদের স্বাগত জানিয়ে সভা শুরু করেন।

EQMS BMD

তিনি জানান, বর্তমানে সিলিকা বালুর কোয়ারীর ইজারাদার বন্ধ আছে। তিনি এই বক্তব্যে উল্লেখ করেন যে, প্রকল্পের পরিবেশগত ও সামাজিক প্রভাব মূল্যায়নের অংশ হিসেবে এই জনমত যাচাই সভার আয়োজন করা হয়েছে। এই ধরনের সভার মাধ্যমে স্থানীয় জনগণের মতামত, পরামর্শ এবং উদ্বেগসমূহ সংগ্রহ করা অত্যন্ত গুরুত্বপূর্ণ, যাতে প্রকল্প বাস্তবায়নের সময় পরিবেশ সুরক্ষা এবং স্থানীয় জনগণের স্বার্থ যথাযথভাবে বিবেচনায় নেওয়া যায়। তিনি আরও বলেন, একটি প্রকল্পের ফলে এলাকার অর্থনৈতিক কর্মকাণ্ড বৃদ্ধি, কর্মসংস্থান সৃষ্টি এবং অবকাঠামোগত উন্নয়ন সম্ভব হলেও পরিবেশের ভারসাম্য রক্ষা করা সমানভাবে জরুরি। তাই প্রকল্পের পরিকল্পনা ও বাস্তবায়নের ক্ষেত্রে পরিবেশগত আইন, মানদণ্ড এবং প্রয়োজনীয় প্রশমন ব্যবস্থা যথাযথভাবে অনুসরণ করা হবে বলে তিনি আশাবাদ ব্যক্ত করেন। শেষে তিনি সকল অংশগ্রহণকারীকে সভায় সক্রিয়ভাবে অংশগ্রহণ করে গঠনমূলক মতামত প্রদান করার জন্য আহ্বান জানান এবং আশা প্রকাশ করেন যে সকলের সহযোগিতার মাধ্যমে প্রকল্পটি পরিবেশসম্মত ও টেকসইভাবে বাস্তবায়ন করা সম্ভব হবে।

৪. পরিবেশগত প্রভাব মূল্যায়নের খসড়া প্রতিবেদনের উপর উপস্থাপনা

ইকিউএমএস (EQMS) কনসাল্টিং লিমিটেডের কনসালটেন্ট এবং পরিবেশ বিশেষজ্ঞ জনাব ফাহিম উদ্দীন অংশগ্রহণকারীদের আন্তরিক শুভেচ্ছা জানিয়ে উপস্থাপনা শুরু করেন। তিনি খসড়া পরিবেশগত প্রভাব নিরূপণ প্রতিবেদনের উপর নিম্নলিখিত বিষয়গুলি সম্পর্কে একটি উপস্থাপনা প্রদান করেন:

১. জনমতের উদ্দেশ্য
২. প্রকল্পের পটভূমি
৪. প্রকল্পের বর্ণনা
৫. প্রকল্প সংশ্লিষ্ট নমুনা নকশা
৬. পরিবেশগত বেসলাইন ডেটা
৭. পরিবেশগত এবং সামাজিক প্রভাব মূল্যায়ন
৮. পরিবেশ ব্যবস্থাপনা পরিকল্পনা
৯. পরিবেশ পর্যবেক্ষণ পরিকল্পনা
১০. উপসংহার এবং সুপারিশ।

জনমত যাচাই সভার উপস্থাপনা, উপস্থিতি শীট এবং জনমত যাচাই সভার ছবি পরিশিষ্ট- এ উপস্থাপন করা হয়েছে।

৫. মুক্ত আলোচনা এবং প্রতিক্রিয়া

উপস্থাপনার পরে, একটি প্রশ্নোত্তর পর্ব ও মুক্ত আলোচনা অনুষ্ঠিত হয়, যা টেবিল-১ এ উপস্থাপন করা হয়েছে। ইকিউএমএস কনসালটিং লিমিটেডের পরিবেশ বিশেষজ্ঞ জনাব ফাহিম উদ্দীন, বিএমডির পক্ষ জনাব মাসুক উন নবী, সহকারী পরিচালক, পরিবেশ অধিদপ্তর এর পক্ষে জনাব ড ইউসুফ আলী, উপ পরিচালক প্রশ্নগুলোর উত্তর প্রদান করেন।

EQMS BMD

টেবিল ১- জনমত সভার প্রশ্ন উত্তর পর্বের বিবরন

ক্রম নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
১	সিরাজুল ইসলাম চৌধুরী, ছাত্র, সমন্বয়ক, বৈষম্যবিরোধী ছাত্র আন্দোলন	বালুমহলগুলোকে কেন্দ্র করে একটি শক্তিশালী ও প্রভাবশালী সিন্ডিকেট গড়ে উঠেছে, যারা প্রশাসনিক দুর্বলতা ও নজরদারির অভাবকে কাজে লাগিয়ে দীর্ঘদিন ধরে অনিয়ন্ত্রিতভাবে বালু উত্তোলন কার্যক্রম পরিচালনা করছে। এর ফলে স্থানীয় নদী ও খালের প্রাকৃতিক প্রবাহ ব্যাহত হচ্ছে, নদীতীর ভাঙন বৃদ্ধি পাচ্ছে এবং কৃষিজমির উপর নেতিবাচক প্রভাব পড়ছে। তিনি আরও বলেন, বর্তমান ব্যবস্থাপনায় স্বচ্ছতার অভাব রয়েছে, ফলে প্রকৃত যোগ্য ইজারাদারের সুযোগ পাচ্ছেন না। সঠিক পরিকল্পনা ও স্বচ্ছ ইজারা প্রক্রিয়া নিশ্চিত করা গেলে পরিবেশগত ক্ষতি অনেকাংশে হ্রাস পাবে বলে তিনি মত প্রকাশ করেন।	বালু উত্তোলন কার্যক্রমকে সম্পূর্ণভাবে নিয়ন্ত্রিত ও বৈজ্ঞানিক পদ্ধতির আওতায় আনা হবে। নদীর হাইড্রোলজিকাল স্টাডি ও সেডিমেন্ট বাজেট বিশ্লেষণের ভিত্তিতে নির্ধারিত সীমার মধ্যে বালু উত্তোলন করা হবে, যাতে প্রাকৃতিক ভারসাম্য বজায় থাকে। ইজারা প্রক্রিয়াকে স্বচ্ছ ও প্রতিযোগিতামূলক করার জন্য ডিজিটাল টেন্ডারিং এবং নির্দিষ্ট অডিট ব্যবস্থা চালু করা হবে। পাশাপাশি স্থানীয় প্রশাসন ও আইনশৃঙ্খলা বাহিনীর সহযোগিতায় অবৈধ উত্তোলন কার্যক্রম বন্ধে কঠোর মনিটরিং ও এনফোর্সমেন্ট জোরদার করা হবে।
২	অরিন্দম আলম ছাত্র	অবৈধ বালু উত্তোলনের কারণে আশপাশের বসতবাড়ি, কৃষিজমি এবং অবকাঠামো মারাত্মকভাবে ক্ষতিগ্রস্ত হচ্ছে। বিশেষ করে ব্রাহ্মণ ডেমটি বর্তমানে ঝুঁকিপূর্ণ অবস্থায় রয়েছে, যা ভেঙে গেলে বৃহৎ এলাকায় জলাবদ্ধতা ও কৃষিক্ষতি হতে পারে। তিনি আরও উল্লেখ করেন যে এসব অনিয়মের বিরুদ্ধে প্রতিবাদ জানাতে গিয়ে স্থানীয় প্রভাবশালী গোষ্ঠীর পক্ষ থেকে হুমকি ও শারীরিক হামলার শিকার হতে হয়েছে, যা স্থানীয় জনগণের নিরাপত্তার জন্য উদ্বেগজনক।	অবৈধ বালু উত্তোলন সম্পূর্ণরূপে বন্ধে প্রশাসনিকভাবে জিরো টলারেন্স নীতি গ্রহণ করা হবে। ব্রাহ্মণ ডেমসহ গুরুত্বপূর্ণ অবকাঠামোর সুরক্ষার জন্য নির্দিষ্ট বাফার জোন নির্ধারণ করা হবে, যেখানে কোনো ধরনের উত্তোলন কার্যক্রম অনুমোদিত হবে না। এছাড়া স্থানীয় জনগণের নিরাপত্তা নিশ্চিত করতে আইনশৃঙ্খলা বাহিনীর টহল বৃদ্ধি এবং অভিযোগ গ্রহণের জন্য একটি কার্যকর গ্রিভেন্স রেড্রেস মেকানিজম (GRM) চালু করা হবে।
৩	মোহাম্মদ মুজিবুল ইসলাম, এসিলাভ, মাধবপুর	হুড়াতে প্রাকৃতিকভাবে সঞ্চিত বালু যদি বৈজ্ঞানিক ও পরিকল্পিতভাবে উত্তোলন করা হয়, তাহলে এটি সরকারের জন্য একটি গুরুত্বপূর্ণ রাজস্ব উৎস হতে পারে এবং অবৈধ উত্তোলনও অনেকাংশে কমে আসবে। তবে তিনি সতর্ক করেন যে, এ ধরণের কার্যক্রম পরিচালনার ক্ষেত্রে	প্রকল্পের আওতায় সরকার অনুমোদিত ইজারা পদ্ধতির মাধ্যমে টেকসই বালু উত্তোলন নিশ্চিত করা হবে। পরিবেশগত প্রভাব মূল্যায়ন (EIA) অনুযায়ী নির্ধারিত গাইডলাইন কঠোরভাবে অনুসরণ করা হবে এবং পরিবেশ ব্যবস্থাপনা পরিকল্পনা (EMP) বাস্তবায়ন করা হবে। এছাড়া

EQMS BMD

ক্রঃ নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
		পরিবেশগত ভারসাম্য, জীববৈচিত্র্য এবং স্থানীয় জনগণের সামাজিক প্রভাবগুলোকে সর্বোচ্চ গুরুত্ব দিতে হবে।	নিয়মিত পরিবেশগত মনিটরিং, সাইট পরিদর্শন এবং রিপোর্টিংয়ের মাধ্যমে কার্যক্রমের প্রভাব মূল্যায়ন ও নিয়ন্ত্রণ করা হবে।
৪	মোহাম্মদ পারভেজ হোসেন চৌধুরী, চেয়ারম্যান, শাহাজানপুর ইউনিয়ন	বালুমহাল কেন্দ্রিক শক্তিশালী সিন্ডিকেট ভেঙে ফেলা সহজ নয় এবং এর জন্য সরকারের দৃঢ় রাজনৈতিক সদিচ্ছা ও কঠোর প্রশাসনিক ব্যবস্থা প্রয়োজন। তিনি আরও প্রস্তাব দেন যে, মনতলা বালুমহালকে গেজেটভুক্ত করা হলে এটি একটি বৈধ কাঠামোর আওতায় আসবে এবং নিয়ন্ত্রণ সহজ হবে।	প্রশাসনের সার্বিক সহযোগিতায় অবৈধ কার্যক্রম বন্ধে কঠোর ব্যবস্থা নেওয়া হবে। বালুমহাল ব্যবস্থাপনায় স্বচ্ছতা ও জবাবদিহিতা নিশ্চিত করতে প্রয়োজনীয় আইনগত কাঠামো অনুসরণ করা হবে। এছাড়া গভুণ সম্বন্ধে বালুমহাল গেজেটভুক্তির বিষয়টি সংশ্লিষ্ট মন্ত্রণালয় ও কর্তৃপক্ষের মাধ্যমে বিবেচনা করা হবে।
৫	শেখ সাইফুল রহমান লিটন, মেম্বার, শাহাজানপুর	বালু পরিবহনের জন্য ভারী যানবাহনের চলাচল বেড়ে যাওয়ায় গ্রামীণ সড়কগুলো দ্রুত ক্ষতিগ্রস্ত হচ্ছে এবং দুর্ঘটনার ঝুঁকি উল্লেখযোগ্যভাবে বৃদ্ধি পাচ্ছে। এছাড়া বালু উত্তোলন ও পরিবহনের ফলে ধুলাবালির পরিমাণ বৃদ্ধি পাচ্ছে, যা বিশেষ করে শিশু ও বয়স্কদের শ্বাসতন্ত্রের সমস্যার কারণ হয়ে দাঁড়াচ্ছে।	প্রকল্পের আওতায় নির্দিষ্ট পরিবহন রুট নির্ধারণ করা হবে এবং ট্রাফিক ব্যবস্থাপনা পরিকল্পনা বাস্তবায়ন করা হবে। সড়কের ক্ষয়ক্ষতি কমাতে নিয়মিত রক্ষণাবেক্ষণ ও প্রয়োজনীয় সংস্কার কার্যক্রম পরিচালনা করা হবে। ধুলা নিয়ন্ত্রণের জন্য নিয়মিত পানি ছিটানো, কভারড ট্রাক ব্যবহার বাধ্যতামূলক করা এবং স্থানীয় জনগণের মধ্যে স্বাস্থ্য সচেতনতা কার্যক্রম পরিচালনা করা হবে।
৬	মোঃ ছাদেক মিয়া	বালু উত্তোলন ও পরিবহন কার্যক্রমের ফলে আশপাশের এলাকায় ধুলাবালির পরিমাণ উল্লেখযোগ্যভাবে বৃদ্ধি পাচ্ছে, যা স্থানীয় জনগণের দৈনন্দিন জীবনযাত্রায় বিরূপ প্রভাব ফেলছে। বিশেষ করে শিশু ও বয়স্ক ব্যক্তিরা শ্বাসকষ্ট, কাশি, অ্যালার্জি এবং অন্যান্য শ্বাসতন্ত্রজনিত রোগে বেশি ঝুঁকির মধ্যে রয়েছে। এছাড়া ধুলাবালির কারণে বসতবাড়ি, ফসলের জমি এবং স্থানীয় পরিবেশের গুণগত মানও হ্রাস পাচ্ছে। তিনি ধুলা নিয়ন্ত্রণে কার্যকর ব্যবস্থা গ্রহণের জন্য প্রকল্প কর্তৃপক্ষের প্রতি জোর দাবি জানান।	ধুলাবালি নিয়ন্ত্রণে একটি সমন্বিত ডাস্ট ম্যানেজমেন্ট প্ল্যান বাস্তবায়ন করা হবে। এর অংশ হিসেবে নিয়মিতভাবে পানি ছিটানো (water spraying) কার্যক্রম পরিচালনা করা হবে, বিশেষ করে বালু উত্তোলন এলাকা এবং পরিবহন রুটে। সকল বালুবাহী যানবাহনে কভার (covered trucks) ব্যবহার বাধ্যতামূলক করা হবে, যাতে পরিবহনের সময় ধুলা ছড়িয়ে না পড়ে। এছাড়া সড়ক ও আশপাশের এলাকায় নিয়মিত পরিচ্ছন্নতা কার্যক্রম পরিচালনা করা হবে। স্থানীয় জনগণের মধ্যে স্বাস্থ্য সচেতনতা বৃদ্ধি করতে সচেতনতামূলক কর্মসূচি আয়োজন করা হবে এবং প্রয়োজনে স্বাস্থ্য সুরক্ষা সামগ্রী (যেমন মাস্ক) বিতরণের ব্যবস্থাও গ্রহণ করা হবে। নিয়মিত

EQMS BMD

ক্রঃ নং	নাম ও পদবী	প্রশ্ন/মতামত (বিস্তারিত)	উত্তর (বিস্তারিত)
			পরিবেশগত মনিটরিংয়ের মাধ্যমে বায়ুর গুণগত মান পর্যবেক্ষণ করা হবে এবং প্রয়োজন অনুযায়ী অতিরিক্ত নিয়ন্ত্রণমূলক ব্যবস্থা গ্রহণ করা হবে।
৭	আব্দুল করিম, কৃষক	বালু উত্তোলনের ফলে আশপাশের কৃষিজমির উর্বরতা কমে যাচ্ছে এবং অনেক ক্ষেত্রে জমির উপরোল নষ্ট হয়ে যাচ্ছে, যার ফলে ফসল উৎপাদন হ্রাস পাচ্ছে। এতে কৃষকদের আর্থিক ক্ষতি হচ্ছে এবং জীবিকা নির্বাহ কঠিন হয়ে পড়ছে।	প্রকল্প কর্তৃপক্ষ উপরোল সংরক্ষণ ও পুনর্ব্যবহারের জন্য বিশেষ ব্যবস্থা গ্রহণ করবে। ক্ষতিগ্রস্ত কৃষকদের জন্য উপযুক্ত ক্ষতিপূরণ প্রদান এবং বিকল্প জীবিকা (alternative livelihood) সৃষ্টির উদ্যোগ নেওয়া হবে। এছাড়া কৃষি সহায়তা কার্যক্রমের মাধ্যমে ক্ষতিগ্রস্তদের পুনর্বাসন নিশ্চিত করা হবে।
৮	মোঃ এনামুল হক, মেম্বার	পরিবেশগত দিকগুলো যথাযথভাবে বিবেচনা না করলে দীর্ঘমেয়াদে বড় ধরনের পরিবেশগত ক্ষতি হতে পারে, যা ভবিষ্যৎ প্রজন্মের জন্য ঝুঁকিপূর্ণ।	প্রকল্পের আওতায় নিয়মিত পরিবেশগত মনিটরিং করা হবে এবং EIA নির্দেশিকা কঠোরভাবে অনুসরণ করা হবে। পরিবেশ ব্যবস্থাপনা পরিকল্পনা (EMP) বাস্তবায়নের মাধ্যমে সম্ভাব্য প্রভাবগুলো নিয়ন্ত্রণ ও প্রশমন করা হবে।
৯	মিজান মিয়া, স্থানীয় ব্যবসায়ী	বালুমহালকে কেন্দ্র করে স্থানীয় অর্থনীতি সচল থাকলেও অনিয়ম ও সিন্ডিকেটের কারণে সবার জন্য সমান ব্যবসায়িক সুযোগ তৈরি হচ্ছে না। ফলে ক্ষুদ্র ব্যবসায়ীরা পিছিয়ে পড়ছে।	স্বচ্ছ ও প্রতিযোগিতামূলক ইজারা প্রক্রিয়ার মাধ্যমে সকলের জন্য সমান সুযোগ নিশ্চিত করা হবে। স্থানীয় উদ্যোক্তাদের অংশগ্রহণ বৃদ্ধি এবং অর্থনৈতিক কার্যক্রমের উন্নয়নে সহায়ক পদক্ষেপ নেওয়া হবে।
১০	নাসির উদ্দিন, সাংবাদিক	বালু উত্তোলন কার্যক্রমের পরিবেশগত প্রভাব ও অবৈধ কার্যক্রম সম্পর্কে সঠিক তথ্যের অভাব রয়েছে এবং পর্যাপ্ত নজরদারি না থাকায় অনিয়মগুলো প্রকাশ পাচ্ছে না।	প্রকল্পের আওতায় তথ্য প্রকাশে স্বচ্ছতা নিশ্চিত করা হবে এবং নিয়মিত মনিটরিং রিপোর্ট প্রকাশ করা হবে। গণশুনানি, স্থানীয় জনগণ এবং সংশ্লিষ্ট স্টেকহোল্ডারদের সম্পৃক্ত করে একটি অংশগ্রহণমূলক মনিটরিং ব্যবস্থা গড়ে তোলা হবে।

EQMS BMD

৬. বিশেষ অতিথির বক্তব্য

বিশেষ অতিথি হিসেবে বক্তব্য প্রদানকালে পরিবেশ অধিদপ্তর, হবিগঞ্জ-এর উপ পরিচালক জনাব ড. মোঃ ইউসুফ আলী সভার শুরুতেই উপস্থিত সকল অংশীজনকে জনমত যাচাই সভায় সক্রিয় অংশগ্রহণ এবং তাদের সুচিন্তিত ও গঠনমূলক মতামত প্রদানের জন্য আন্তরিক ধন্যবাদ জানান। তিনি আয়োজক সংস্থাকেও পরিবেশগত প্রভাব নিরূপণ (EIA) এর খসড়া প্রতিবেদন সুন্দর ও সুশৃঙ্খলভাবে উপস্থাপনের জন্য প্রশংসা করেন।

তিনি তার বক্তব্যে আরও বলেন যে, পরিবেশ অধিদপ্তরের পক্ষ থেকে ১৭/০৯/২০২৫ তারিখে সদর দপ্তরে প্রেরিত মতামতে উল্লেখ করা হয়েছে এই কোয়ারীগুলো থেকে বালু উত্তোলনের ফলে নদীর স্বাভাবিক গতিপথ পরিবর্তিত হতে পারে, পাহাড় বা টিলা ধসের ঝুঁকি বৃদ্ধি পেতে পারে এবং সামগ্রিকভাবে পরিবেশ ও জনজীবনে বিরূপ প্রভাব সৃষ্টি হতে পারে। এসব বিষয় বিবেচনায় নিয়ে তিনি মত দেন যে, উপরোক্ত কোয়ারীগুলোতে বালু উত্তোলনের জন্য অবস্থানগত ছাড়পত্র প্রদান করা সমীচীন নয় বলে প্রতীয়মান হয়।

তিনি আরও উল্লেখ করেন যে, Bangladesh Environmental Lawyers Association (BELA)-এর "Demand for Justice"-এর প্রেক্ষিতে জানানো হয়েছে যে, হবিগঞ্জ জেলার ২৩টি সিলিকা বালুর অবস্থান খাল, ছড়া, নদী, চা বাগান, গ্রামাঞ্চল, বনাঞ্চল, বসতভিটা, শিক্ষা প্রতিষ্ঠান, ধর্মীয় স্থাপনা, রাস্তা এবং পাহাড়ি টিলা সংলগ্ন এলাকায় অবস্থিত। এসব পরিবেশগতভাবে সংবেদনশীল এলাকায় খনন কার্যক্রম পরিচালিত হলে পরিবেশ ও প্রতিবেশের ওপর গুরুতর নেতিবাচক প্রভাব পড়ার আশঙ্কা রয়েছে।

তিনি তার বক্তব্যে অংশীজন মতবিনিময় সভার গুরুত্ব তুলে ধরে বলেন যে, এ ধরনের জনসম্পৃক্ততা প্রকল্পের বাস্তবায়নের পূর্বে সম্ভাব্য পরিবেশগত ও সামাজিক প্রভাবসমূহ সঠিকভাবে চিহ্নিত করতে গুরুত্বপূর্ণ ভূমিকা পালন করে। তিনি উল্লেখ করেন যে, প্রস্তাবিত সিলিকা বালু কোয়ারীগুলো পরিবেশগতভাবে অত্যন্ত সংবেদনশীল এলাকায় অবস্থিত, যেখানে যেকোনো বালু উত্তোলন কার্যক্রম সরাসরি পানি, মাটি, বায়ু, জীববৈচিত্র্য এবং স্থানীয় মানুষের জীবন-জীবিকার উপর প্রভাব ফেলতে পারে। তাই প্রকল্প বাস্তবায়নের পূর্বে যথাযথভাবে পরিবেশগত প্রভাব নিরূপণ (EIA) সম্পন্ন করা এবং তা বিদ্যমান আইন ও বিধিমালার আলোকে মূল্যায়ন করা অত্যন্ত জরুরি।

এক্ষেত্রে হবিগঞ্জ জেলার ২৩ টি সিলিকা বালুর কোয়ারীর তালিকা সংক্রান্ত খনিজ সম্পদ বুরো কর্তৃক প্রকাশিত গেজেট সংশোধন করা যেতে পারে।

সর্বশেষে তিনি জোর দিয়ে বলেন যে, উন্নয়ন কার্যক্রম অবশ্যই পরিবেশগত সুরক্ষা ও টেকসই ব্যবস্থাপনার সাথে সামঞ্জস্যপূর্ণ হতে হবে। তাই প্রকল্প বাস্তবায়নের ক্ষেত্রে পরিবেশগত সংবেদনশীলতা, স্থানীয় জনগণের মতামত এবং বৈজ্ঞানিক বিশ্লেষণকে সর্বোচ্চ গুরুত্ব দিয়ে সিদ্ধান্ত গ্রহণ করা উচিত।

৭. সভাপতির বক্তব্য

মোঃ মুজিবুল ইসলাম, উপজেলা ভূমি কর্মকর্তা ও সহকারী কমিশনার (ভূমি) মতবিনিময় সভায় সিলিকা বালু কোয়ারী প্রকল্পের বাস্তবায়ন প্রক্রিয়া, প্রকল্পকাজের মান বজায় রাখা এবং পরিবেশ সুরক্ষার গুরুত্ব তুলে ধরেন। তিনি বলেন, প্রকল্পের প্রতিটি কার্যক্রম স্থানীয় জনগণের জীবনযাত্রা, কৃষি, পানি ব্যবস্থাপনা এবং পরিবেশের উপর সরাসরি প্রভাব ফেলে, তাই সব কাজ অত্যন্ত সতর্কতা ও দায়িত্বশীলতার সঙ্গে বাস্তবায়ন করা হবে। তিনি আরও জানান, প্রকল্প এলাকায় কাজের সময় পরিবেশগত মানদণ্ড, সামাজিক নিরাপত্তা এবং প্রাকৃতিক পানি প্রবাহের স্বাভাবিকতা রক্ষায় সর্বোচ্চ গুরুত্ব দেওয়া হবে। যেকোনো প্রকল্প শুরু করার আগে এলাকার জনগণের অবস্থান, কৃষিজমি, যোগাযোগব্যবস্থা ও পানি প্রবাহ সম্পর্কিত বিষয়গুলো বিশ্লেষণ করে কাজ শুরু করা হবে।

EQMS BMD

এছাড়া তিনি কমিউনিটিকে আশ্বস্ত করে বলেন যে, পরিবেশের কোনো ধরনের ক্ষতি যাতে না হয়, সে বিষয়টি সর্বোচ্চ গুরুত্বাধিকার দিয়ে প্রতিটি ধাপে পরিবেশগত প্রভাব মূল্যায়ন ও প্রয়োজনীয় প্রশমন ব্যবস্থা গ্রহণ করা হবে। প্রকল্প চলাকালে ধূলাবালি, শব্দদূষণ, যানবহন চলাচল এবং খননজনিত ভোগান্তি কমাতে বিশেষ ব্যবস্থা নেওয়া হবে। তিনি আরও উল্লেখ করেন যে স্থানীয় জনগণের উত্থাপিত সমস্যাগুলো বাস্তবায়ন পর্যায়ে বিবেচনায় নেওয়া হবে এবং উপজেলা প্রশাসন নিয়মিত তদারকির মাধ্যমে উন্নয়নকাজের গুণগত মান নিশ্চিত করবে।

৯. জনমত যাচাই সভার সারাংশ

প্রস্তাবিত সিলিকা বালু কোয়ারী প্রকল্পের পরিবেশ এবং সামাজিক প্রভাব মূল্যায়ন (EIA) প্রক্রিয়ার অংশ হিসেবে একটি খসড়া EIA রিপোর্ট প্রস্তুত করা হয় এবং ৫ এপ্রিল ২০২৬ তারিখে মাধবপুর উপজেলা পরিষদ সম্মেলন কক্ষে অনুষ্ঠিত অংশীজন পরামর্শ সভায় উপস্থাপন করা হয়। সভায় মোট ৪০ জন অংশগ্রহণ করেন, যার মধ্যে সরকারি দপ্তরের প্রতিনিধি, স্থানীয় নির্বাচিত কর্মকর্তা, সাংবাদিক, এবং প্রকল্প এলাকার স্থানীয় সম্প্রদায়ের সদস্যরা ছিলেন। সভায় প্রকল্পের পটভূমি, লক্ষ্য, সম্ভাব্য প্রকৌশল কাঠামো, পরিবেশগত ভিত্তি অবস্থান এবং প্রকল্পের প্রত্যাশিত পরিবেশ ও সামাজিক প্রভাব সম্পর্কে বিস্তারিত উপস্থাপনা দেওয়া হয়। অংশগ্রহণকারীরা অবৈধ বালু উত্তোলন, সিন্ডিকেট নিয়ন্ত্রণ, নদীর প্রাকৃতিক প্রবাহ ব্যাহত হওয়া, নদীতীর ভাঙন, কৃষিজমির ক্ষতি, অবকাঠামোর ঝুঁকি (যেমন বাঁধার ব্রেম), ধূলাবালি ও শব্দদূষণ, সড়ক ক্ষয়ক্ষতি, স্থানীয় জনগণের নিরাপত্তা ও অংশগ্রহণের বিষয়সমূহ, কৃষিজমির সুরক্ষা, জীববৈচিত্র্য রক্ষা এবং স্থানীয় জনগণের নিরাপত্তা ও অংশগ্রহণসহ বিভিন্ন বিষয়ে গুরুত্বপূর্ণ মন্তব্য ও সুপারিশ প্রদান করেন।

অংশগ্রহণকারীরা উল্লেখ করেন যে বর্তমানে অনিয়ন্ত্রিত ও অবৈধ বালু উত্তোলনের ফলে পরিবেশ ও সমাজের উপর নেতিবাচক প্রভাব পড়ছে, যা একটি সুশৃঙ্খল ও বৈজ্ঞানিক ব্যবস্থাপনার মাধ্যমে নিয়ন্ত্রণ করা সম্ভব। তারা স্বচ্ছ ইজারা প্রক্রিয়া, প্রশাসনিক নজরদারি বৃদ্ধি এবং স্থানীয় জনগণের অংশগ্রহণ নিশ্চিত করার ওপর গুরুত্বারোপ করেন।

প্রকল্প কর্তৃপক্ষ অংশগ্রহণকারীদের সকল মতামত গুরুত্বের সাথে গ্রহণ করে এবং আশ্বস্ত করে যে বালু উত্তোলন কার্যক্রমকে বৈজ্ঞানিক ও নিয়ন্ত্রিত পদ্ধতির আওতায় আনা হবে। নদীর হাইড্রোলজিকাল অবস্থা ও সেডিমেন্ট বিশ্লেষণের ভিত্তিতে সীমিত পরিসরে উত্তোলন নিশ্চিত করা হবে, যাতে পরিবেশগত ভারসাম্য বজায় থাকে। অবৈধ উত্তোলন বন্ধে জিরো টলারেন্স নীতি গ্রহণ, প্রশাসনিক তদারকি জোরদার, এবং আইনশৃঙ্খলা বাহিনীর সহায়তায় কঠোর মনিটরিং ব্যবস্থা বাস্তবায়ন করা হবে। এছাড়া গুরুত্বপূর্ণ অবকাঠামো যেমন রাবার ড্যাম সুরক্ষার জন্য বাফার জোন নির্ধারণ, সড়ক ক্ষয়ক্ষতি কমাতে নির্দিষ্ট পরিবহন রুট ও ট্রাফিক ব্যবস্থাপনা পরিকল্পনা বাস্তবায়ন, এবং ধূলাবালি নিয়ন্ত্রণে পানি ছিটানো ও কভারড ট্রাক ব্যবহারের মতো ব্যবস্থা গ্রহণের কথা উল্লেখ করা হয়। কৃষিজমির ক্ষতি মোকাবিলায় উপসয়েল সংরক্ষণ, ক্ষতিপূরণ প্রদান এবং বিকল্প জীবিকার ব্যবস্থা গ্রহণের প্রতিশ্রুতি দেওয়া হয়। সভায় পরিবেশগত দিকগুলোর গুরুত্ব বিশেষভাবে তুলে ধরা হয় এবং অংশগ্রহণকারীরা একমত হন যে পরিবেশ ব্যবস্থাপনা পরিকল্পনা (EMP) এবং পরিবেশ পর্যবেক্ষণ পরিকল্পনা (EMoP) যথাযথভাবে বাস্তবায়ন করা হলে সম্ভাব্য নেতিবাচক প্রভাবগুলো কার্যকরভাবে নিয়ন্ত্রণ করা সম্ভব হবে। একইসাথে তথ্য প্রকাশে স্বচ্ছতা এবং ঘণমাধ্যম ও স্থানীয় জনগণকে সম্পৃক্ত করে অংশগ্রহণমূলক মনিটরিং ব্যবস্থার ওপর গুরুত্ব আরোপ করা হয়।

বিশেষ অতিথি তার বক্তব্যে উল্লেখ করেন যে সিলিকা বালু কোয়ারী এলাকা পরিবেশগতভাবে সংবেদনশীল হওয়ায় এখানে যেকোনো ধরনের বালু উত্তোলন কার্যক্রম অত্যন্ত সতর্কতার সাথে পরিচালনা করতে হবে। তিনি EIA প্রক্রিয়ার গুরুত্ব তুলে ধরে বলেন যে প্রকল্প বাস্তবায়নের পূর্বে যথাযথ পরিবেশগত মূল্যায়ন এবং আইনগত কাঠামো অনুসরণ করা অত্যন্ত জরুরি।

সভাপতি তার বক্তব্যে প্রকল্প বাস্তবায়নের ক্ষেত্রে পরিবেশ সংরক্ষণ, সামাজিক নিরাপত্তা এবং স্থানীয় জনগণের স্বার্থকে সর্বোচ্চ গুরুত্ব দেওয়ার ওপর জোর দেন। তিনি আশ্বস্ত করেন যে প্রকল্পের প্রতিটি ধাপে পরিবেশগত মানদণ্ড অনুসরণ

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করা হবে এবং স্থানীয় জনগণের উত্থাপিত সমস্যা ও সুপারিশসমূহ যথাযথভাবে বিবেচনায় নেওয়া হবে। উপজেলা প্রশাসনের নিয়মিত তদারকির মাধ্যমে প্রকল্পের গুণগত মান ও পরিবেশগত সুরক্ষা নিশ্চিত করা হবে বলেও তিনি উল্লেখ করেন।

সার্বিকভাবে, অংশীজনরা একমত হন যে প্রকল্পটি যদি স্বচ্ছতা, জবাবদিহিতা, পরিবেশবান্ধব ব্যবস্থাপনা এবং স্থানীয় জনগণের সক্রিয় অংশগ্রহণের মাধ্যমে বাস্তবায়ন করা হয়, তবে এটি অবৈধ বালু উত্তোলন নিয়ন্ত্রণ, পরিবেশ সুরক্ষা, এবং স্থানীয় অর্থনৈতিক উন্নয়নে গুরুত্বপূর্ণ ভূমিকা রাখতে সক্ষম হবে।

উপসংহারে বলা যায় যে, জনমত যাচাই সভায় প্রাপ্ত মতামত, উদ্বেগ এবং সুপারিশসমূহ বিবেচনায় নিয়ে প্রস্তাবিত সিলিকা বালু কোয়ারী প্রকল্প বাস্তবায়ন করা হলে এটি পরিবেশগত ভারসাম্য রক্ষা এবং স্থানীয় জনগণের জীবিকা ও নিরাপত্তা নিশ্চিত করার পাশাপাশি একটি টেকসই ও সুশাসিত সম্পদ ব্যবস্থাপনার মডেল হিসেবে প্রতিষ্ঠিত হতে পারে।

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	মোবাইল: ০১৬৪১০০৭৯০৮	মোবাইল: ০১৭১৭১৫৬৯৬

অংশীজন মতবিনিময় সভার উপস্থিতির তালিকা



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অংশীজন মতবিনিময় সভার ছবি



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অংশীজন মতবিনিময় সভার ঘসড়া প্রতিবেদনের ছবি



৪ | খবর

সমকাল

শরীরে আঘাতের চিহ্ন নিয়ে ফিরলেন ১৪ জেলে

লিবিয়ায় জিম্মিদশা থেকে মুক্ত সুজন এখন চক্রের হোতা

ব্রাসফায়ারের সঙ্গে জড়িতদের বিচার হবে

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হবিগঞ্জ জেলা পরিষদের প্রশাসক হলেন আহমেদ আলী মুকিব

মহান মে দিবস পালনে প্রস্তুতি সভা

বানিয়াচংয়ে মসজিদের হিসাব নিয়ে সংঘর্ষের জেরে প্রতিপক্ষের বাড়ি-ঘরে হামলা, ভাংচুর

চাঁদা না দেয়ায় পাইপ চুরির অভিযোগ

নবীগঞ্জে বালু উত্তোলনে ভোগান্তি

চাঁদাবাজদের অত্যাচারে অভিষ্ট ব্যবসায়ীরা

নবীগঞ্জে এক সংবাদকর্মী পরিবারের ভূমি জবর দখলের চেষ্টা বিএনপি নেতা শাহীন ও তার অনুসারীদের

বানিয়াচংয়ে প্রতিপক্ষের লোকজনকে ফাঁসাতে বৃদ্ধাকে হত্যার অভিযোগ

বাড়িঘরে কয়েক দফায় হামলা, ভাংচুর ও লুটপাট

বানিয়াচংয়ের ব্যবসায়ীর ডুপ্লিকেট ফোনের সংকট তদন্ত করে দ্রুত প্রত্যয়ন পত্র দেয়ার নির্দেশ জেলা প্রশাসকের

নবীগঞ্জে চাঁদা না পেয়ে প্যারেজ মালিকের উপর হামলার অভিযোগ

ব্যারিস্টার হলেন হবিগঞ্জের কৃতি সন্তান অ্যাডভোকেট নিগার সুলতানা

রক্তদান সংগঠন 'ব্লেড সেল ইন বাংলাদেশ'-এর কেন্দ্রীয় ও প্রবাসী নতুন কমিটি গঠন

আহমেদ আলী মুকিব

প্রশাসক

আন্তরিক শুভেচ্ছা

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Appendix J: Details of Each Sand Quarry

Appendix J-1: Mantala Chaumuhani

The following table shows the details of the Mantala Chaumuhani Quarry.

Table 11-1: Details of the Mantala Chaumuhani Quarry

Items	Description
Name of Quarry	Mantala Chaumuhani
Geographical Coordinate	24° 1'41.43"N 91°21'46.35"E
Location	Mouza: Mangalpur; Union: Chaumuhani; Upazila: Madhabpur
Total Area	20.58 Acre
Volume of Sand	------
Direction of Chora	North- South
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land, and Bahara Rubber Dam **East:** Village, Homestead Vegetation, Agricultural Land **South:** Village, Homestead Vegetation, Agricultural land, Chaumuhani Bazar, Chaumuhani Sonai Bridge, Chaumuhani Rubber Dam, and India
Access and Connectivity	The Mantala Chaumuhani Quarry is located within the Sonai River, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Rubber Dam Road, which provides a direct connection to Mantala-Harashpur Road.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are dispersed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Mantala Chaumuhani Quarry and its surrounding bushland exhibit significant biodiversity. The nearest ecological reserve is the Rubber Dam Eco Park. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Mantala Chaumuhani Quarry.

Figure 11-1: Existing Features of the Mantala Chaumuhani Quarry



North Side



South Side



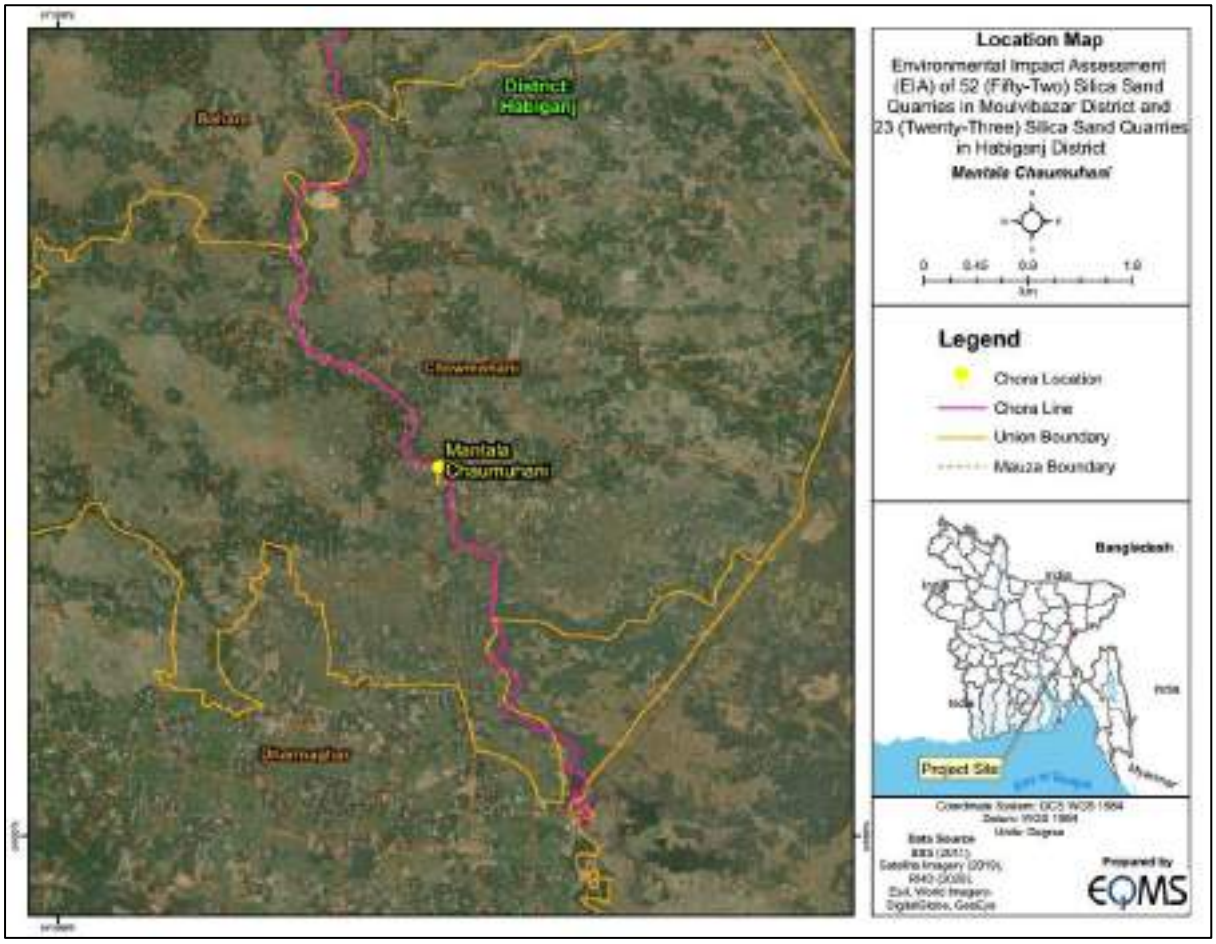
Access Road (Rubber Dam Road)



Surrounding Vegetation

The following figure shows the location within the mouza boundary of the Mantala Chaumuhani Quarry and the surrounding features of the sand Quarry.

Figure 11-2: Location within the Mouza Boundary of the Mantala Chaumuhani Quarry and Surrounding Features of the Sand Quarry



Appendix J-2: Sahapur Noapara

The following table shows the details of the Sahapur Noapara Quarry.

Table 11-2: Details of the Sahapur Noapara Quarry

Items	Description
Name of Quarry	Sahapur Noapara
Geographical Coordinate	24°13'43.95"N 91°22'13.79"E
Location	Mouza: Haritala; Union: Bagasura; Upazila: Madhabpur
Total Area	9.07 Acre
Volume of Sand	------
Direction of Chora	West- East
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land, and Industry **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural land, and Tea Garden **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Sahapur Noapara Quarry is serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Saiham Nagar Shajibazar Road, which provides a direct connection to the Dhaka- Sylhet Highway (N2).
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, a tea garden, a rubber garden, and agricultural land. Residential households are distributed throughout the surrounding areas. The dense vegetation around the quarry provides a habitat for diverse wildlife.
Ecological Importance	The Quarry and its surrounding vegetation are rich in biodiversity. According to local consultations, the area is frequently visited by the Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal (Canis aureus), and the Rhesus Macaque (*Macaca mulatta*), etc. Additionally, the vegetation provides an essential habitat for a variety of bird species like Black hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*), etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the region. Additionally, local residents use its water for domestic purposes, including bathing and washing clothes during the wet season. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Sahapur Noapara Quarry.

Figure 11-3: Existing Features of the Sahapur Noapara Quarry



East Side



West Side



Access Road



Rubber Garden near the Quarry

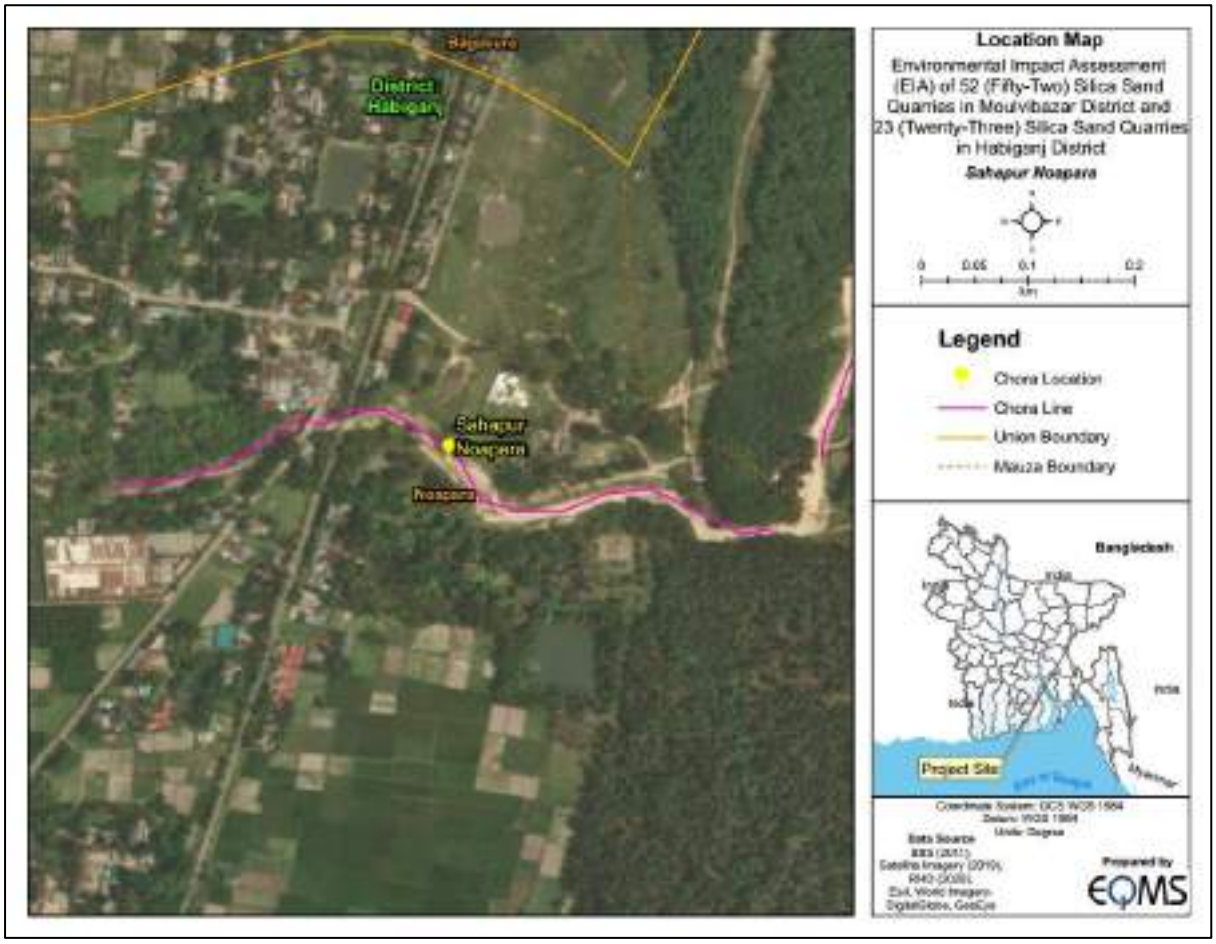




Surrounding vegetation

The following figure shows the location within the mouza boundary of the Sahapur Noapara Quarry and the surrounding features of the sand Quarry.

Figure 11-4: Location within the Mouza Boundary of the Sahapur Noapara Quarry and Surrounding Features of the Sand Quarry



Appendix J-3: Mantala Balimahal

The following table shows the details of the Mantala Balimahal Quarry.

Table 11-3: Details of the Mantala Balimahal Quarry

Items	Description
Name of Quarry	Mantala Balimahal
Geographical Coordinate	24° 4'3.33"N 91°21'19.20"E
Location	Mouza: Durlabpur; Union: Bahara; Upazila: Madhabpur
Total Area	26.72 Acre
Volume of Sand	------
Direction of Chora	North- South
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land **South:** Village, Homestead Vegetation, Agricultural land, Bahara Rubber Dam
Access and Connectivity	The Mantala Balimahal Quarry is located within the Sonai River, serving as a designated site for sand extraction. This quarry started from Bahara Rubber Dam and toward the North. Access to the extraction points will be facilitated through Madhabpur- Mantala Road, which provides a direct connection to Mantala-Harashpur Road.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are dispersed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Mantala Balimahal Quarry and its surrounding vegetation exhibit significant biodiversity. The nearest ecological reserve is the Rubber Dam Eco Park. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Mantala Balimahal Quarry.

Figure 11-5: Existing Feature of the Mantala Balimahal Quarry



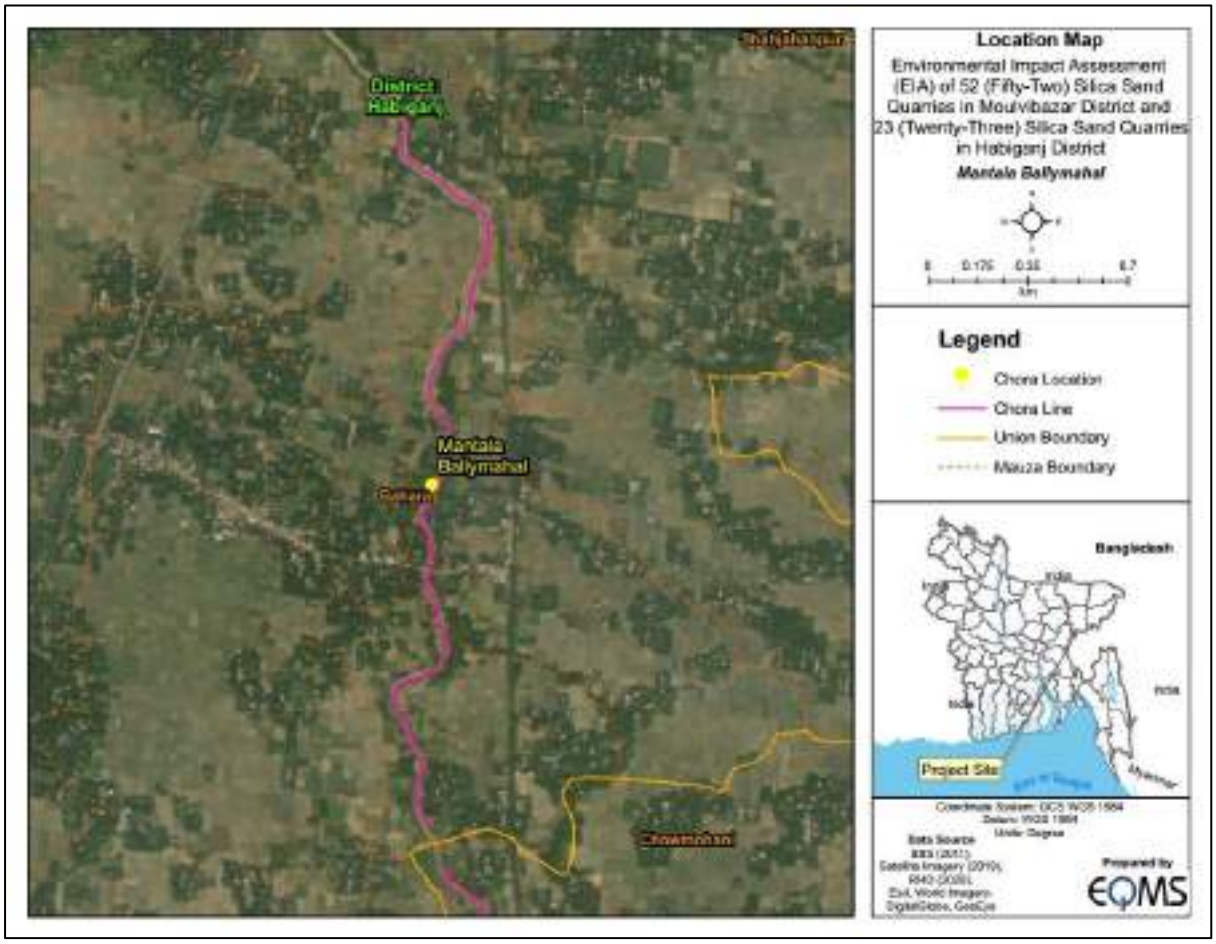
North Side



South Side

The following figure shows the location within the mouza boundary of the Mantala Balimahal Quarry and the surrounding features of the sand Quarry.

Figure 11-6: Location within the Mouza Boundary of the Mantala Balimahal Quarry and Surrounding Features of the Sand Quarry



Appendix J-4: Rasulpur

The following table shows the details of the Rasulpur Quarry.

Table 11-4: Details of the Rasulpur Quarry

Items	Description
Name of Quarry	Rasulpur
Geographical Coordinate	24° 6'37.17"N 91°21'54.93"E
Location	Mouza: Bhandarua; Union: Shahjahanpur; Upazila: Madhabpur
Total Area	16.76 Acre
Volume of Sand	------
Direction of Chora	East- West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land and India **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	Access to Rasulpur Quarry will be ensured through the Mantala-Harashpur Road, which will serve as the primary route for transportation. This road will facilitate the movement of personnel, equipment, and materials to and from the quarry, ensuring smooth logistical operations.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are scattered throughout the area. The surrounding vegetation provides a habitat for various wildlife species.
Ecological Importance	The Rasulpur Quarry and its surrounding vegetation exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the vegetation serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The Quarry serves as a vital source of water for agriculture in the region. Additionally, local residents use its water for domestic activities such as bathing and washing clothes, although it is not utilized as a source of drinking water. The cowboys bring their animals to drink water from the Quarry.

The following figure shows the existing features of the Rasulpur Quarry.

Figure 11-7: Existing Features of the Rasulpur Quarry



West Side



East Side



Access Road



Surrounding vegetation



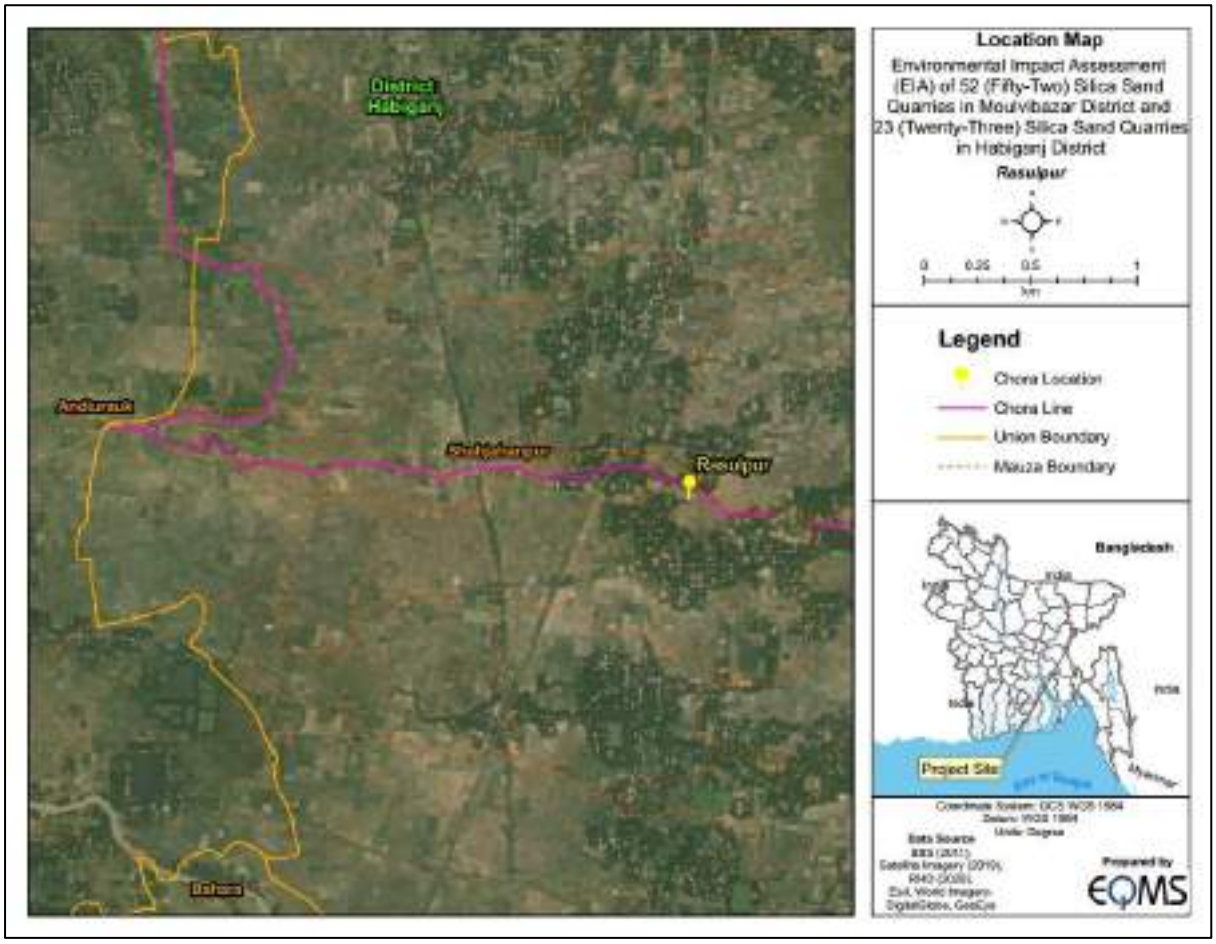
Rail crossing over the Quarry



Road Crossing over the Quarry

The following figure shows the location within the mouza boundary of the Rasulpur Quarry and the surrounding features of the sand Quarry.

Figure 11-8: Location within the Mouza Boundary of the Rasulpur Quarry and Surrounding Features of the Sand Quarry



Appendix J-5: Teliapara Tea Garden

The following table shows the details of the Teliapara Tea Garden Quarry.

Table 11-5: Details of the Teliapara Tea Garden Quarry

Items	Description
Name of Quarry	Teliapara Tea Garden
Geographical Coordinate	24° 6'26.60"N 91°22'54.86"E
Location	Mouza: Teliapara Tea Estate; Union: Shahjahanpur; Upazila: Madhabpur
Total Area	15.95 Acre
Volume of Sand	------
Direction of Chora	East- West
Project Surrounding	**West:** Village, Homestead Vegetation and Agricultural land **North:** Village, Homestead Vegetation and Tea Garden **East:** Homestead Vegetation and Tea Garden **South:** Homestead Vegetation, Tea Garden, and India
Access and Connectivity	The Teliapara Tea Garden Quarry is connected with the Teliapara Tea Estate. Access to the extraction points will be facilitated through Teliapara Road, which provides a direct connection to the Madhabpur-Hobiganj Highway.
Environmental Features	The quarry is surrounded by dense vegetation, including natural herbs, shrubs, and a tea garden. Residential households are scattered in the western part of the quarry. The majority of the quarry is located within the Teliapara Tea Estate.
Ecological Importance	The Quarry and its surrounding tea garden exhibit significant biodiversity. The nearest ecological sensitive area is Satchari National Park. Local consultations have indicated that the Golden Jackal is frequently observed in the area. Additionally, the tea garden serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a secondary water source for tea garden water spray. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Teliapara Tea Garden Quarry.

Figure 11-9: Existing Feature of the Teliapara Tea Garden Quarry



West Side



East Side



Access road



Surrounding vegetation

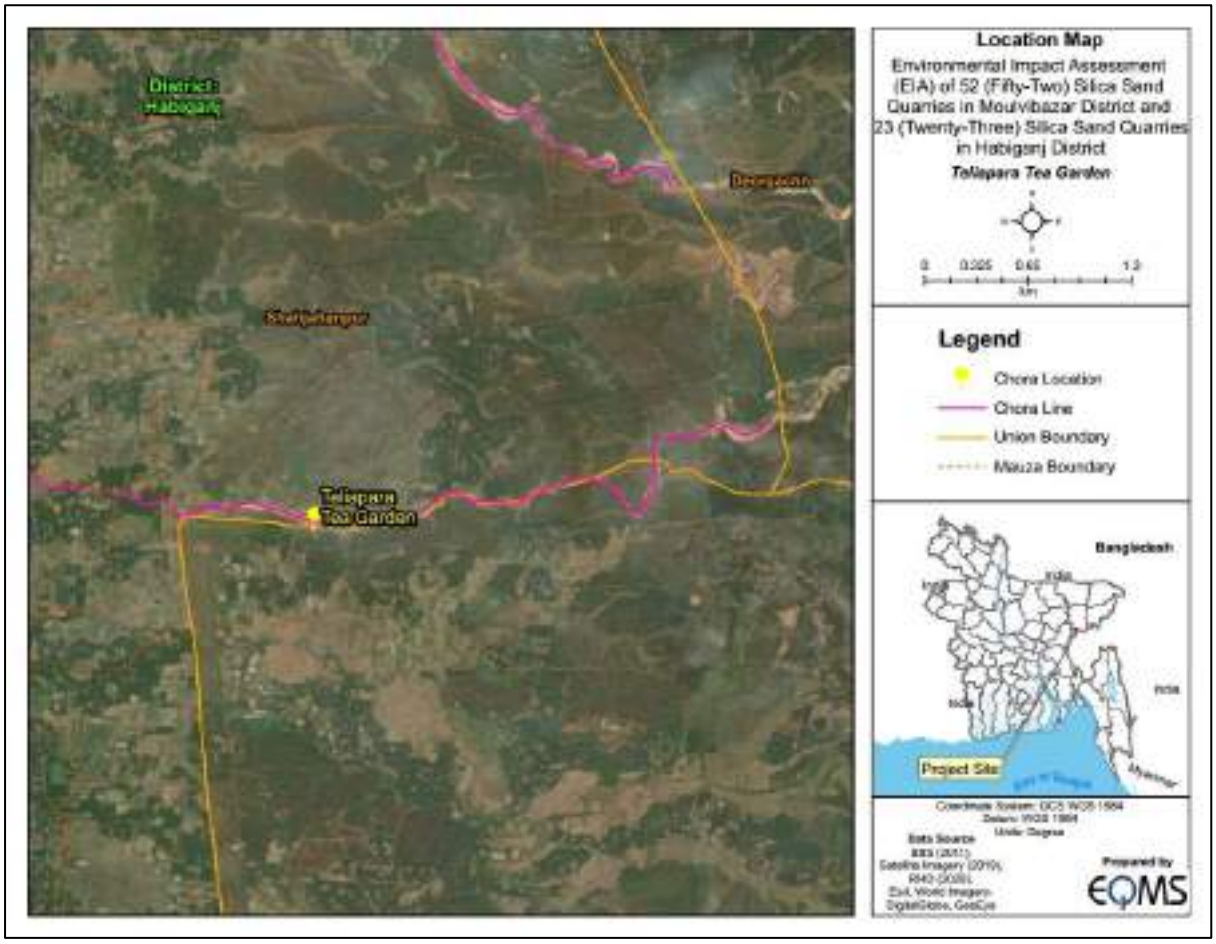




Surrounding tea garden (Teliapara Tea Estate)

The following figure shows the location within the mouza boundary of the Teliapara Tea Garden Quarry and the surrounding features of the sand Quarry.

Figure 11-10: Location within the Mouza Boundary of the Teliapara Tea Garden Quarry and Surrounding Features of the Sand Quarry



Appendix J-6: Kibriabadh

The following table shows the details of the Kibriabad Quarry.

Table 11-6: Details of the Kibriabad Quarry

Items	Description
Name of Quarry	Kibriabad
Geographical Coordinate	24° 8'47.77"N 91°22'0.14"E
Location	Mouza: Surma Tea Estate; Union: Shahjahanpur; Upazila: Madhabpur
Total Area	20.09 Acre
Volume of Sand	------
Direction of Chora	Southeastern – Northwestern
Project Surrounding	**West:** Village, Homestead Vegetation and Agricultural land **North:** Village, Homestead Vegetation and Agricultural land **East:** Homestead Vegetation and Tea Garden **South:** Village, Homestead Vegetation, and Agricultural land
Access and Connectivity	The Kibriabad Quarry is connected with the Surma Tea Estate. Access to the extraction points will be facilitated through Narainpur Mosjid Road, which provides a direct connection to Jagadishpur- Noapara Road. The other portion of this quarry can be accessed by the Madhabpur- Hobiganj Highway in the Surma Tea Estate area.
Environmental Features	The quarry is surrounded by dense vegetation, including natural herbs, shrubs, and a tea garden. Residential households are scattered in the western part of the quarry. The majority of the quarry is located within the Surma Tea Estate.
Ecological Importance	The Quarry and its surrounding tea garden exhibit significant biodiversity. The nearest ecological sensitive area is Satchari National Park. Local consultations have indicated that the Golden Jackal is frequently observed in the area. Additionally, the tea garden serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a secondary water source for tea garden water spray and agriculture in the surrounding areas. Additionally, during the wet season, local residents use its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Kibriabad Quarry.

Figure 11-11: Existing Features of the Kibriabad Quarry



West Side



East Side

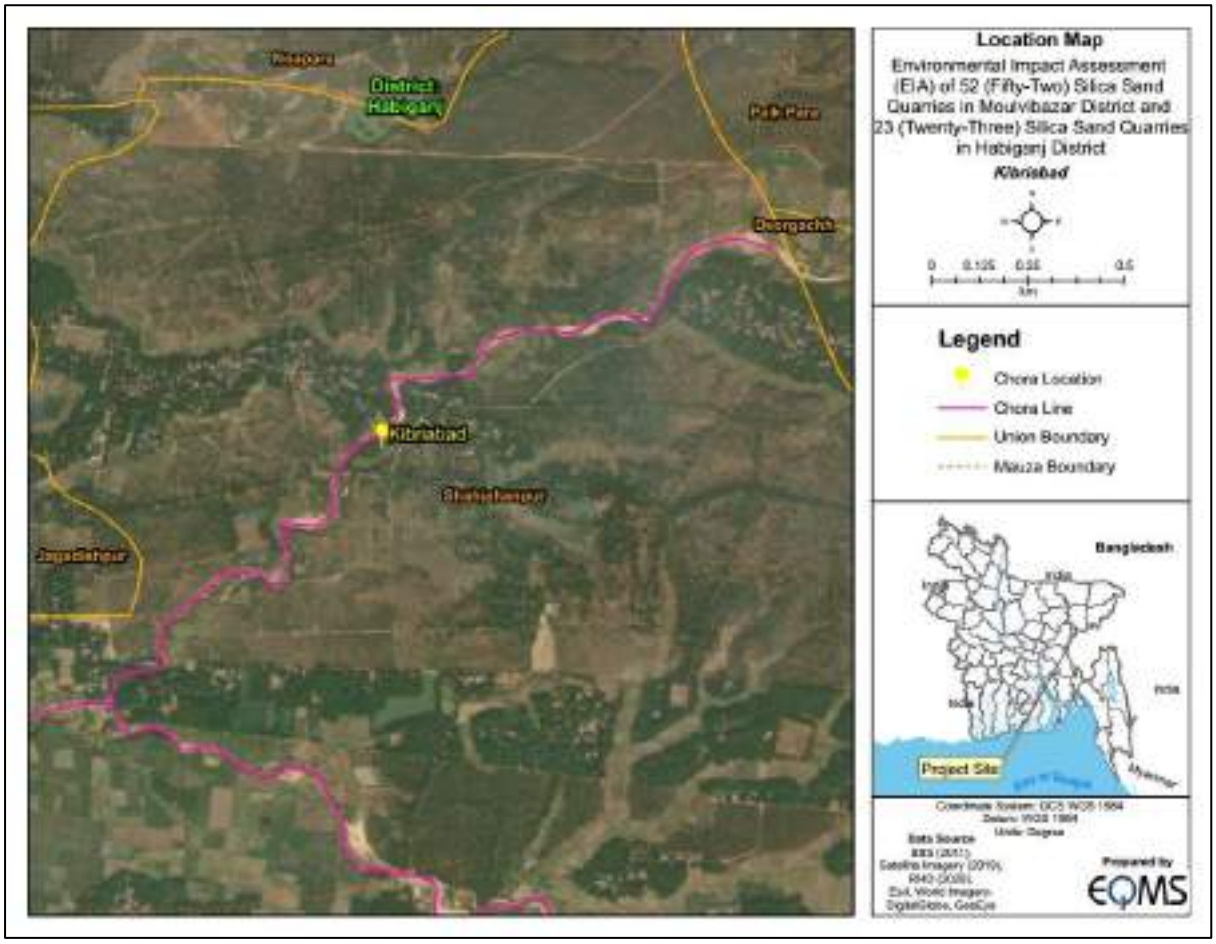




Surrounding tea garden (Surma Tea Estate)

The following figure shows the location within the Mouza boundary of the Kibriabad Quarry and the surrounding features of the sand Quarry.

Figure 11-12: Location within the Mouza Boundary of the Kibriabad Quarry and Surrounding Features of the Sand Quarry



Appendix J-7: Jagadishpur Chora

The following table shows the details of the Jagadishpur Chora.

Table 11-7: Details of the Jagadishpur Chora

Items	Description
Name of Quarry	Jagadishpur Chora
Geographical Coordinate	24° 9'32.53"N 91°21'12.63"E
Location	Mouza: Jagadishpur; Union: Jagadishpur; Upazila: Madhabpur
Total Area	9.47 Acre
Volume of Sand	------
Direction of Chora	East- West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land, and Industry **East:** Village, Homestead Vegetation, Agricultural Land **South:** Village, Homestead Vegetation, Bazar and Industry
Access and Connectivity	The Jagadishpur Quarry is located within the Jagadishpur Bazar area. Access to the extraction points will be facilitated through Jagadishpur-Noapara Road, which provides a direct connection to Dhaka- Sylhet Highway (N2) Road.
Environmental Features	The quarry is surrounded by vegetation, including natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are distributed throughout the surrounding areas. The vegetation around the quarry provides a habitat for diverse wildlife.
Ecological Importance	The Jagadishpur Quarry and its surrounding vegetation exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the surrounding areas. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Jagadishpur Chora.

Figure 11-13: Existing Features of the Jagadishpur Chora



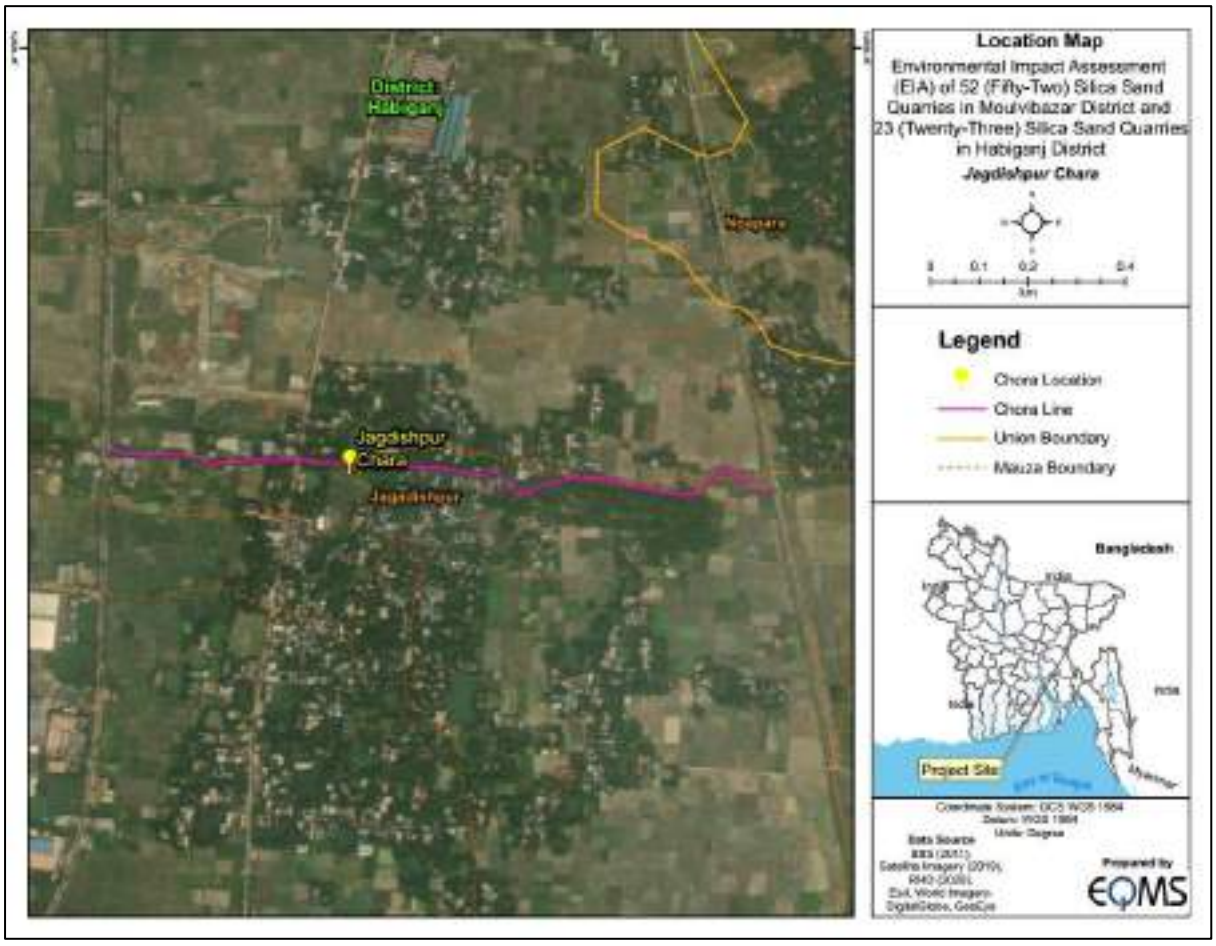
West Side East Side



Access Road (Jagadishpur- Noapara Road)

The following figure shows the location within the Mouza boundary of the Jagadishpur Chora and the surrounding features of the sand Quarry.

Figure 11-14: Location within the Mouza Boundary of the Jagadishpur Chora and Surrounding Features of the Sand Quarry



Appendix J-8: Madhabpur

The following table shows the details of the Madhabpur Quarry.

Table 11-8: Details of the Madhabpur Quarry

Items	Description
Name of Quarry	Madhabpur
Geographical Coordinate	24° 5'51.61"N 91°19'31.72"E
Location	Mouza: Sundadil; Union: Bahara; Upazila: Madhabpur
Total Area	33.49 Acre
Volume of Sand	------
Direction of Chora	East- West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land, and Bazar **North:** Village, Homestead Vegetation, Agricultural land, and Industry **East:** Village, Homestead Vegetation, Agricultural Land **South:** Village, Homestead Vegetation, Agricultural Land
Access and Connectivity	The Madhabpur Quarry is connected with the Sonai and Khasty Rivers, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Muradpur Road, which provides a direct connection to the Dhaka- Sylhet Highway (N2) Road.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are distributed throughout the surrounding areas. The vegetation around the quarry provides a habitat for diverse wildlife.
Ecological Importance	The Madhabpur Quarry and its surrounding vegetation exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the vegetation serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Madhabpur Quarry.

Figure 11-15: Existing Features of the Madhabpur Quarry



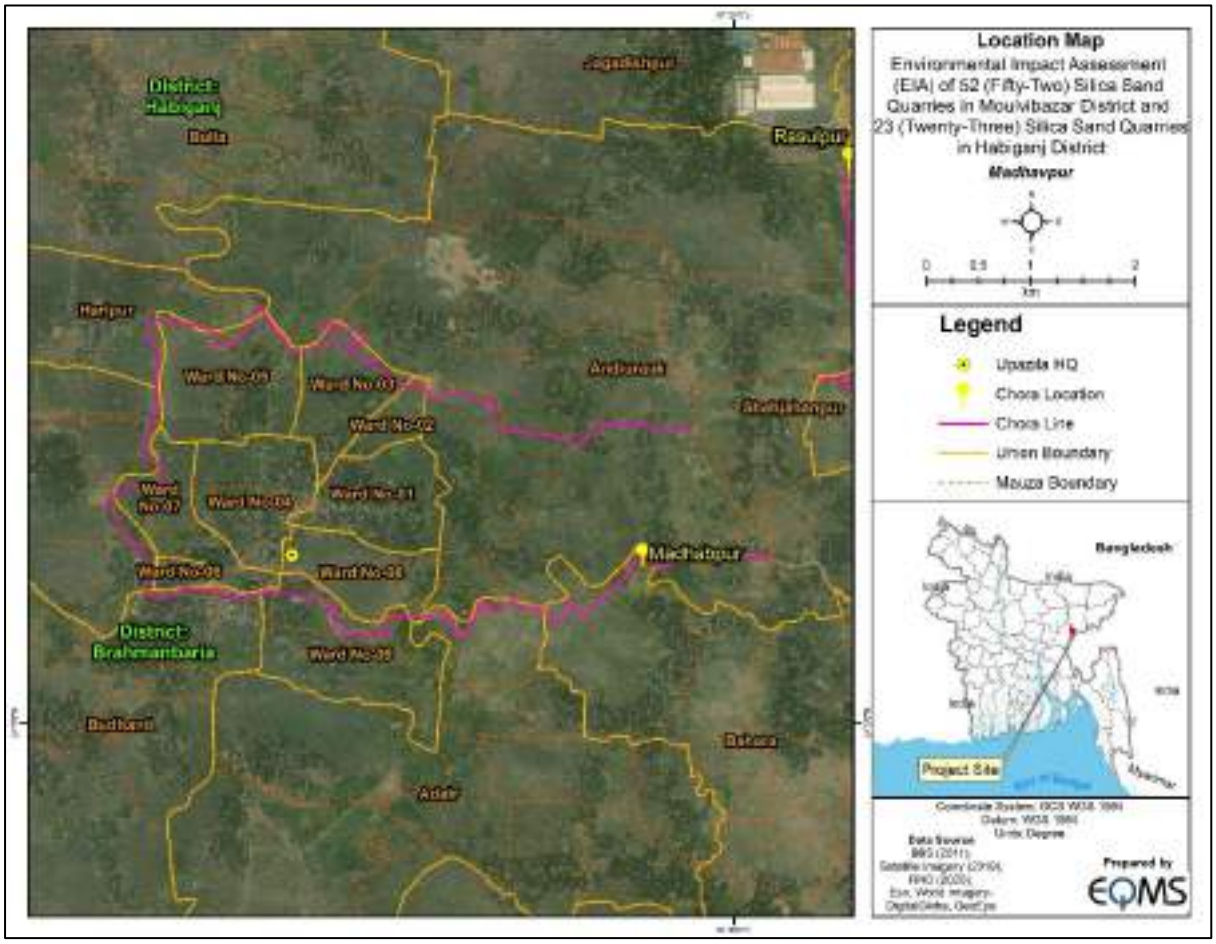
East Side



West Side

The following figure shows the location within the Mouza boundary of the Madhabpur Quarry and the surrounding features of the sand Quarry.

Figure 11-16: Location within the Mouza Boundary of the Madhabpur Quarry and Surrounding Features of the Sand Quarry



Appendix J-9: Sahapur Chora

The following table shows the details of the Sahapur Chora.

Table 11-9: Details of the Sahapur Chora

Items	Description
Name of Quarry	Sahapur Chora
Geographical Coordinate	24°12'55.25"N 91°22'29.40"E
Location	Mouza: Raghunandanpur Reserve Forest; Union: Sankhola; Upazila: Chunarughat
Total Area	------
Volume of Sand	------
Direction of Chora	East- West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land, and Reserve Forest **East:** Reserve Forest, Tea Garden, and Rubber Garden **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Sahapur quarry is located in the Raghunandanpur Reserve Forest, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Saiham Nagar Shajibazar Road, which provides a direct connection to the Dhaka- Sylhet Highway (N2).
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are dispersed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Quarry and its surrounding vegetation are rich in biodiversity. According to local consultations, the area is frequently visited by the Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal (Canis aureus), and the Rhesus Macaque (*Macaca mulatta*), etc. Additionally, the vegetation provides an essential habitat for a variety of bird species like Black hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*), etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the region. Additionally, local residents use its water for domestic purposes, including bathing and washing clothes during the wet season. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Sahapur Chora.

Figure 11-17: Existing Features of the Sahapur Chora



East Side



West Side

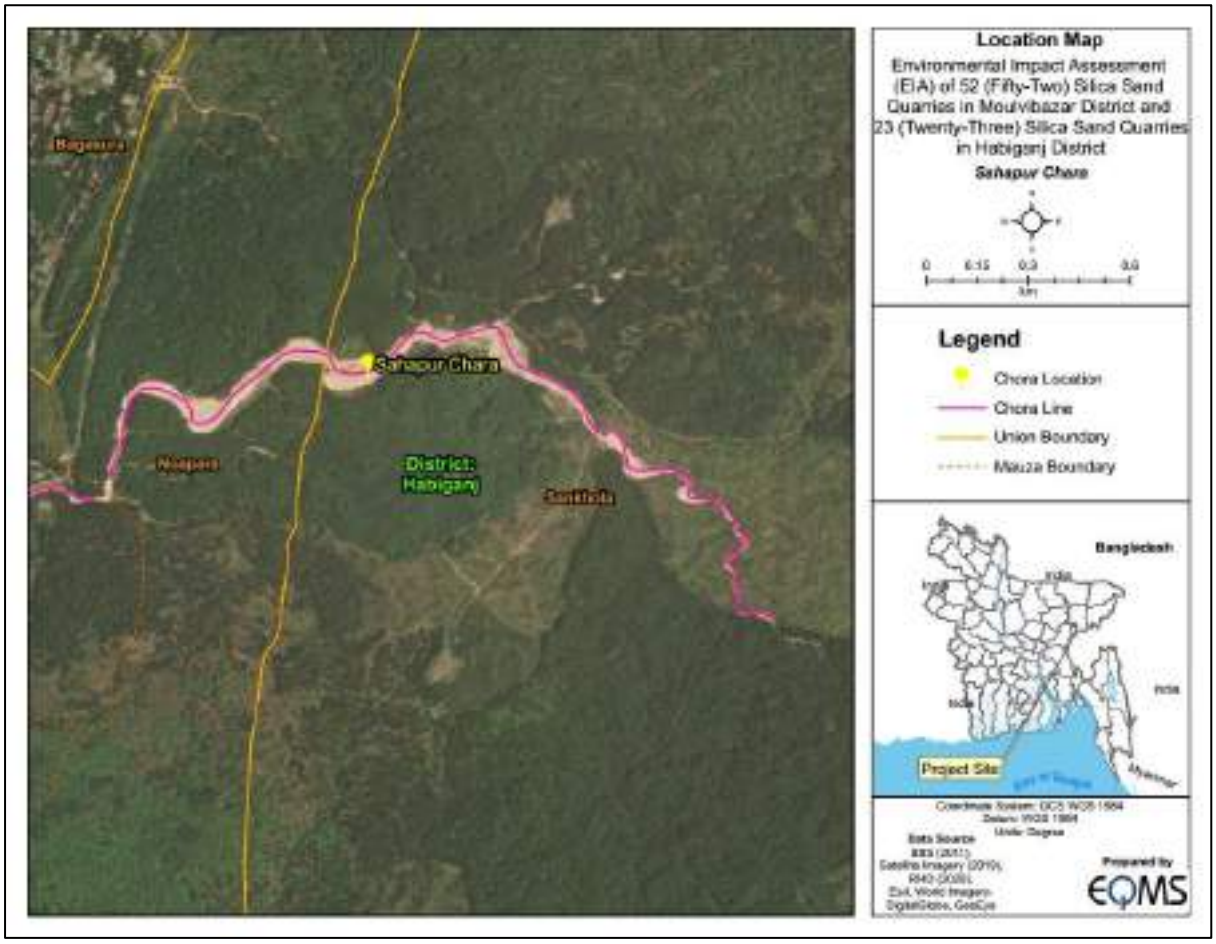




Surrounding vegetation

The following figure shows the location within the mouza boundary of the Sahapur Chora and the surrounding features of the sand Quarry.

Figure 11-18: Location within the Mouza Boundary of the Sahapur Chora and Surrounding Features of the Sand Quarry



Appendix J-10: Sutang River "Kha" Part

The following table shows the details of the Sutang River "Kha" Part Quarry.

Table 11-10: Details of the Sutang River "Kha" Part Quarry

Items	Description
Name of Quarry	Sutang River "Kha" Part
Geographical Coordinate	24°11'14.30"N 91°29'39.67"E
Location	Mouza: Marulura Chak; Union: Paik Para; Upazila: Chunarughat
Total Area	47.62 Acre
Volume of Sand	------
Direction of Chora	Northwestern- Southeastern
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land, and Shayestaganj- Dewndi Road **South:** Village, Homestead Vegetation, Agricultural land, and Jagadishpur – Chunarughat - Shaistaganj Highway (N204)
Access and Connectivity	The Sutang River "Kha" Part Quarry is located within the Sutang River, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Shayestaganj- Dewndi Road, which provides a direct connection to Jagadishpur – Chunarughat - Shaistaganj Highway (N204).
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are distributed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Quarry and its surrounding vegetation exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing feature of the Sutang River "Kha" Part Quarry.

Figure 11-19: Existing Feature of the Sutang River "Kha" Part Quarry



North Side



South Side



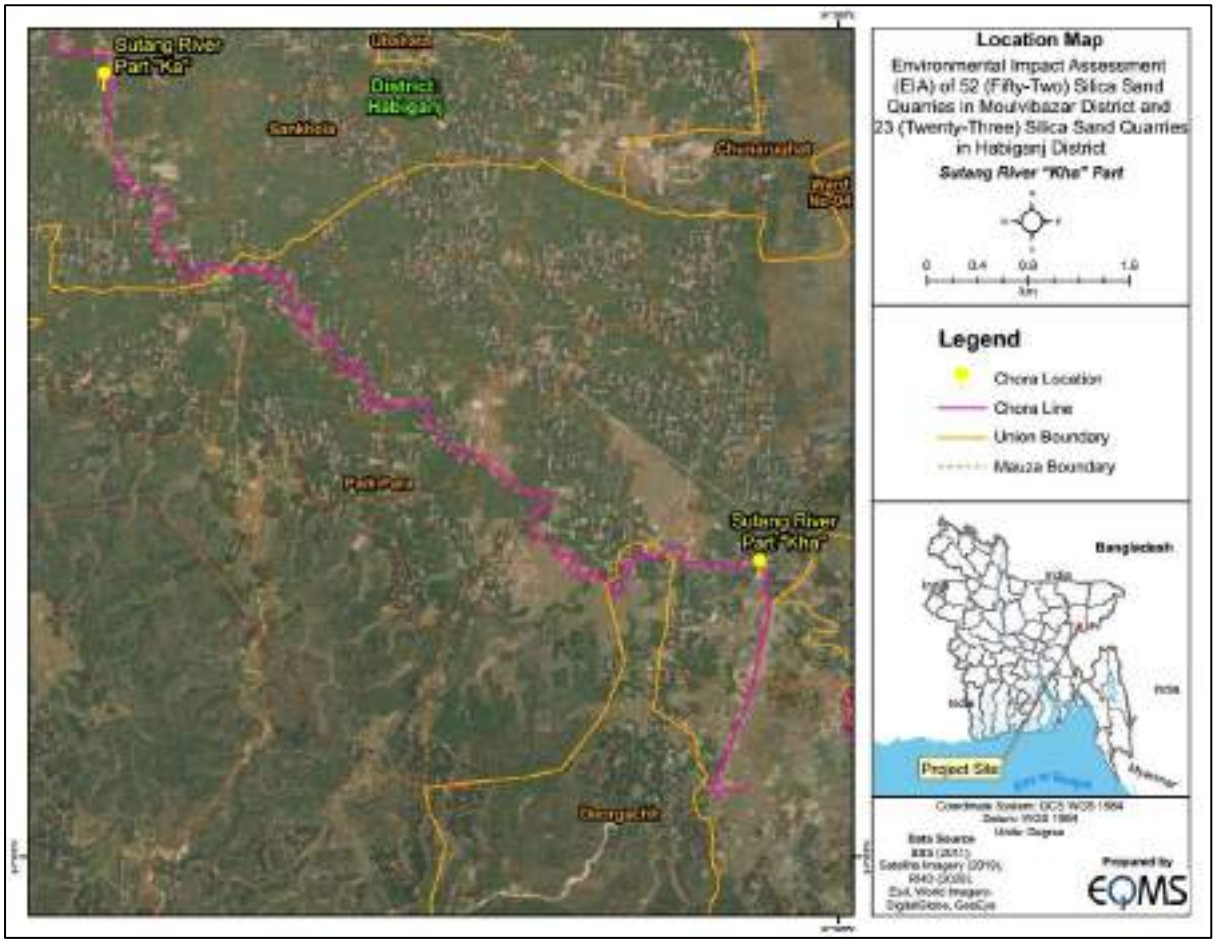
Surrounding Vegetation



Sand extraction from the Quarry

The following figure shows the location within the mouza boundary of the Sutang River "Kha" Part Quarry and the surrounding features of the sand Quarry.

Figure 11-20: Location within the Mouza Boundary of the Sutang River "Kha" Part Quarry and Surrounding Features of the Sand Quarry



Appendix J-11: Sutang River Part "Ka" Quarry

The following table shows the details of the Sutang River Part "Ka" Quarry.

Table 11-11: Details of the Sutang River Part "Ka" Quarry

Items	Description
Name of Quarry	Sutang River Part "Ka"
Geographical Coordinate	24°13'19.04"N 91°26'52.19"E
Location	Mouza: Mahimaura; Union: Sankhola; Upazila: Chunarughat
Total Area	51.49 Acre
Volume of Sand	------
Direction of Chora	Northwestern- Southeastern
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land, and Dhaka Sylhet Highway (N2) **East:** Village, Homestead Vegetation, Agricultural Land, and Shayestaganj- Dewndi Road **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Sutang River Part "Ka" Quarry is located within the Sutang River, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Shayestaganj- Dewndi Road, which provides a direct connection to Dhaka Sylhet Highway (N2).
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are dispersed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Quarry and its surrounding vegetation exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Sutang River Part "Ka" Quarry.

Figure 11-21: Existing Feature of the Sutang River Part "Ka" Quarry



North Side



South Side



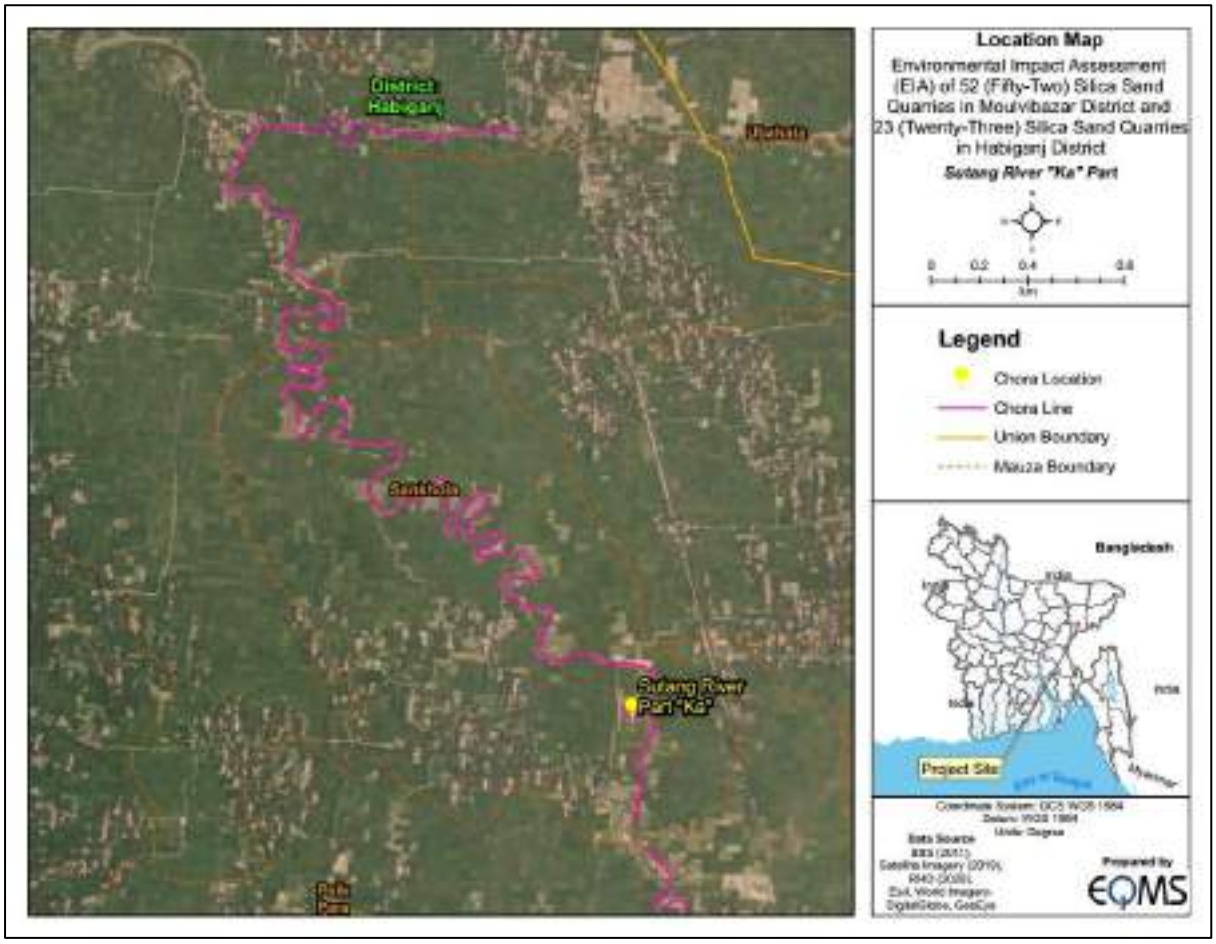
North Eastern Side



West Side

The following figure shows the location within the mouza boundary of the Sutang River Part "Ka" Quarry and the surrounding features of the sand Quarry.

Figure 11-22: Location within the Mouza Boundary of the Sutang River Part "Ka" Quarry and Surrounding Features of the Sand Quarry



Appendix J-12: Sutang River Part "Ga"

The following table shows the details of the Sutang River Part “Ga” Quarry.

Table 11-12: Details of the Sutang River Part “Ga” Quarry

Items	Description
Name of Quarry	Sutang River Part "Ga"
Geographical Coordinate	24°10'6.01"N 91°30'34.30"E
Location	Mouza: Deorgach; Union: Deorgach; Upazila: Chunarughat
Total Area	27.46 Acre
Volume of Sand	------
Direction of Chora	Northwestern- South
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land, and Chondro-Pur Rubber Garden **North:** Homestead Vegetation, Agricultural land, and Jagadishpur – Chunarughat - Shaistaganj Highway (N204) **East:** Village, Homestead Vegetation, Agricultural Land **South:** Homestead Vegetation, Agricultural land, Tea Garden, and Pori bill.
Access and Connectivity	The Sutang River Part "Ga" Quarry is located within the Sutang River, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Deorgach- Amuroad Bazar Road, which provides a direct connection to Jagadishpur – Chunarughat - Shaistaganj Highway (N204).
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are dispersed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Quarry and its surrounding vegetation exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Sutang River Part “Ga” Quarry.

Figure 11-23: Existing Feature of the Sutang River Part "Ga" Quarry



North Side



South Side



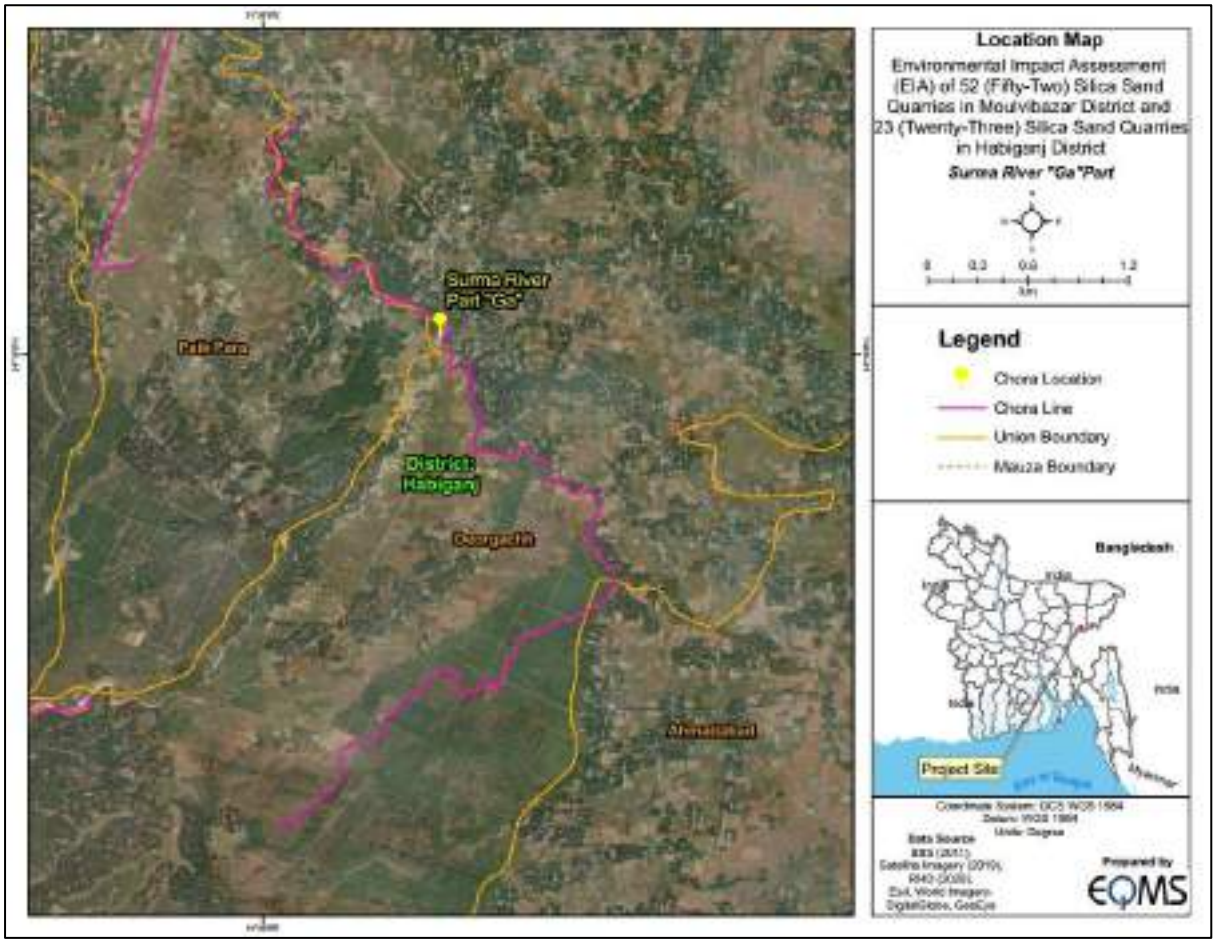
Road crossing over the Quarry



Surrounding Vegetation

The following figure shows the location within the mouza boundary of the Sutang River Part "Ga" Quarry and the surrounding features of the sand Quarry.

Figure 11-24: Location within the Mouza Boundary of the Sutang River Part "Ga" Quarry and Surrounding Features of the Sand Quarry



Appendix J-13: Deo Chora

The following table shows the details of the Deo Chora.

Table 11-13: Details of the Deo Chora

Items	Description
Name of Quarry	Deo Chora
Geographical Coordinate	24°16'31.83"N 91°34'1.22"E
Location	Mouza: Daragaon Tea Garden; Union: Shatiajuri; Upazila: Chunarughat
Total Area	11.86 Acre
Volume of Sand	------
Direction of Chora	East - West
Project Surrounding	**West:** Village, Homestead Vegetation and Agricultural land **North:** Daragaon Bazar, Homestead Vegetation and Tea Garden **East:** Hatimara bungalow, Homestead Vegetation and Tea Garden **South:** Homestead Vegetation and Daragaon Tea Garden
Access and Connectivity	The Deochora Quarry is connected with the Korangi River. Access to the extraction points will be facilitated through the Daragaon Bazar Road, which provides a direct connection to the Dhaka-Moulvibazar Highway at Kamaicherra Bazar.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, and a Tea Garden. Residential households are distributed throughout the surrounding areas in the western part of the quarry.
Ecological Importance	The Quarry and its surrounding tea garden exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area. Additionally, the tea garden serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the surrounding areas. Additionally, during the wet season, local residents use its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Deo Chora.

Figure 11-25: Existing Features of the Deo Chora



West Side



Access Road

East Side



Daragaon Tea Garden



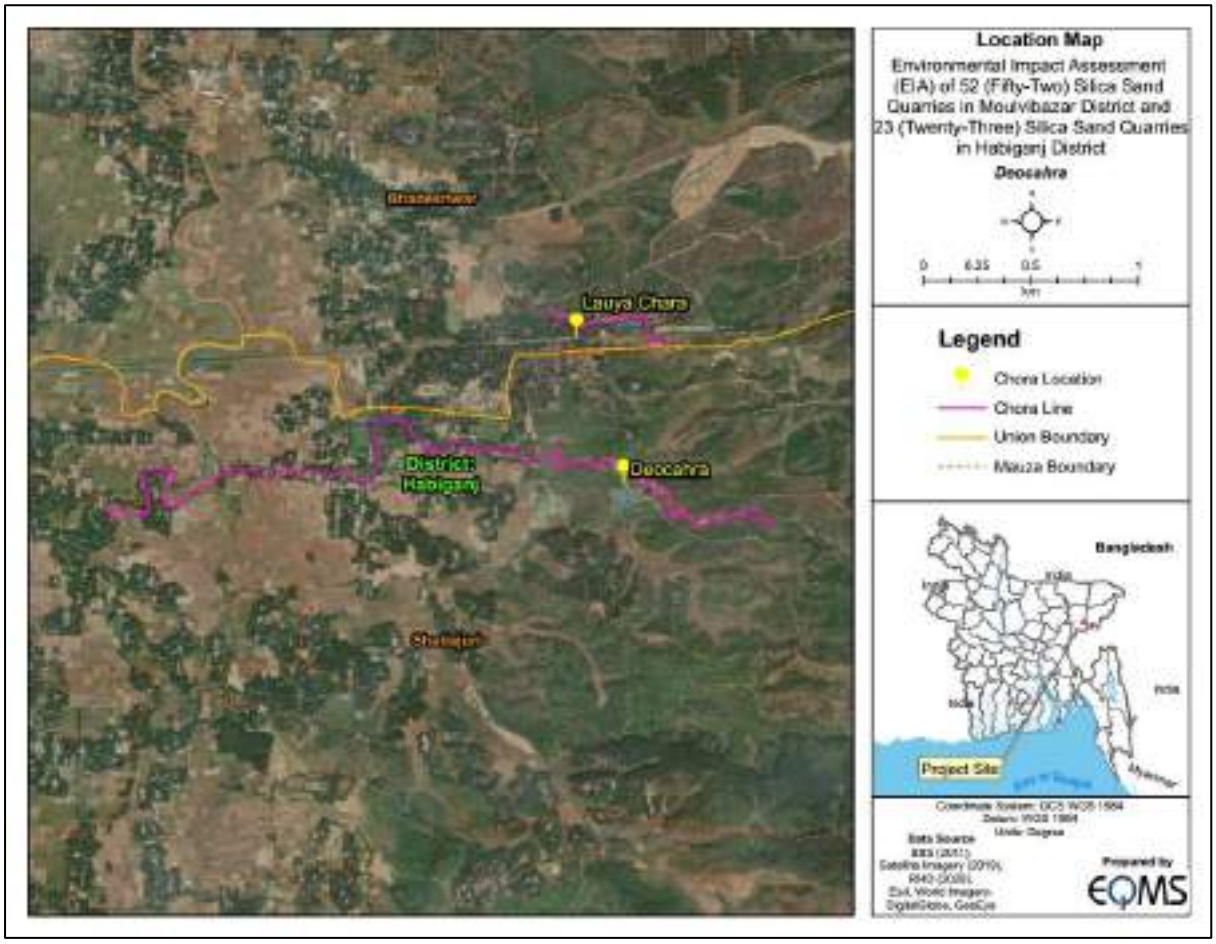
Surrounding Household



Surrounding Vegetation

The following figure shows the location within the mouza boundary of the Deo Chora and the surrounding features of the sand Quarry.

Figure 11-26: Location within the Mouza Boundary of the Deo Chora and Surrounding Features of the Sand Quarry



Appendix J-14: Ichalia Chora

The following table shows the details of the Ichalia Chora.

Table 11-14: Details of the Ichalia Chora

Items	Description
Name of Quarry	Ichalia Chora
Geographical Coordinate	24° 5'56.76"N 91°34'17.93"E
Location	Mouza: Gobarkhola; Union: Gazipur; Upazila: Chunarughat
Total Area	39.36 Acre
Volume of Sand	------
Direction of Chora	North- South
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land **South:** Village, Homestead Vegetation, Tea Garden, and India
Access and Connectivity	The Ichalia Chora has been designated as an official site for sand extraction. To ensure efficient transportation and logistics, access to the extraction points will be facilitated through the Chunarughat–Ashampara Road, which serves as the primary route for vehicles and equipment involved in the extraction process.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are scattered throughout the surrounding areas. The thick vegetation and bushland around the quarry serve as a habitat for various wildlife species.
Ecological Importance	The Quarry and its surrounding bushland exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area, along with the Bengal Monitor Lizard, a species classified as near threatened. Additionally, the bushland serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Ichalia Chora.

Figure 11-27: Existing Features of the Ichalia Chora



North Side



South Side



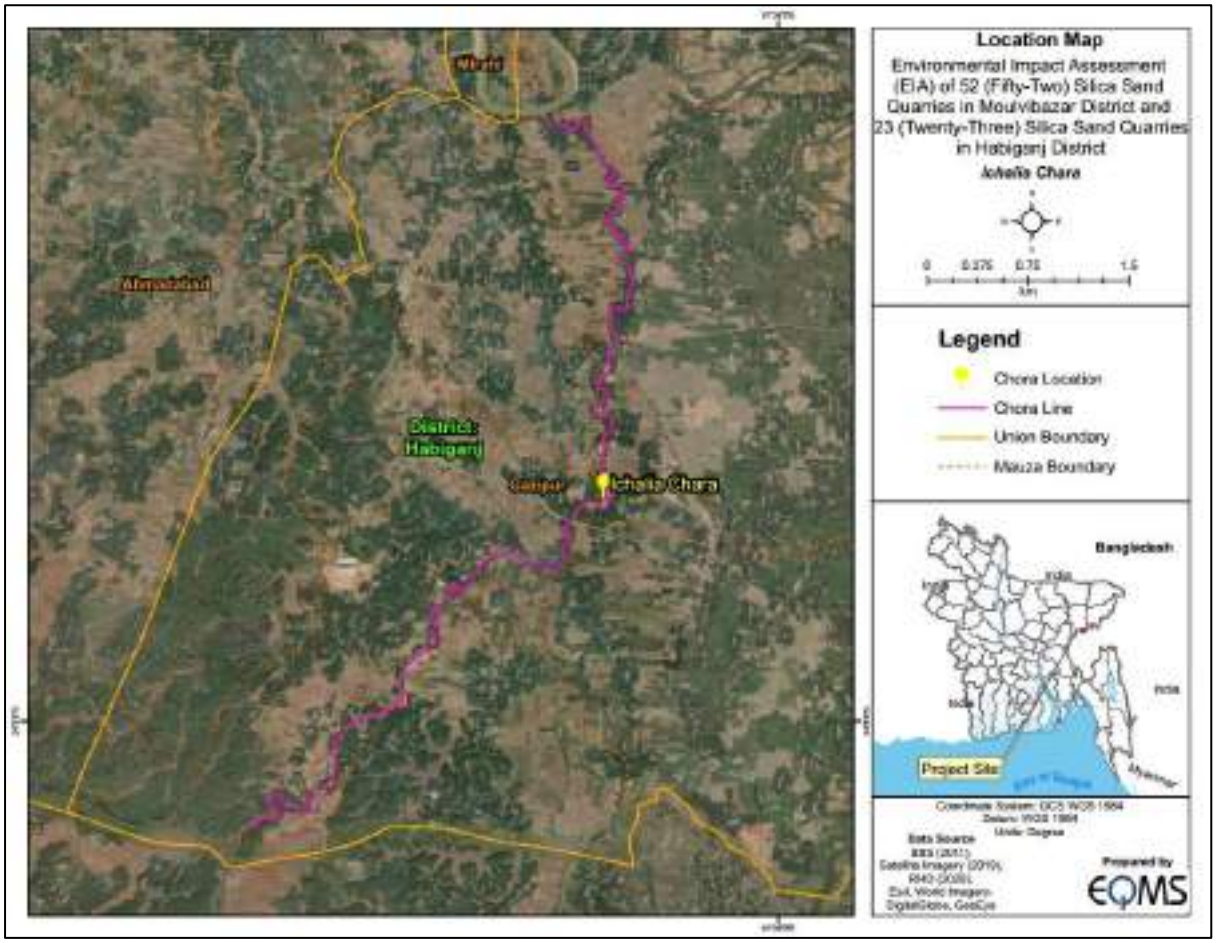
Access Road



Surrounding Household

The following figure shows the location within the mouza boundary of the Ichalia Chora and the surrounding features of the sand Quarry.

Figure 11-28: Location within the Mouza Boundary of the Ichalia Chora and Surrounding Features of the Sand Quarry



Appendix J-15: Ramganga Chandi Chora

The following table shows the details of the Ramganga Chandi Chora.

Table 11-15: Details of the Ramganga Chandi Chora

Items	Description
Name of Quarry	Ramganga Chandi Chora
Geographical Coordinate	24° 8'1.99"N 91°28'39.25"E
Location	Mouza: Nawab Khan Tea Garden; Union: Deorgach; Upazila: Chunarughat
Total Area	27.86 Acre
Volume of Sand	------
Direction of Chora	Northeastern- Southwestern
Project Surrounding	**West:** Village, Homestead Vegetation, Tea Garden **North:** Village, Homestead Vegetation, Tea Garden, and Chandpore Tea Estate **East:** Village, Homestead Vegetation, Tea Garden, and National Tea Company Ltd. **South:** Village, Homestead Vegetation, Tea Garden, and Chaklapunji Tea Factory
Access and Connectivity	The Ramganga Chandichora Quarry is located within the Chandichora Tea Garden, Nawab Khan Tea Garden, and Chandpur Tea Garden, serving as a designated site for sand extraction. Access to the extraction points will be facilitated through the Jagadishpur-Chunarughat-Shaistaganj Highway Road (N204).
Environmental Features	The quarry is surrounded by tea gardens. Residential households are distributed throughout the surrounding areas. The tea gardens around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Quarry and its surrounding tea gardens exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area. Additionally, tea gardens serve as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	Local residents use quarry water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing feature of the Ramganga Chandi Chora.

Figure 11-29: Existing Feature of the Ramganga Chandi Chora



Northeastern Side



Southwestern Side



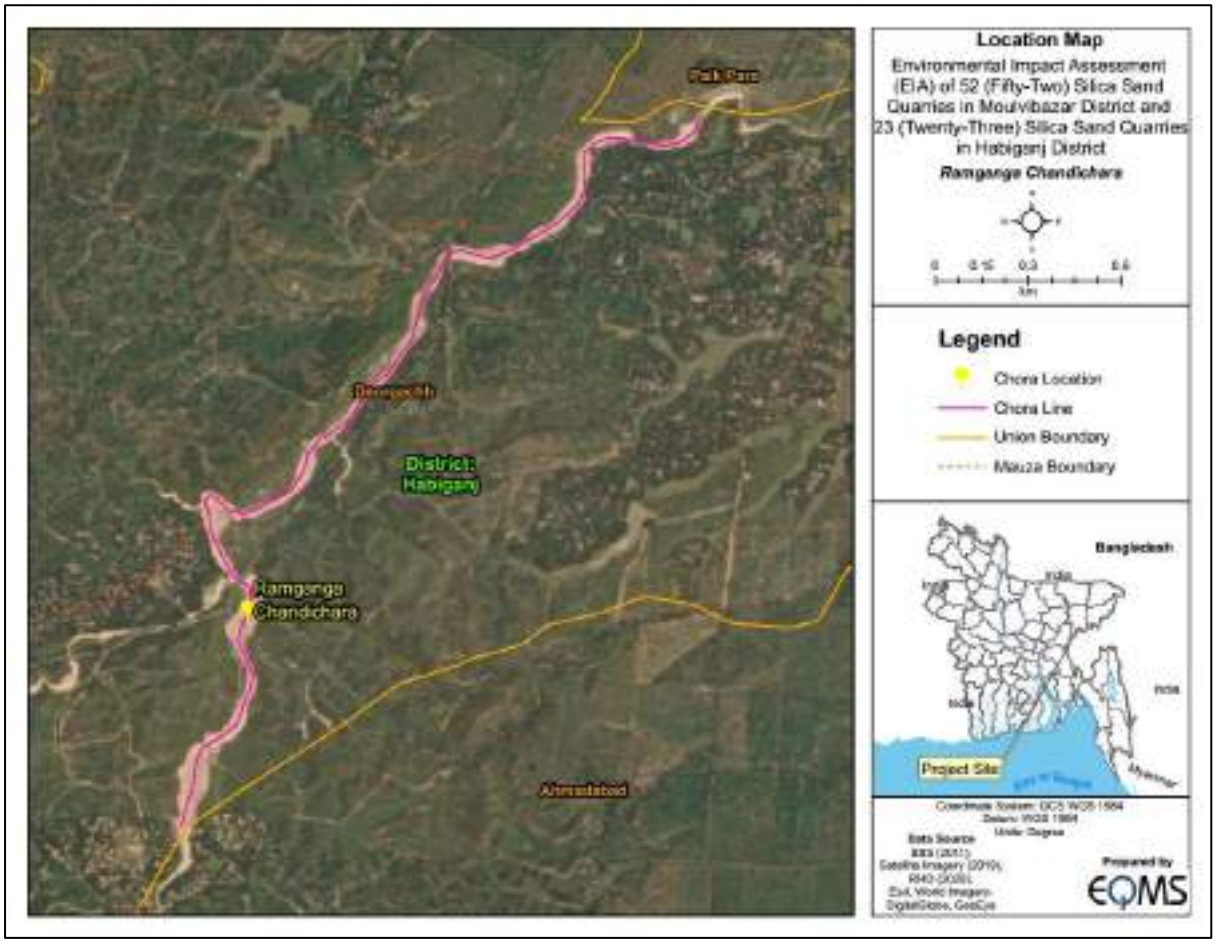
Access Road Jagadishpur-Chunarughat-Shaistaganj Highway Road (N204)



Surrounding Tea Garden

The following figure shows the location within the mouza boundary of the Ramganga Chandi Chora and the surrounding features of the sand Quarry.

Figure 11-30: Location within the Mouza Boundary of the Ramganga Chandi Chora and Surrounding Features of the Sand Quarry



Appendix J-16: Shashanchora

The following table shows the details of the Shashan Chora.

Table 11-16: Details of the Shashan Chora

Items	Description
Name of Quarry	Shashanchora
Geographical Coordinate	24°25'34.72"N 91°34'55.08"E
Location	Mouza: Sukhchar, Babanpur; Union: Putijuri ; Upazila: Bahubal
Total Area	4.33 Acre
Volume of Sand	------
Direction of Chora	East-West
Project Surrounding	**West:** Agricultural Land **North:** Village, Homestead Vegetation, Agricultural land **East:** Agricultural land and Rubber Garden **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Shashanchora Quarry is directly connected to the Dhaka-Sylhet Highway. Access to the extraction points will be facilitated through the highway road.
Environmental Features	The quarry is surrounded by dense vegetation, including bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are dispersed throughout the surrounding areas. The dense bushland and vegetation around the quarry provide a habitat for diverse wildlife.
Ecological Importance	The Shashanchora Quarry and its surrounding bushland support notable biodiversity. Local consultations have reported frequent sightings of the Golden Jackal (*Canis aureus)*, along with the Bengal Monitor Lizard (*Varanus bengalensis*), a species classified as Near Threatened. Furthermore, the bushland serves as a habitat for a diverse array of bird species, underscoring the area's ecological significance.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the region. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Shashan Chora.

Figure 11-31: Existing Features of the Shashan Chora



Eastern Side



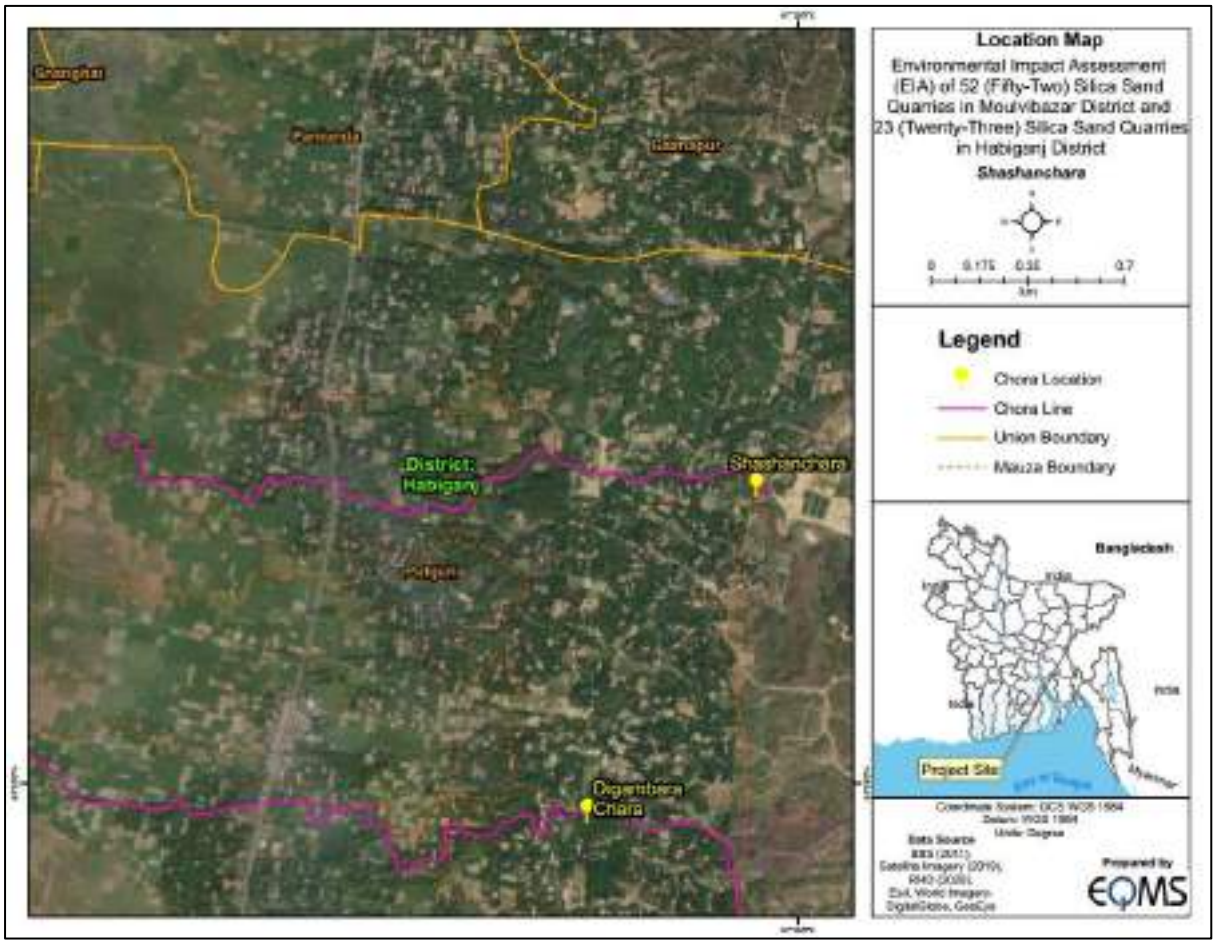
Western Side



Surrounding Vegetation

The following figure shows the location within the mouza boundary of the Shashan Chora and the surrounding features of the sand Quarry.

Figure 11-32: Location within the Mouza Boundary of the Shashan Chora and Surrounding Features of the Sand Quarry



Appendix J-17: Digambara Chora

The following table shows the details of the Digambara Chora.

Table 11-17: Details of the Digambara Chora

Items	Description
Name of Quarry	Digambara Chora
Geographical Coordinate	24°24'56.73"N 91°34'35.31"E
Location	Mouza: Rajsuyot, Sultanpur; Union: Putijuri; Upazila: Bahubal
Total Area	3.67 Acre
Volume of Sand	------
Direction of Chora	East-West
Project Surrounding	**West:** Agricultural Land, Village, and Pond **North:** Village, Homestead Vegetation, Agricultural land **East:** Agricultural land and Rubber Garden **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Digambara Chora Quarry is located along the Dhaka-Sylhet Highway. Access to the extraction points will be facilitated through the highway road.
Environmental Features	The area surrounding the quarry is characterized by dense vegetation, consisting of bamboo groves, natural herbs, shrubs, woodland bushes, and agricultural land. Residential households are scattered throughout the region. The abundant bushland and vegetation support a diverse range of wildlife species, contributing to the area's ecological richness.
Ecological Importance	The Digambara Chora Quarry and its surrounding bushland harbor rich biodiversity. According to local consultations, the area is frequently visited by the Golden Jackal (*Canis aureus*), Asian Common toad (*Duttaphrynus melanostictus)*, Common Garden Lizard (*Calotes versicolor*) and the Bengal Monitor Lizard (Varanus bengalensis), etc. Additionally, the bushland provides essential habitat for a variety of bird species, highlighting its ecological importance.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the region. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Digambara Chora.

Figure 11-33: Existing Features of the Digambara Chora



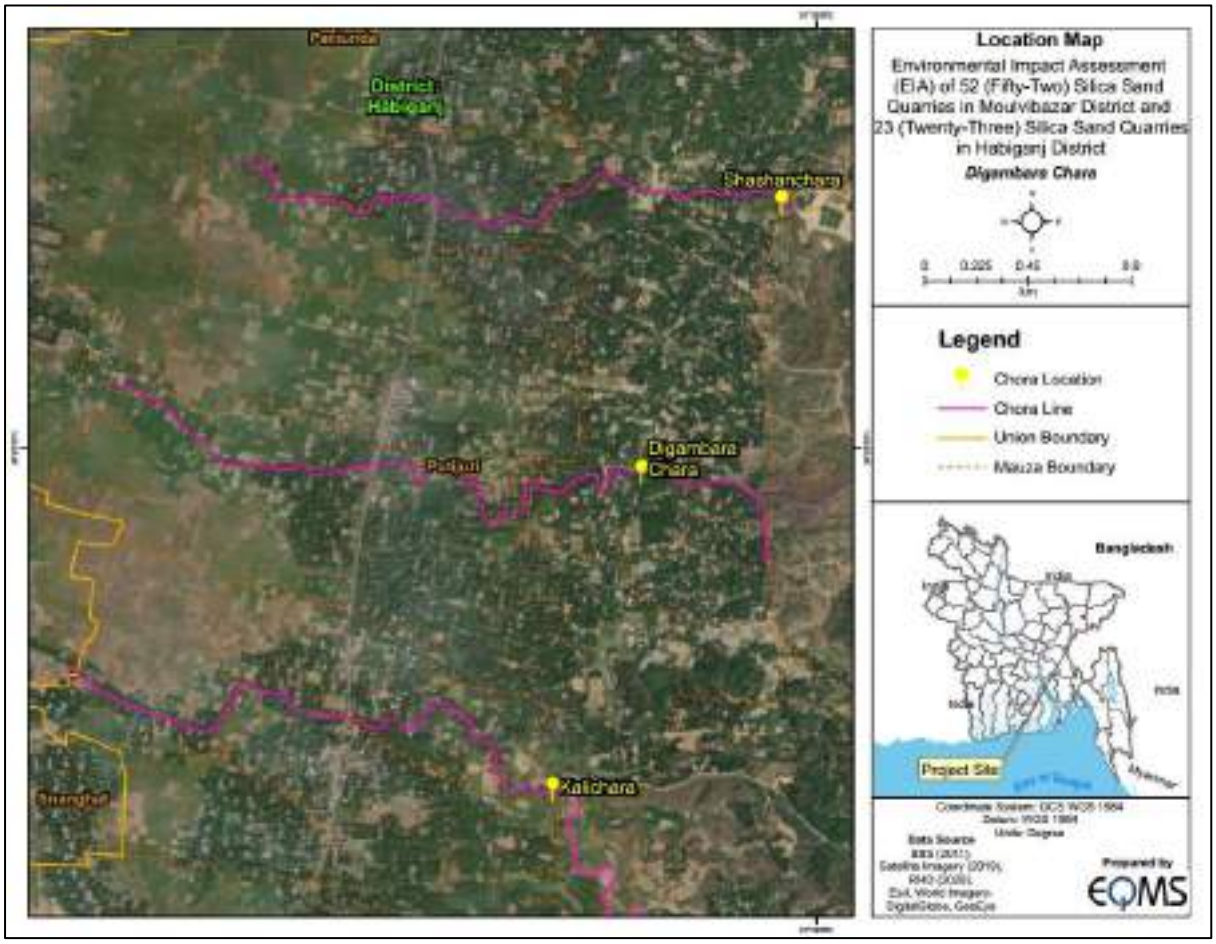
East Side



West Side

The following figure shows the location within the mouza boundary of the Digambara Chora and the surrounding features of the sand Quarry.

Figure 11-34: Location within the Mouza Boundary of the Digambara Chora and Surrounding Features of the Sand Quarry



Appendix J-18: Kali Chora

The following table shows the details of the Kali Chora.

Table 11-18: Details of the Kali Chora

Items	Description
Name of Quarry	Kali Chora
Geographical Coordinate	24°24'11.91"N 91°34'22.82"E
Location	Mouza: Mostompur, Harirampur; Union: Putijuri; Upzila: Bahubal
Total Area	5.21 Acre
Volume of Sand	------
Direction of Chora	East-West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land and Tea Garden **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Kalichora Quarry is located along the Dhaka-Sylhet Highway. Access to the extraction points will be facilitated through the highway road.
Environmental Features	The quarry is surrounded by lush vegetation, including bamboo groves, native herbs, shrubs, woodland thickets, and agricultural fields. Scattered residential households are present across the region. The dense vegetation and bushland provide habitat for a variety of wildlife species, enhancing the area's ecological diversity.
Ecological Importance	The Quarry and its surrounding bushland harbor rich biodiversity. According to local consultations, the area is frequently visited by the Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal (Canis aureus), and the Rhesus Macaque (*Macaca mulatta*), etc. Additionally, the bushland provides an essential habitat for a variety of bird species like Black-hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*) etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the region. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Kali Chora.

Figure 11-35: Existing Features of the Kali Chora



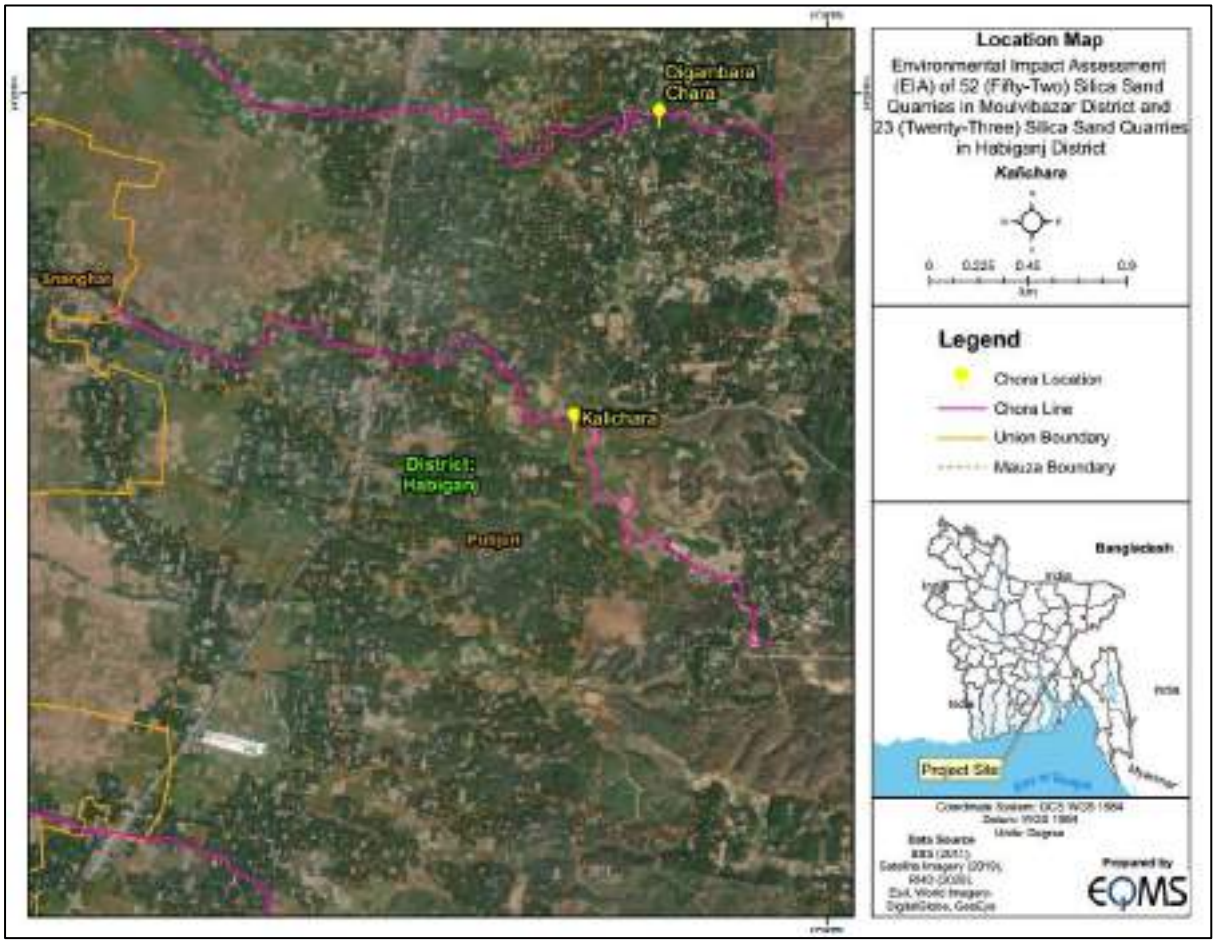
East Side



West Side

The following figure shows the location within the mouza boundary of the Kali Chora and the surrounding features of the sand Quarry.

Figure 11-36: Location within the Mouza Boundary of the Kali Chora and Surrounding Features of the Sand Quarry



Appendix J-19: Madhavi Chora

The following table shows the details of the Madhavi Chora.

Table 11-19: Details of the Madhavi Chora

Items	Description
Name of Quarry	Madhavi Chora
Geographical Coordinate	24°22'55.68"N 91°33'59.24"E
Location	Mouza: Mostompur, Harirampur; Union: Putijuri; Upzila: Bahubal
Total Area	2.10 Acre
Volume of Sand	------
Direction of Chora	East-West
Project Surrounding	**North:** Village, Homestead Vegetation, Agricultural land **South:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land and Tea Garden **West:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Madhavi Chora Quarry is located along the Dhaka-Sylhet Highway. Access to the extraction points will be facilitated through the highway road.
Environmental Features	The landscape around the quarry is a mix of dense greenery, featuring bamboo clusters, wild herbs, shrubs, and patches of woodland, interspersed with agricultural fields. Residential settlements are dispersed throughout the area. The rich plant life and bushy terrain create a favorable environment for diverse wildlife, adding to the region's ecological significance.
Ecological Importance	The Madhavi Chora Quarry and its surrounding bushland harbor rich biodiversity. According to local consultations, the area is frequently visited by Jungle Cat (Felis chaus), Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal (Canis aureus), and the Common Indian Field Mouse (*Mus booduga*), etc. Additionally, the bushland provides essential habitat for a variety of bird species like White Wagtail (*Motacilla alba*), Black hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*), etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Madhavi Chora.

Figure 11-37: Existing Features of the Madhavi Chora



East Side



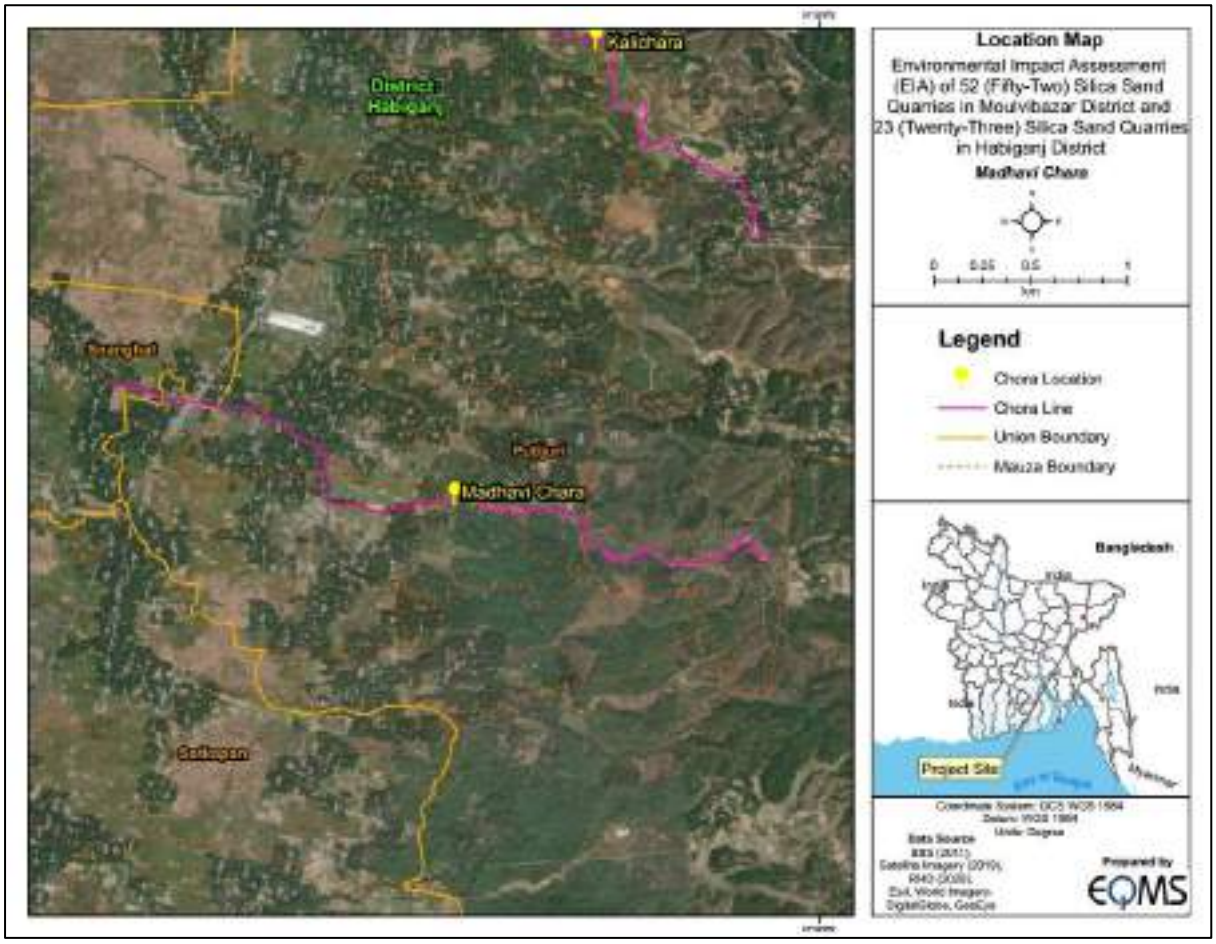
West Side



Surrounding Mosque

The following figure shows the location within the mouza boundary of the Madhavi Chora and the surrounding features of the sand Quarry.

Figure 11-38: Location within the Mouza Boundary of the Madhavi Chora and Surrounding Features of the Sand Quarry



Appendix J-20: Dhalia Chora

The following table shows the details of the Dhalia Chora.

Table 11-20: Details of the Dhalia Chora

Items	Description
Name of Quarry	Dhalia Chora
Geographical Coordinate	24°20'34.29"N 91°33'27.70"E
Location	Mouza: Rampur Tea Garden, Mayzabad Hills; Union: Bhadeshwar; Upzila: Bahubal
Total Area	7.94 Acre
Volume of Sand	------
Direction of Chora	East-West
Project Surrounding	**North:** Village, Homestead Vegetation, Agricultural land **South:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land **West:** Village, Homestead Vegetation, Agricultural land, and Pond
Access and Connectivity	The Dhalia Quarry serves as a designated site for sand extraction. Access to the extraction points will be facilitated through the Doyalpur road which is connected to the Dhaka Sylhet Highway through Bahubal Road.
Environmental Features	The quarry area is enveloped by a mix of thick vegetation, featuring bamboo clusters, wild herbs, shrubs, forested undergrowth, and farmland. Residential homes are dispersed throughout the landscape. This rich bushland and plant life fosters a wide array of wildlife, adding to the ecological vitality of the region.
Ecological Importance	The Dhalia Quarry and its surrounding bushland harbor rich biodiversity. According to local consultations, the area is frequently visited by the Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal *(Canis aureus),* and the Rhesus Macaque (*Macaca mulatta*), etc. Additionally, the bushland provides an essential habitat for a variety of bird species like Black hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*), etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Dhalia Chora.

Figure 11-39: Existing Features of the Dhalia Chora



Southeastern Side



Northwestern Side



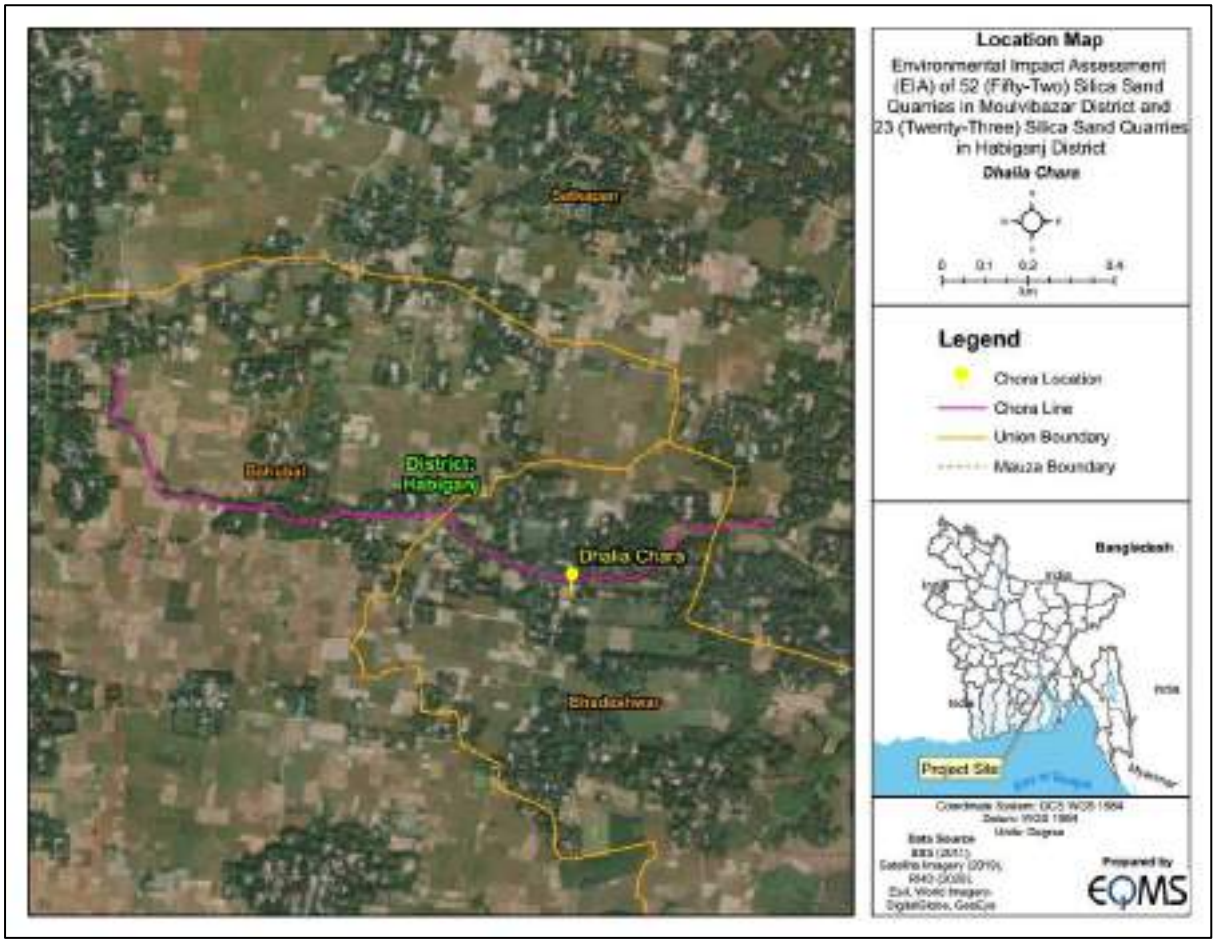
Switchgate on the quarry



Surrounding Vegetation

The following figure shows the location within the mouza boundary of the Dhalia Chora and the surrounding features of the sand Quarry.

Figure 11-40: Location within the Mouza Boundary of the Dhalia Chora and Surrounding Features of the Sand Quarry



Appendix J-21: Karangi River

The following table shows the details of the Karangi River Quarry.

Table 11-21: Details of the Karangi River Quarry

Items	Description
Name of Quarry	Karangi River
Geographical Coordinate	24°21'20.87"N 91°32'17.85"E
Location	Mouza: Bhabanipur; Union: Bahubal; Upazila: Bahubal
Total Area	125 Acre
Volume of Sand	------
Direction of Chora	East- West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural Land **South:** Village, Homestead Vegetation, Agricultural land
Access and Connectivity	The Karangi River Quarry is located along the Dhaka-Sylhet Highway and serves as a designated site for sand extraction. Access to the extraction points will be facilitated through the highway road.
Environmental Features	The quarry is surrounded by lush vegetation, including bamboo groves, native herbs, shrubs, woodland thickets, and agricultural fields. Scattered residential households are present across the region. The dense vegetation and bushland provide habitat for a variety of wildlife species, enhancing the area's ecological diversity.
Ecological Importance	The Karangi River Quarry and its surrounding bushland harbor rich biodiversity. According to local consultations, the area is frequently visited by the Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal (Canis aureus), and the Rhesus Macaque (*Macaca mulatta*), etc. Additionally, the bushland provides an essential habitat for a variety of bird species like Black hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*), etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Karangi River Quarry.

Figure 11-41: Existing Features of the Karangi River Quarry



East Side



West Side



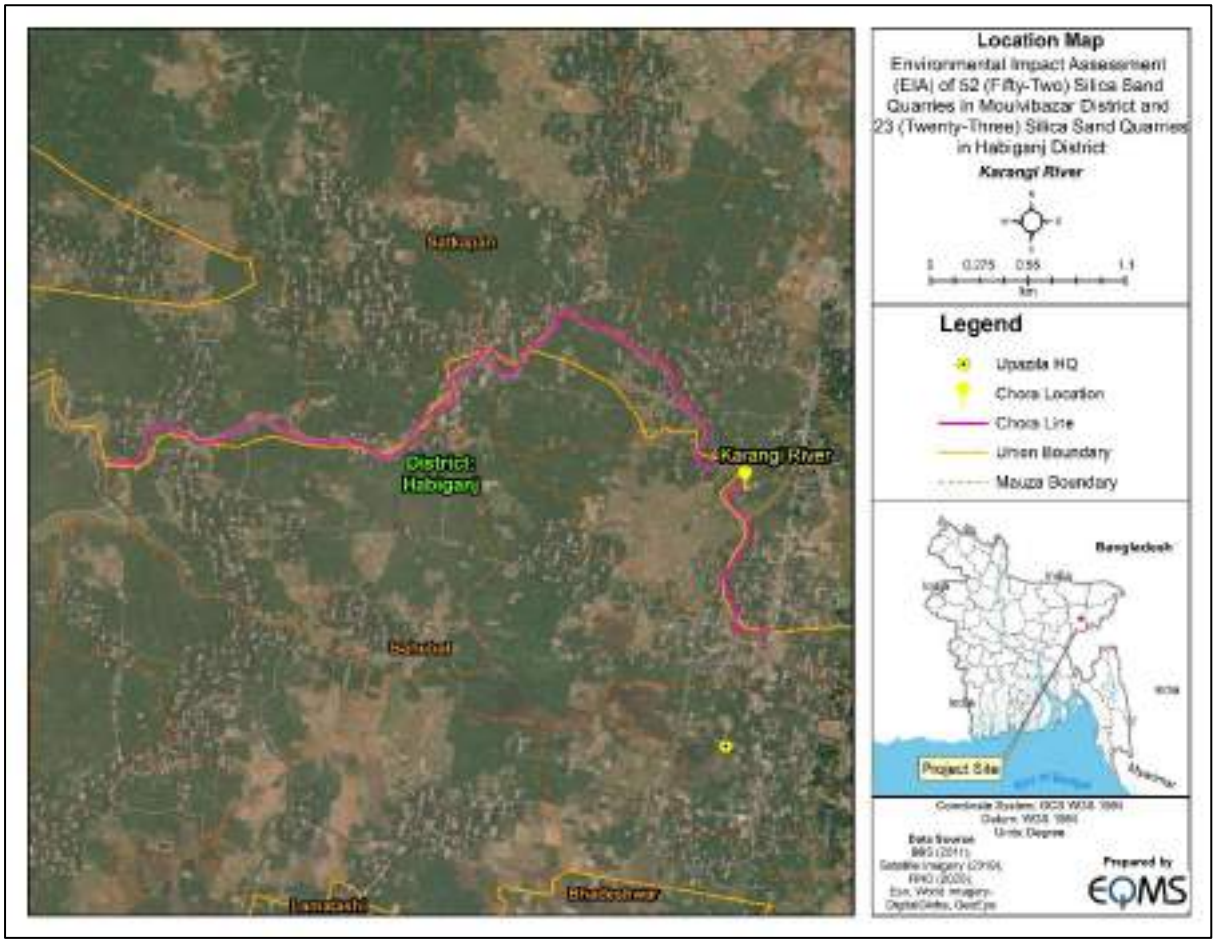
Surrounding vegetation



Access Road

The following figure shows the location within the Mouza boundary of the Karangi River Quarry and the surrounding features of the sand Quarry.

Figure 11-42: Location within the Mouza Boundary of the Karangi River Quarry and Surrounding Features of the Sand Quarry



Appendix J-22: Kamai Chora

The following table shows the details of the Kamai Chora.

Table 11-22: Details of the Kamai Chora

Items	Description
Name of Quarry	Kamai Chora
Geographical Coordinate	24°19'4.85"N 91°33'23.96"E
Location	Mouza: Rashidpur Tea Garden; Union: Bhadeshwar; Upazila: Bahubal
Total Area	5.18 Acre
Volume of Sand	------
Direction of Chora	Northwestern- Southeastern
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land **East:** Village, Homestead Vegetation, Agricultural land, and Tea Garden **South:** Village, Homestead Vegetation, Agricultural land, and Tea Garden
Access and Connectivity	The Quarry is located in the Rashidpur Tea Garden and serves as a designated site for sand extraction. Access to the extraction points will be facilitated through the Rashidpur Tea Garden Road.
Environmental Features	The quarry is surrounded by a Tea Garden. Residential households are distributed throughout the surrounding areas in the Northwestern part of the quarry.
Ecological Importance	The Kamai Chora Quarry and its surrounding tea garden are rich in biodiversity. According to local consultations, the area is frequently visited by the Indian Fruit Bat (*Pteropus giganteus*), Golden Jackal (Canis aureus), and the Rhesus Macaque (*Macaca mulatta*), etc. Additionally, the bushland provides an essential habitat for a variety of bird species like Black hooded Oriole (*Oriolus xanthornus*), Black-rumped Flameback (*Dinopium benghalense*), Chestnut-tailed starling (*Sturnia malabarica*), etc. highlighting its ecological importance.
Livelihood Importance	The quarry serves as a crucial water source for agriculture in the region. Additionally, local residents rely on its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Kamai Chora.

Figure 11-43: Existing Features of the Kamai Chora



Southeastern Side



Northwestern Side



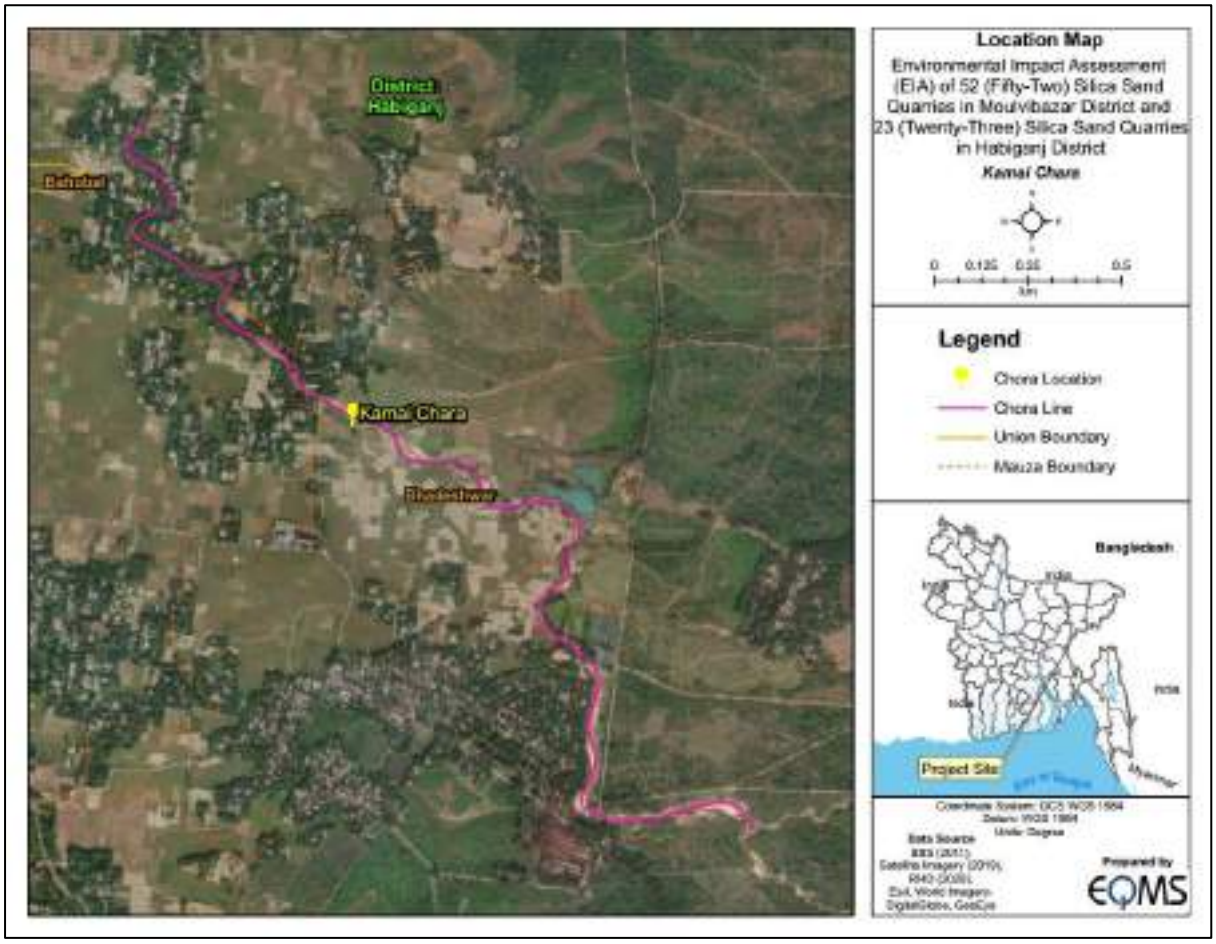
Switchgate on the quarry



Surrounding Vegetation

The following figure shows the location within the mouza boundary of the Kamai Chora and the surrounding features of the sand Quarry.

Figure 11-44: Location within the Mouza Boundary of the Kamai Chora and Surrounding Features of the Sand Quarry



Appendix J-23: Lauya Chora

The following table shows the details of the Lauya Chora.

Table 11-23: Details of the Lauya Chora

Items	Description
Name of Quarry	Lauya Chora
Geographical Coordinate	24°16'53.88"N 91°33'54.14"E
Location	Mouza: Daragaon Tea Garden; Union: Bhadeshwar; Upazila: Bahubal
Total Area	1.10 Acre
Volume of Sand	------
Direction of Chora	East -West
Project Surrounding	**West:** Village, Homestead Vegetation, Agricultural land **North:** Village, Homestead Vegetation, Agricultural land, and Tea Garden **East:** Village, Homestead Vegetation, Tea Garden **South:** Village, Homestead Vegetation, and Daragaon tea garden
Access and Connectivity	The Deochora Quarry is located in Daragaon Tea Garden. Access to the extraction points will be facilitated through the Daragaon Bazar Road, which provides a direct connection to the Dhaka-Moulvibazar Highway at Kamaicherra Bazar.
Environmental Features	The quarry is surrounded by a Tea Garden. Residential households are distributed throughout the surrounding areas in the western part of the quarry.
Ecological Importance	The Quarry and its surrounding tea garden exhibit significant biodiversity. Local consultations have indicated that the Golden Jackal is frequently observed in the area. Additionally, the tea garden serves as a habitat for various bird species, further enhancing the region's ecological value.
Livelihood Importance	The quarry serves as a secondary water source for agriculture in the surrounding areas. Additionally, during the wet season, local residents use its water for domestic purposes, including bathing and washing clothes. However, it is not used as a source of drinking water.

The following figure shows the existing features of the Lauya Chora.

Figure 11-45: Existing Features of the Lauya Chora





East Side



Surrounding vegetation

West Side



Daragaon Tea Garden

The following figure shows the location within the mouza boundary of the Lauya Chora and the surrounding features of the sand Quarry.

Figure 11-46: Location within the Mouza Boundary of the Lauya Chora and Surrounding Features of the Sand Quarry

