GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

Local Government Engineering Department (LGED)

Local Government Division

Ministry of Local Government, Rural Development and Cooperatives

ENVIRONMENTAL AND SOCIAL ASSESSMENT (ESA) REPORT FOR

Package No: RUTDP/CHO/2024-25/W-01
At
Chakaria Pourashava, Cox's bazar

Resilient Urban and Territorial Development Project (RUTDP)

Design, Supervision, and Management (DSM) Consultancy Services

Eptisa Servicios de Ingenieria, S.L (Eptisa), Madrid, Spain

Joint Venture with

AQUA Consultants & Associates Ltd., Bangladesh;
DevConsultants Limited (DEVCON), Bangladesh;
Design, Planning & Management Consultants Ltd. (DPM), Bangladesh

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ABBREVIATIONS

AP (AP's)	Affected Person
BDT	Bangladeshi Taka
BMD	Bangladesh Meteorological Department
BOQ	Bill of Quantity
BGS	British Geological Survey
CC	Cement Concrete
CIP	Capital Investment Plan
CP	Contingency Planning
CC	City Corporation
DSM	Design, Supervision, and Management
DPHE	Department of Public Health Engineering (Bangladesh)
EA	Environmental Assessment
ECR	Environmental Conservation Rules
EMP	Environmental Management Plan
EPP	Emergency Preparedness Planning
ES	Environmental Screening
FGD	Focal Group Discussion
GoB	Government of Bangladesh
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GRP	Grievance Redress Procedure
IIS	Infrastructure Improvement Section
LGED	Local Government Engineering Department
RUTDP	Resilient Urban and Territorial Development Project
PD	Project Director
PMU	Project Management Unit
RCC	Reinforcement Cement Concrete
RP	Relevant Reports
TL	Team Leader
WB	World Bank
XEN	Executive Engineer

1 INTRODUCTION

1.1 Subproject Background

Chakaria Pourashava, an old municipality of Bangladesh, was established on the December 14, 1994. It was formed by separating 9 Ward from the Chakaria Pourashava of Coxs bazar district. At present, the Pourashava is an "A" grade Pourashava. It has a total area of 15.42sq. km. It is located in between 21°74'10"N latitudes and 92°4'42"E longitudes. Lakshyachar Union is located to the north of this municipality, Kakara Union and Phansiakhali Union are located to the east, Chiringa Union is located to the south, and Purba Bora Beola Union is located to the west. The distance from the district headquarters to Chakaria Pourashava is 30 km. Chakaria pourashava has total House hold 19,649 and current population of the Pourashava is about 94,397 (BBS,2022) Chakaria Pourashava has 82 km Paved Road, 30 km Katcha Road, 9 km Half Paved Road, 13 km CC/RCC Road, 8 km Drains Pacca and 20 km Drains Katcha, 427 nos. of natural or man-made ponds/ditches, 1 river and 4 khals also exist in the Pourashava area. Infrastructure and physical development are not attained significantly in the Chakoria Pourashava. Hence, this subproject is a continuation of the infrastructural development of the Chakoria Pourashava for the improvement of transport and drainage facilities. (Chakaria Pourashava: At a glance). With the increasing population and rapid urbanization, Chakaria Pourashava requires continuous infrastructure development.

This subproject to be implemented under RUTDP would have the following activities:

- Rehabilitation and replacement of Reinforcement Cement Concrete (RCC) pavements and
- Replacement of RCC drains with allied works including footpath works.

1.2 Objectives of the Study

The aim of the study is to examine the environmental and social impacts due to construction and operation of the subproject and formulate the environmental and social management plan to minimize the negative impacts and enhance the positive impacts.

The specific objectives include:

- To assess the existing environmental and social conditions of the subproject site and its adjacent areas in order to establish a baseline framework against which potential environmental and social impacts due to implementation of the subproject would be compared;
- To identify and assess impacts resulting from the subproject during its construction phase and operation phase;
- To develop a rational environmental and social management plan with recommendations for mitigating adverse impacts, enhancing positive impacts & outlining environmental and social monitoring requirements during construction & operational phase of the subproject.

1.3 Scope and Methodology of the Study

The study methodology comprised the following activities:

- Desktop Study;
- Field Investigations and Data Collection;
- Data Analysis and Report Writing.

Desktop Study

The desktop study involved:

- Initial meetings with client, stakeholders to discuss the proposed subproject, including subproject activities;
- Collection and review of the baseline data, maps, reports (feasibility study report and secondary reports) and other relevant information (draft ESMF and other relevance) on the existing environmental and social conditions of the subproject area;
- Review the relevant existing legislation, regulation and policies;
- Understand the anticipated technical processes that may affect the environment as well as community lives and livelihood.

Field Investigation and Data Collection

A team of the consultants made a field investigation to the proposed site. Field investigations involved mainly site walks within the subproject area and the neighboring areas that may be affected by the subproject. The following key tasks were performed during the field visit:

- Taking photographs of the significant aspects to assist in describing the baseline environmental and social conditions of the subproject area;
- Interviews with representatives of the Chakaria Pourashava officials, within the subproject area and interested and affected people within the subproject influence zone;
- Obtaining relevant documents from the Pourashava and local people within the subproject influence zone;
- Verifying information and data collected during the desktop study and to collect new information that may have been important in the assessment of the impacts and design of the mitigation measures.

Data Analysis and Report Writing

The data and information collected from all the sources (literature review, secondary and primary data, public consultation) were analyzed to describe the existing environmental and social setting of the subproject area, to identify the potential positive and negative impacts of the proposed subproject, as well as to provide preliminary suggestions for mitigation measures. Finally, this environmental and social assessment report has been prepared.

2 SUBPROJECT DESCRIPTION

2.1 The Study Area and Activities

The subproject is located in the Chakaria Pourashava within the jurisdiction area of the ward nos. wards no 3, 5. and 8. This subproject comprises RCC roads and RCC drains with allied works activities. The activities are given below-

Activity 1: This subproject also encompasses approximately 3480 Km Rehabilitation and reconstruction of RCC road pavement with 3480 Km RCC Drain and Street Light allied works at

a) **Activity-1.1:** Improvement of RCC road and drain from Chiringa Baitush Road to Bashghat road at (Ch. 0+000m to 0+560m);
b) **Activity-1.2:** Improvement of RCC Road from South Karia Ghona PIO culvert to Showdagar Ghona Alauddin Road at (Ch. 0+000m to 1+550m)
c) **Activity-1.3:** Improvement of RCC Road and drain from Batakhali Namar jailepara road to Torojghat station via Leader Haider Ali house road at (Ch. 0+000m to 0+770m)
d) **Activity-1.4:** Improvement of RCC Road from Moddachakaria Govt. Primari school to Kadinga Pukur road (Ch. 0+000m to 0+600 m.)

The location map, topographical features & layout plan of this subproject are shown in ***Figure 2.1.1, Figure 2.1.2, Figure 2.1.3*** and ***Figure 2.1.4.***

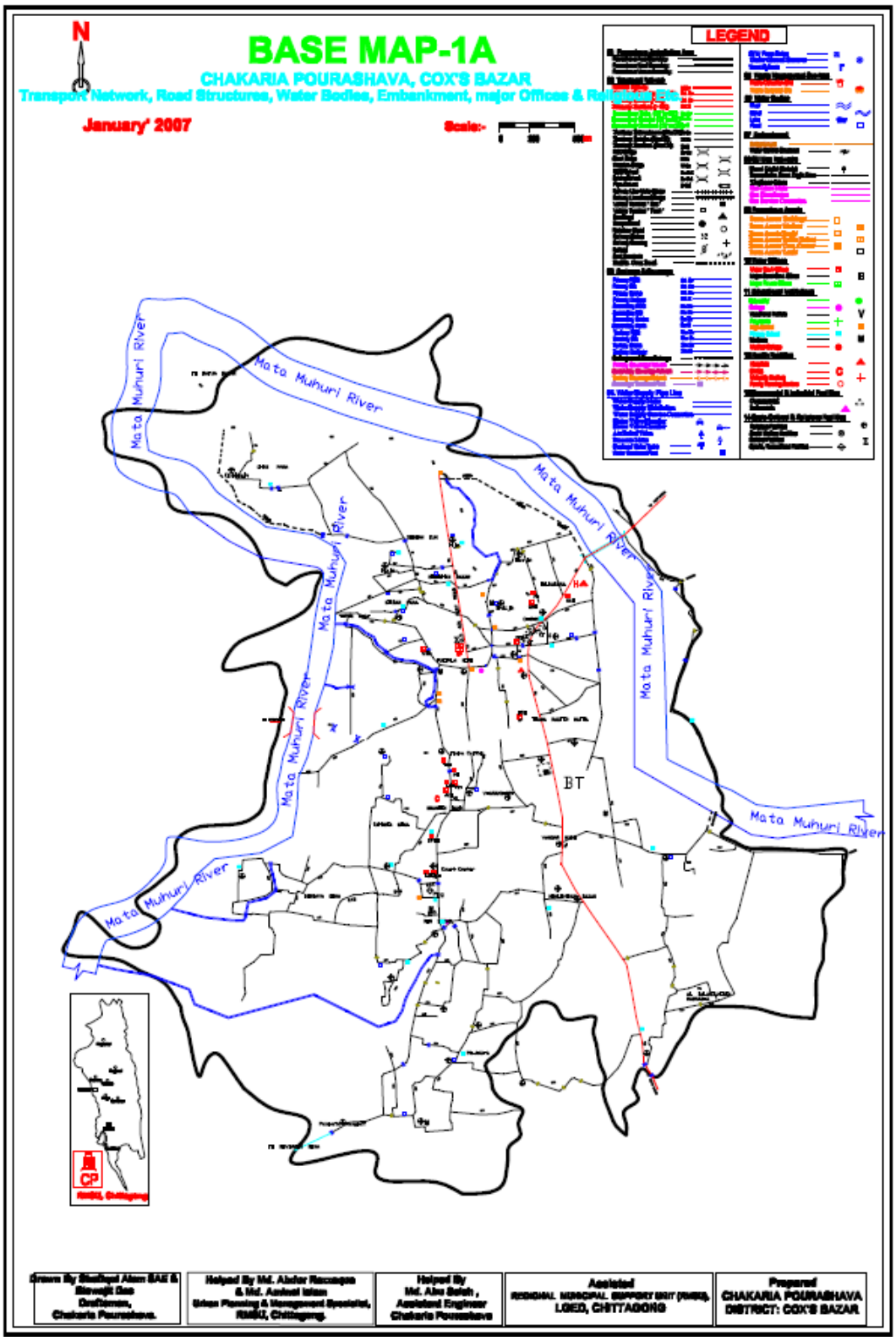

Figure 2.1.1: Pourashava Location Map

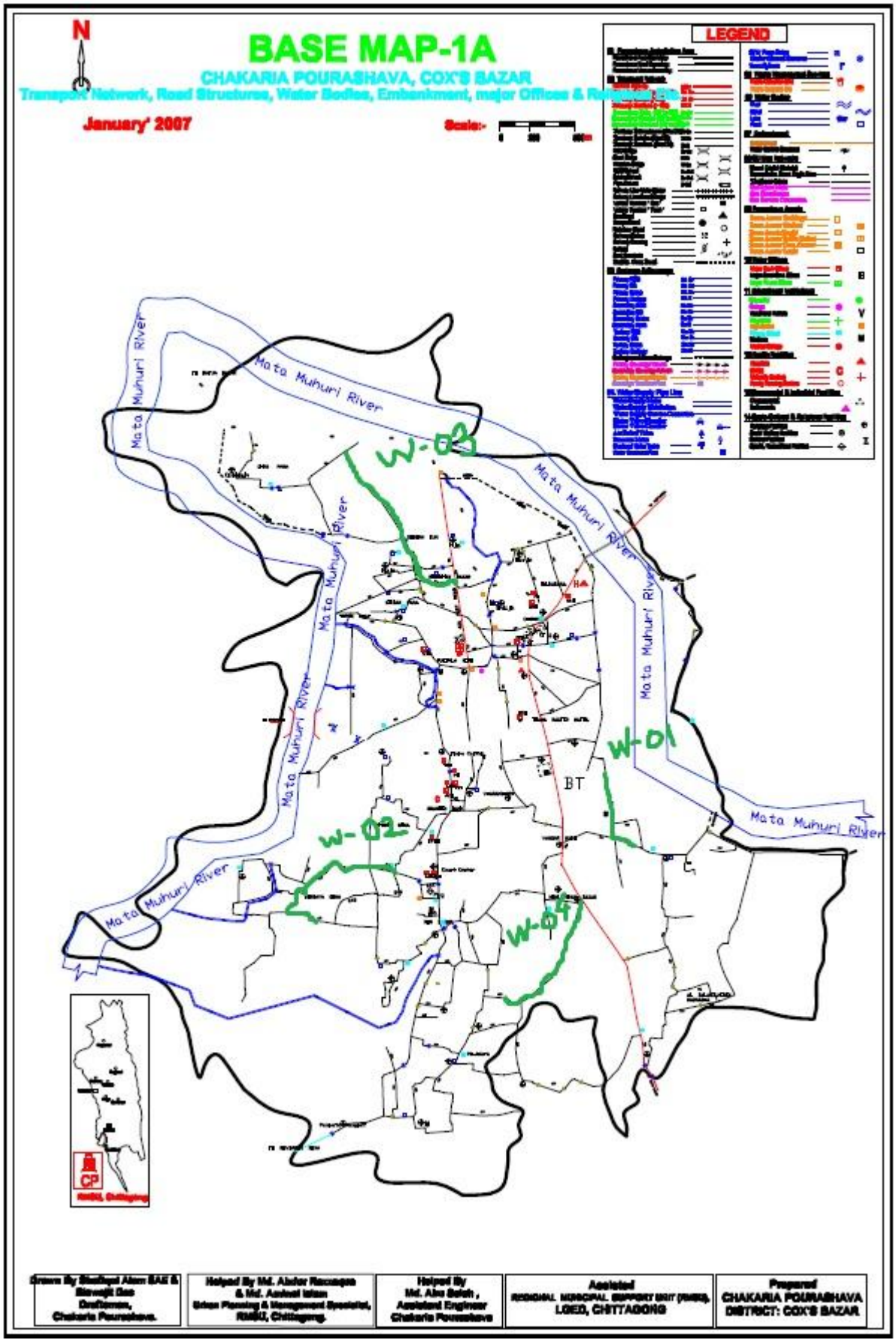

Figure 2.1.2: Pourashava Location Map of the Subproject

Figure 2.1.3: Topographic Features of the Subproject Area and its Adjoining Roads with Influence Zone

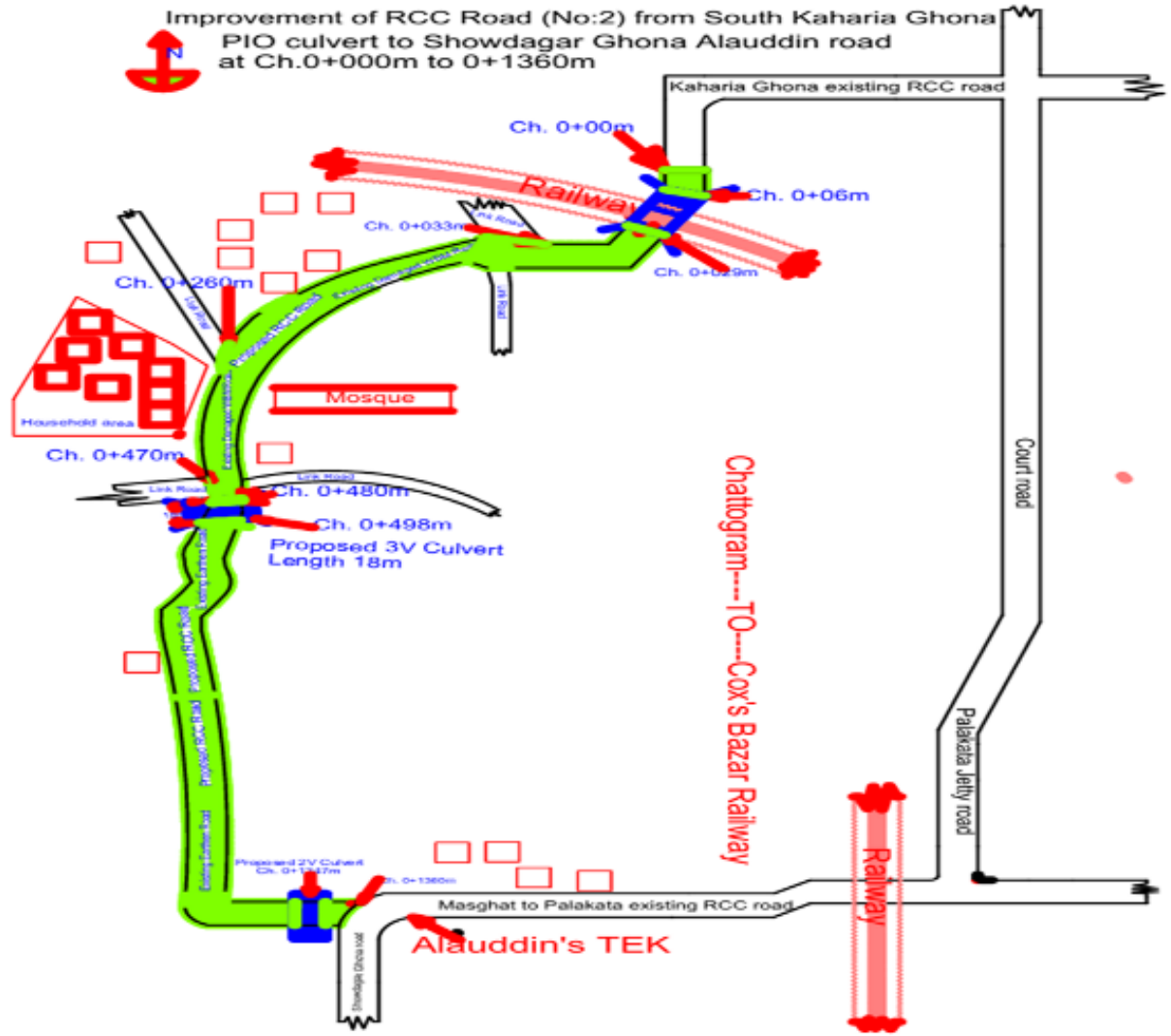

Figure 2.1.4: Zone Layout Plan of the Proposed Subproject Area (Road) and its Adjoining Roads with Influence Zone

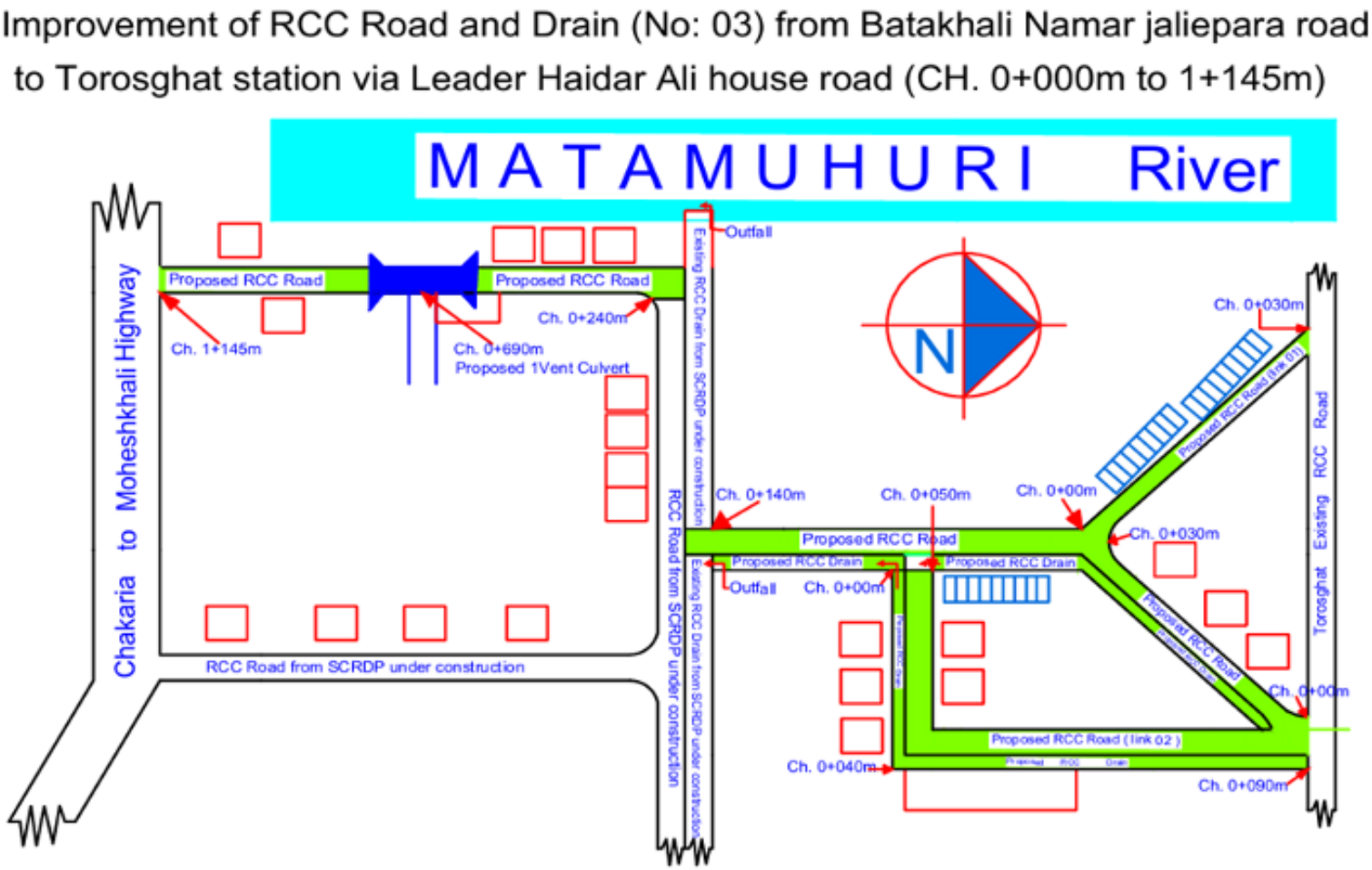

Figure 2.1.5: Zone Layout Plan of the Proposed Subproject Area (Road) and its Adjoining Roads with Influence Zone

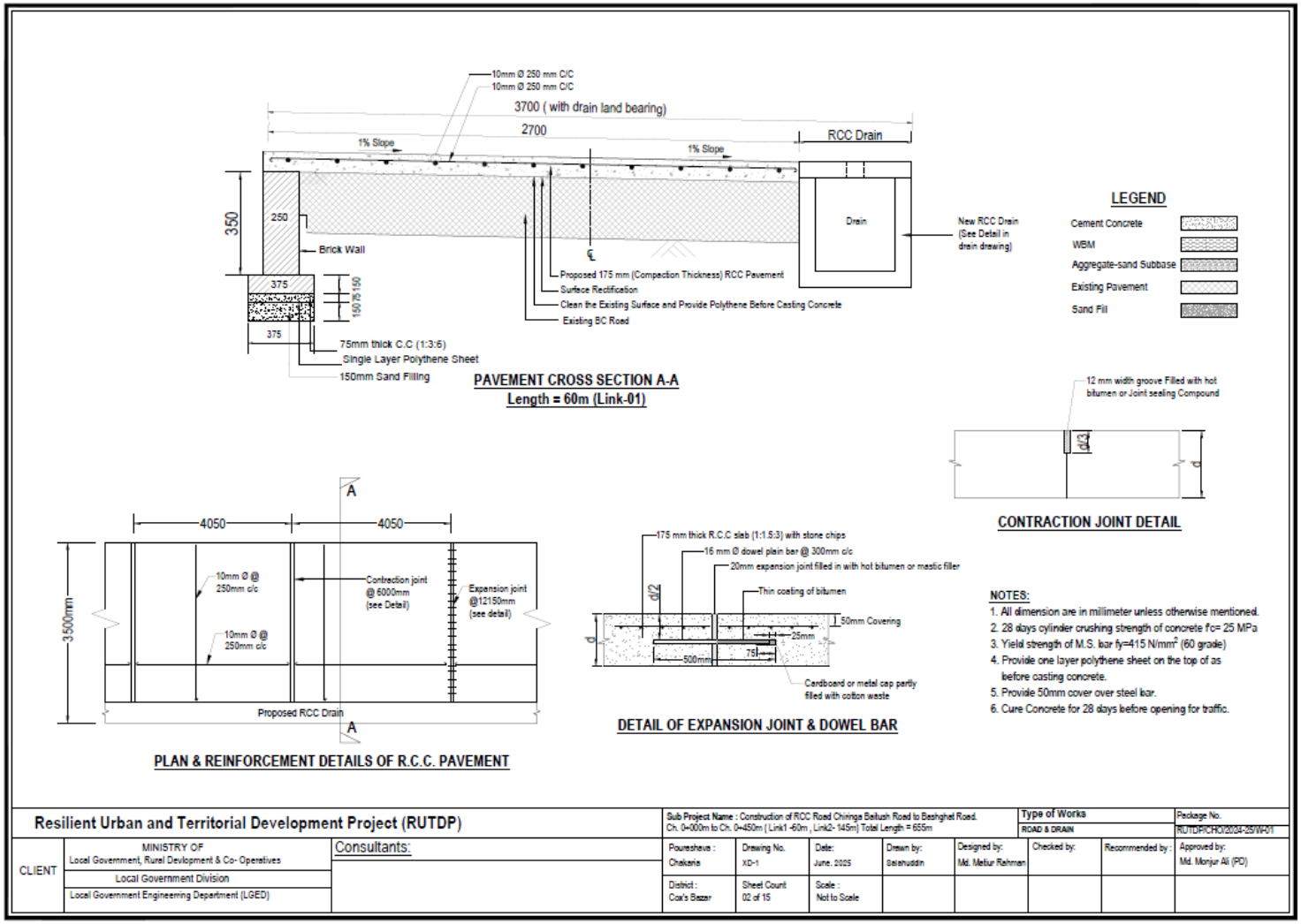

Figure 2.1.6: Zone Layout Plan of the Proposed Subproject Area (Road) and its Adjoining Roads with Influence Zone

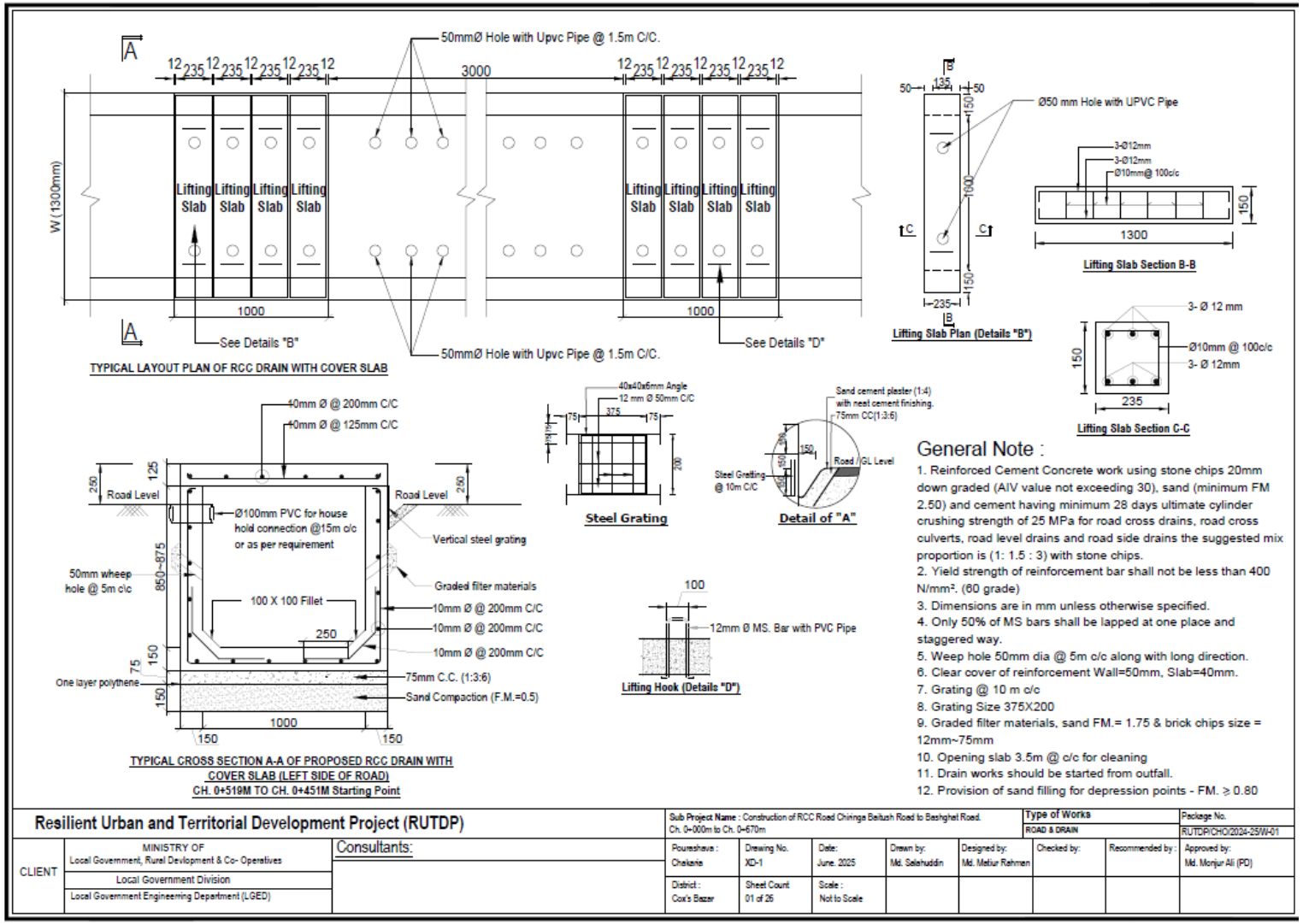

Figure 2.1.7: Zone Layout Plan of the Proposed Subproject Area (Road) and its Adjoining Roads with Influence Zone

2.2 Current Situation, Proposed Intervention and Need for the Subproject

The proposed roads will be developed by replacing and rehabilitating the existing damaged road to new RCC pavement and narrow, silted-up, inadequate and inappropriate drains will be constructed newly proposed scheme, RCC drain with proper outfall.

The proposed subproject roads go under the urban and urban area of Pourashava and situated within the jurisdiction of the ward no. 3, 5 and 8 of Chakaria Pourashava. The roads are mostly damaged. Potholes and undulations are formed on the road surface. The existing average pavement width is 5.0m. considering the poor condition of the pavement in places, it is necessary to improve all of these roads with a proper width. To provide an easy and smooth traffic movement, increasing business volumes of the Pourashava, improving the proposed road by RCC road with proper drainage facility on priority basis for the community people. Considering the poor condition of the pavement with a narrow width in places, it is necessary to improve all of these roads with a proper width.

The drainage facility is inappropriate and inadequate. Furthermore, the existing drains are not functioning properly due to narrowness, damaged and silted-up by the solid wastes. Additionally, the drainage system is discontinuous and some segments it has not proper outfall for draining out the storm water. Therefore, in the monsoon period heavy and continuous rainfall and tidal influence causes delay discharge of the storm water which creates drainage congestion and temporary water stagnation at adjacent roads and residential areas which hampers the normal traffic operations by damaging the roads, daily lives and livelihood of the influence area individuals. To improve the drainage congestion, construction of new RCC drains is needed to minimize the drainage congestion and temporary water logging phenomenon. The drain water goes down to Matamuhuri River via connecting drain which will act as the final outfall for the proposed drains.

This subproject has significant benefit to the community people after completion. These are important roads and drains network for the urban area of the municipality which will fasten the progression of rapidly growing Chakaria Pourashava and also increase its services and governance strength.

The present situation of the subproject area is further elaborated in the following **Photographs 2.2.1**, **Photographs 2.2.2** and **Photographs 2.2.3**

Photograph 2.2.1: Existing Road Condition of the Subproject Site

Photograph 2.2.2: Current Situation of the Drain at Subproject Site

Photograph 2.2.3: Current Situation of the Outfalls at Subproject Site

2.3 Justification of Selection of this Subproject

Feasibility Study Consultants (FSC) team conducted detailed feasibility study of Chakaria Pourashava. The FS consultants with the help of Chakaria Pourashava identified the list of subprojects of Chakaria Pourashava through Capital Investment Plan (CIP) preparation process. The FS consultant prepared Feasibility Study report with priority list of subprojects of Chakaria Pourashava and submitted to PMU-RUTDP. The subprojects for first 18 months implementation of the project have been selected from the priority list of FS report submitted by FS consultant. As a part of the reconnaissance survey, Chakaria Pourashava Officials and subprojects preparation consultants of RUTDP visited and evaluated the existing site condition of the subproject. The Pourashava authority conducted a topographic survey and existing conditional survey of the subproject and submitted to PMU-RUTDP. The environmental & social development consultants visited the respective subproject and conducted environmental and social screening. To implement this subproject the roadside-built infrastructure will not be severely disturbed. In addition, private land acquisition is not an issue for implementation of this subproject. The Pourashava mostly owned the subproject road. This subproject will have minor impact on ecology due to tree felling. The proposed subproject components (Roads, drains works) will improve the transport and drainage facilities and build a new communication structure. The proposed roads will make easier connection and comfortable traffic movement to central area of Pourashava. Therefore, the proposed roads will definitely have a positive impact of the business transaction & proceeds, rapid accelerating of the urbanization process, stress-free communication with the local administration tires and better for the urban area inhabitants of the municipality. The new drains will reduce the drainage congestion and water logging problem and will completing the drainage demand of the municipality as per their master plan which will provide a better environment to the community people. As per information by the Chakaria Pourashava considering the ward population (Wards no 3, 5 and 8) about 35,400 people will be benefited directly and many others indirectly. After completion, this subproject will create employment opportunities and better livelihood for local people which results in rapid accelerating of the urbanization process and will provide better environment to the community people. Considering the significant potential benefits that will derive after completion, the local community demands and welcome this subproject.

2.3 Envisaged Subproject Activities and Implementation Process

The general works associated with the subproject activities includes: construction of the semi-pucca site office, construction of the labor shed, site clearing and grubbing work, relocation of the electric poles and tree plantation work.

The specific activities for the subproject include: site clearing and dismantling work, maintaining of the semi-pucca site office and installation of waste collection bins, road painting work.

The key tasks for the Activity (***RCC Road)*** include:

i. Clearing and grubbing;
ii. Removal of existing structures/obstacles;
iii. Compaction of the soil;
iv. Laying of granular;
v. Cutting, bending, and placing steel bars;
vi. Mixing and pouring of M-Grade RCC (typically M30 or higher);
vii. Screeding and surface levelling;
viii. Broom finish or tinning for skid resistance;
ix. Cutting transverse contraction joints;
x. Cleaning and marking.

The key tasks for the Activity (***RCC Drain***) includes:

i. Earth work in excavation of the foundation;
ii. Pumping and bailing out of water as per requirement;
iii. Lying of polythene sheet;
iv. Sand filling for the preparing foundation bed;
v. Plain cement concrete work in foundation;
vi. Manufacturing CC blocks;
vii. Fabrication of the ribbed or deformed bar;
viii. Reinforced cement concrete work.

The key activities for ***Street Lighting Works*** include:

i. Assembling, fitting, fixing, installation, testing and commissioning of the GI pole;
ii. Fitting and fixing energy meter;
iii. Earthling the electrical installation;
iv. Fixing insulator;
v. Erection of tubular pole;
vi. Fixing of the overhead conductor;
vii. Fixing of the wire rack;
viii. Fixing and installation of the switch board;
ix. Providing, fitting and fixing of the water tight street light.

The materials and resources to be used for the key activities: Soil in earth work, sand, bricks, brick chips, stone chips, cement, concrete, reinforcement, kerosene, diesel, electricity, water, GI poles and other associate accessories.

The major equipment to be used for the implementation of the subproject: hydraulic excavator, brick breaking / stone crushing machine, concrete mixer, mechanical vibrator, mixture machine, mechanical compactor, diesel engine, MS sheet, steel cutter, steel shutter, boulders, dump truck, water tanker, pump, ladder and light fixing equipment.

2.4 Category of the Subproject

The environmental and social impacts (*Section 4.2: ES Impact assessment*) due to the subproject intervention are mainly site specific, limited within the subproject boundary and significantly manageable through the appropriate mitigation measures.

For road and drain with footpath works

- According to ECR 2023 : Green □ Yellow □ Orange □√ Red □ Not Listed □
- According to WB categorization: Low □ Moderate □√ Substantial □ High □

In the Project ESMF, road and drain with allied works are categorized as Orange or Yellow [*Environmental Conservation Rules (ECR), 2023*] depending on environmental and social impact. Hence, considering the anticipated environmental impacts for this subproject, roads (RCC roads) and drains with allied works can be considered as orange category as per ECR-2023. According to the WB ESF Risk Categorization, it can classify as Moderate risk subproject.

Considering the environmental impacts, the overall subproject can be considered as orange category as per ECR-2023 [*Environmental Conservation Rules (ECR), 2023*]. According to the WB ESF Risk Categorization, it can be classified as Moderate risk subproject. So, detailed ESIA documents are not needed for subproject appraisal. The detailed ESA document with site specific ESMP and Environmental-Social measurement/monitoring budget/cost can fulfill the requirement of the subproject implementation.

2.5 Subproject Schedule

The tentative schedule of construction of the subproject is:

(a) Subproject duration (months) : ……. months
(b) Tentative start date : ……..…. (mm, dd, yr.)
(c) Tentative completion date : ……... (mm, dd, yr.)

The daily construction hours will normally include regular working time. However, daily working hours may vary based on the on-site condition. The detailed work program will be prepared by the contractor with the assistance of the PIU. Then it will be shared with the PMU, LGED and DSM consultants. In addition, the detailed work program will also be shared with the Bank as per requirement.

3 BASELINE ANALYSIS OF THE ENVIRONMENTAL CONDITION

3.1 Physical Environment

Geology, Topography, and Soils

The Chakaria region lies in the southeastern part of Bangladesh, within the Chittagong Division. The geology is governed by the structural setting of the Bengal Basin margin and the folded belt of the Indo-Burma range. While detailed site-specific borehole logs for the Pourashava may not be publicly available, relevant regional information enables a reasonably-sized description: The broader Cox's Bazaar district is described as comprising sedimentary rocks — such as sandstones that alternate with bluish-grey shales and siltstones; Chakaria lies closer to the coastal plain transition zone, the geology should include younger alluvial and deltaic deposits overlain upon older tertiary units. The Chakaria Upazila area includes a mix of gently undulating coastal floodplain, river/estuarine lowlands, and some relic higher ground/hillocks remaining from the folded belt. Within Chakaria Pourashava, the terrain is likely dominated by low-lying alluvial land close to sea-level, interspersed with slightly elevated mounds or ridges (former dunes, old terraces) and possibly coastal embankments. Elevation varies modestly across the area; given the coastal orientation, many areas may lie within a few meters above mean sea level, subject to tidal, storm surge or monsoon flood influences. In the coastal floodplain and alluvial plain parts of Chakaria, soils are primarily unconsolidated sediments deposited by rivers, estuarine tidal action and coastal processes: sands, silty-sands, silts and clays. Based on neighboring studies in Cox's Bazar region, soils may show high variation in density, moisture content, and plasticity — especially where tidal or marine influence is present. For instance, adjacent studies report hillside residual soils (in hilly terrain) with bulk densities ~1.49-1.97 g/cm^3, liquid limits 25-48 % etc. According to Geological Survey Bangladesh [GSB, 1978] **(Figure 3.1.1)** the subproject area falls in medium intensity seismic zone (Zone-II, Basic Seismic Coefficient 0.05g). The major soil types are acid sulphate soils according to the general soil map of Bangladesh (Source: BARC, 2005) **(Figure 3.1.1).**

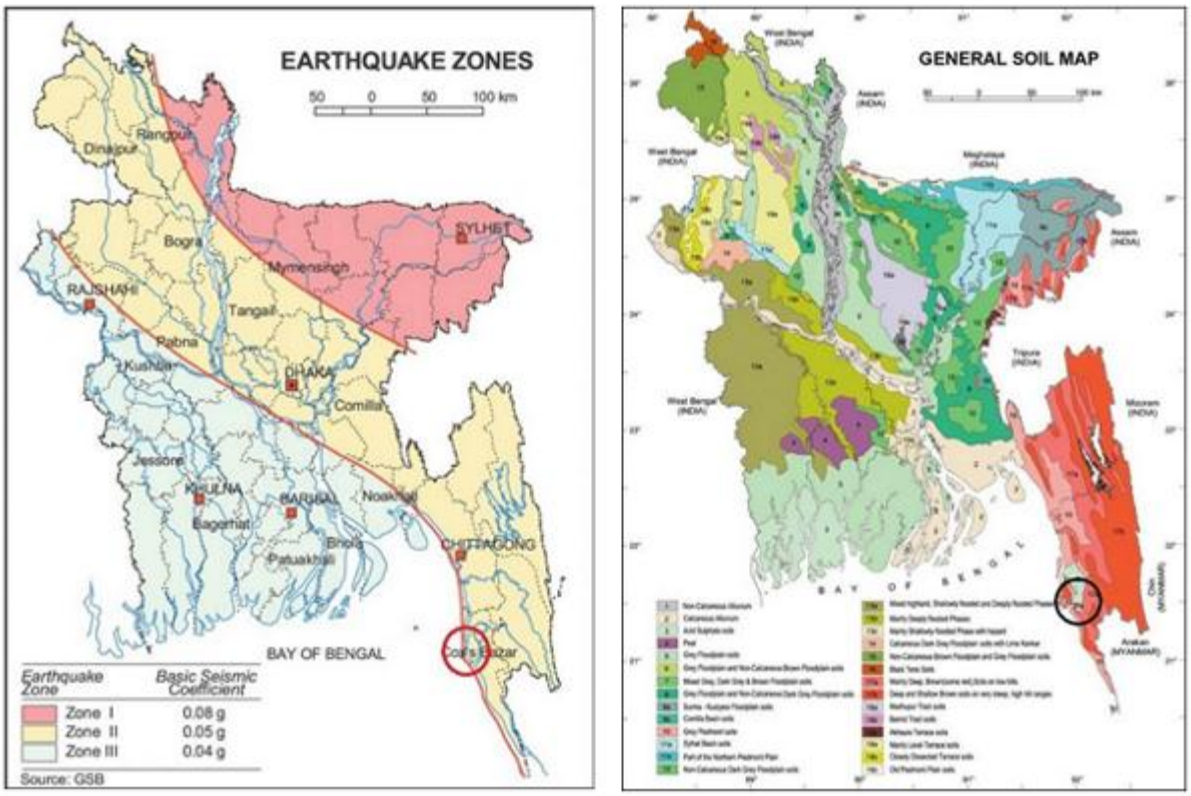

Figure 3.1.1: Location of Chakaria Pourashava in Earthquake Zoning map of Bangladesh [*Source: GSB, 1978*] and General Soil Map of Bangladesh [*Source: BARC, 2005*] (the red and black circle denotes Chakaria Pourashava)

Climate and Meteorology

Temperature

Chakoria experiences a **tropical monsoon climate**, with warm temperatures throughout the year. The mean annual temperature generally ranges from **22°C to 32°C**.

- **Cool Season (December–February):**
  Temperatures dip to **15–20°C** at night, offering mild and pleasant weather.
- **Pre-Monsoon Hot Season (March–May):**
  The mercury often climbs to **34–36°C**, with high humidity.
  Heatwaves occasionally occur in April.
- **Monsoon Season (June–September):**
  Temperatures remain steady around **28–32°C**, moderated by cloud cover and frequent rainfall.

Graphical Description – Temperature Trend

Imagine a smooth curve that rises from **January (20°C)**, peaks around **April–May (34–36°C)**, and then slopes down during the rainy monsoon to **about 30°C**, settling again near **20–22°C** in December.

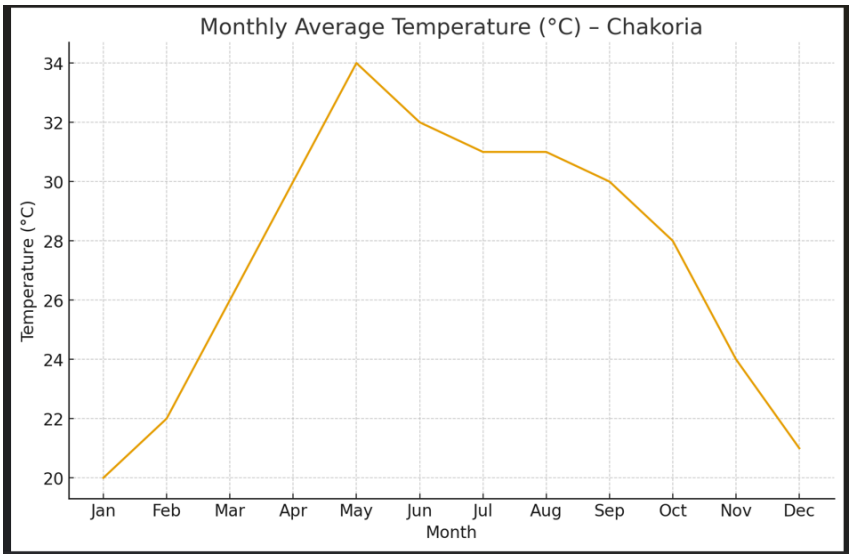

Figure 3.1.2: Monthly Average Temperature of Chakoria Pourashava (Source: BMD)

Rainfall

The area receives **abundant rainfall**, one of the highest in the country, due to its proximity to the Bay of Bengal and hill ranges.

- **Annual Rainfall:** Typically, **3,000–3,500 mm**.
- **Monsoon Contribution:** Around **70–75%** of total rainfall occurs between **June and September**.
- **Peak Months:** July and August often exceed **500–600 mm** per month.

Graphical Description – Monthly Rainfall Bar Chart
Picture twelve bars lined up like guards:

- Short bars in **December–February** (10–40 mm)
- Medium bars in **March–May** (60–150 mm)
- Very tall bars in **June–September**, rising sharply up to 500+ mm
- Bars fall again in **October–November** as rainfall declines

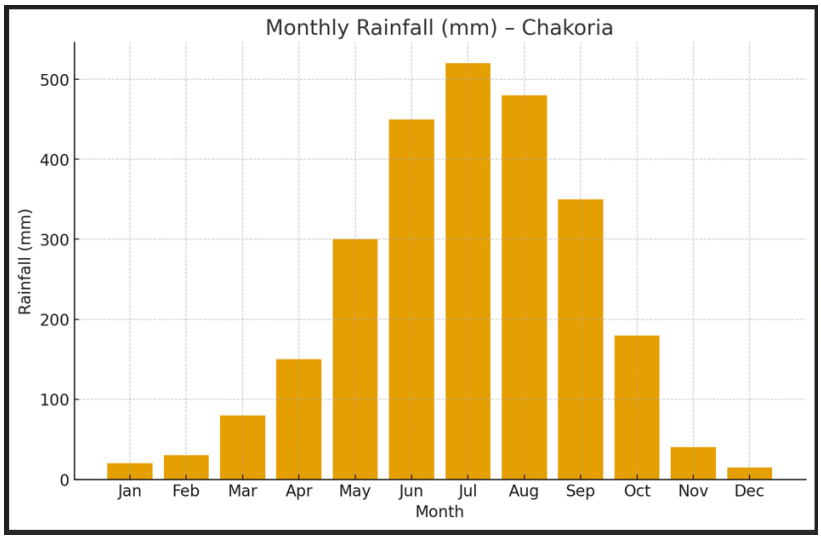

Figure 3.1.3: Monthly Average Rainfall of Chakoria Pourashava (Source: BMD)

Humidity

Relative humidity stays high year-round, typically **70–90%**, especially during monsoon months.

- Lowest humidity: **December–January** (~65–70%)
- Highest humidity: **June–September** (~85–95%)

Humidity affects material curing, worker comfort, and dust suppression requirements on construction sites.

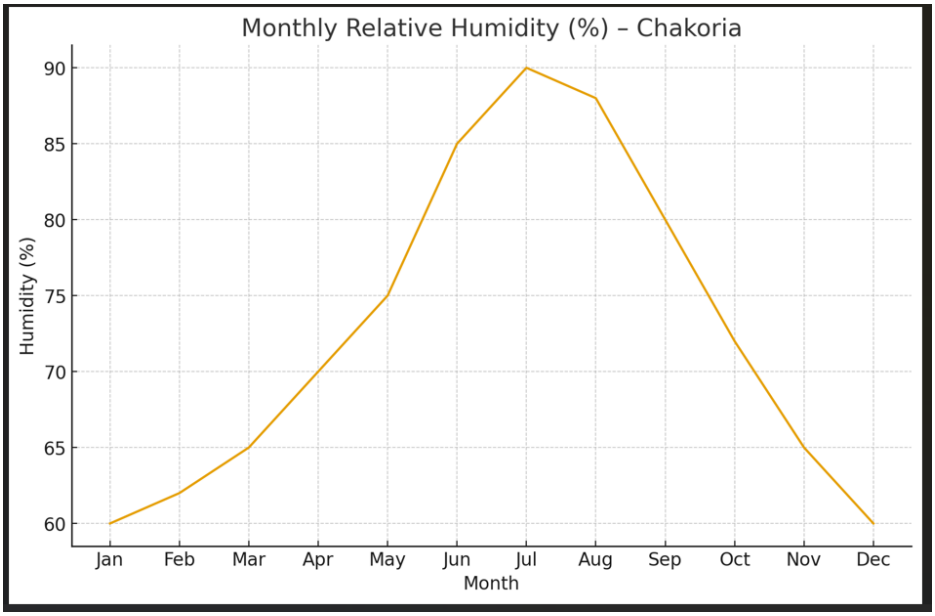

Figure 3.1.3: Monthly Average Humidity of Chakoria Pourashava (Source: BMD)

Wind Pattern

Chakoria's winds follow a monsoon-driven pattern:

- **Pre-Monsoon (Mar–May):**
  South and southwest winds pick up, sometimes gusty due to local storms (Kalbaishakhi).
- **Monsoon (Jun–Sep):**
  Strong, moist southwesterly winds dominate, bringing heavy rain.
- **Dry Season (Nov–Feb):**
  Northerly winds prevail; generally calm and cool.

Wind speeds usually range from **2–10 km/h**, with occasional higher gusts during thunderstorms.

Cyclone and Storm Influence

Chakoria lies close to the Bay of Bengal and falls within the **cyclone-prone coastal belt**.

Though direct hits are less frequent than central coastal zones, the area experiences:

- peripheral impacts
- storm surges
- heavy rainfall
- strong winds from cyclonic depressions

These events must be considered in design, site safety, worker protection, and scheduling.

Hydrology (Surface Water and Ground Water)

Chakoria Pourashava rests like a small delta-town cradled between the Matamuhuri River and the coastal floodplains of Cox's Bazar. Its hydrology is shaped by monsoon rainfall, tidal influence from the bay ward lowlands, and the intricate web of canals, ponds, and drainage channels that weave through the settlement. Chakoria lies within the **Matamuhuri River Basin**, one of the major freshwater systems flowing from the Chattogram Hill Tracts toward the Bay of Bengal. The river forms a low-lying alluvial plain around Chakoria, where seasonal overflows recharge wetlands, beels, and village ponds.

The hydrological character of the area is governed by:

- Heavy monsoon rainfall (June to September)
- River water fluctuation and occasional bank overtopping
- Tidal backflow influence in nearby lowlands
- A dense system of khals and natural depressions

These elements together create a mosaic of flowing streams during the wet season and slow-moving residual water bodies during the dry months. The Matamuhuri is the primary hydrological driver. During monsoon, water levels rise sharply, feeding surrounding canals and inundating floodplain pockets. This seasonal pulse is vital for sediment recharge and ecological productivity. Several natural khals such as the **Chakoria Khal** and its branch canals act as the town's circulatory system. They:

- Carry storm runoff during monsoon
- Connect household and agricultural drainage
- Link with ponds and borrow pits
- Discharge excess water toward peripheral lowlands

Due to siltation and encroachment, some channels now flow sluggishly, losing their natural efficiency. Chakoria sits on a thick alluvium composed of fine sand, silt, and clay. Groundwater is generally found at shallow to moderate depths:

- **Dry season water table:** 8–12 m
- **Monsoon water table:** 2–5 m

Recharge occurs mainly from rainfall infiltration and seepage from surface water bodies. Tube wells are common but face seasonal fluctuations. In some peripheral areas, the water shows moderate salinity and iron content, influenced by tidal intrusion and sediment mineralization.

According to the BADC [2010] groundwater zoning map, groundwater table in Cox's Bazar region varies from 0 to 7.6 meter below ground level. According to **Figure 3.1.4**, the range of GW level from 0-5.3m.

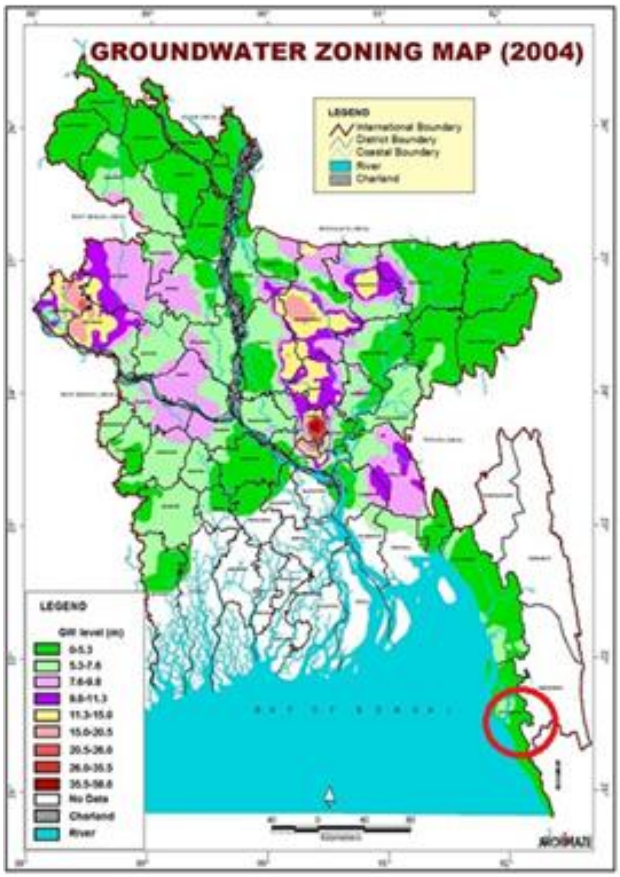

Figure 3.1.2: Location of *Chakaria* Pourashava in Groundwater Zoning Map of Bangladesh [*Source: BADC, 2010*] (the red circle denotes *Chakaria* Pourashava)

Flooding, Water Logging and Drainage Pattern

As per flood zoning map (***Figure 3.1.5***) of Bangladesh (Bangladesh Meteorological Department) showing no flood affected area in Chakaria Pourashava. Chakoria Pourashava is moderately flood-prone due to its low-lying terrain and proximity to a network of natural khals flowing toward the Matamuhuri River floodplain. During peak monsoon months (June to September), heavy rainfall from both local convection and upstream hill catchments can raise water levels sharply. Flash flood pulses from the nearby hilly zones occasionally push water into the built-up areas, especially where drainage outlets are narrow or blocked.Water logging in Chakoria often behaves like rainwater trying to escape a maze. Much of the problem is linked to the mismatch between intense monsoon rainfall and the limited, partially obstructed drainage channels. Chakoria's drainage system is a patchwork of **natural khals**, **man-made drains**, and **roadside channels**, all leaning toward the larger outlet provided by the **Matamuhuri River system** and tidal wetlands. The natural drainage pattern of Chakaria Pourashava is shown in ***Figure 3.1.6***.

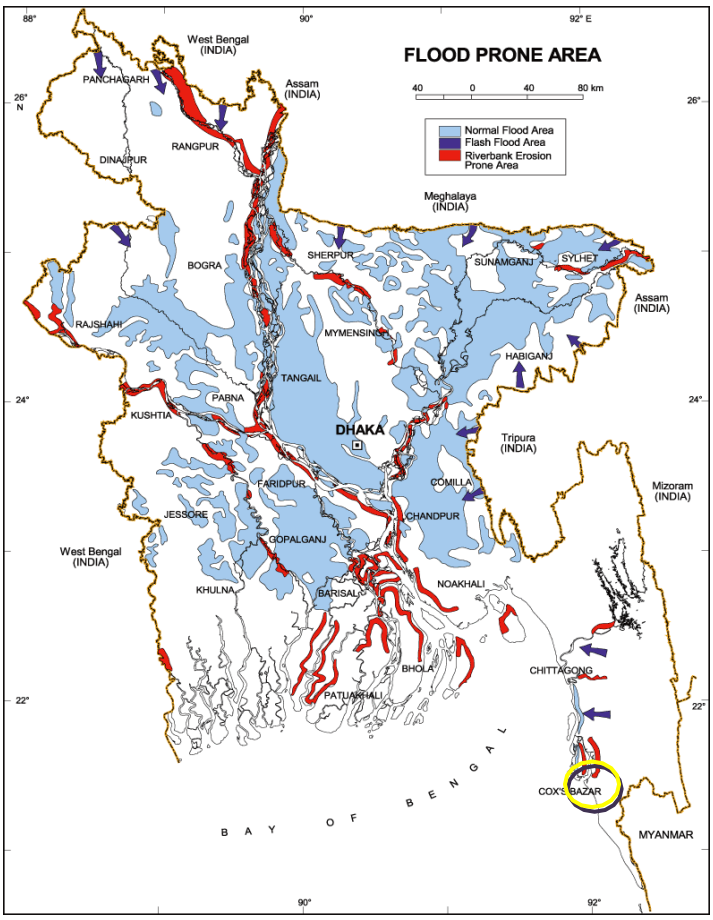

Figure 3.1.3*: Location of* Chakaria *Pourashava in Flood Zone Map of Bangladesh* [*Source: BMD*]

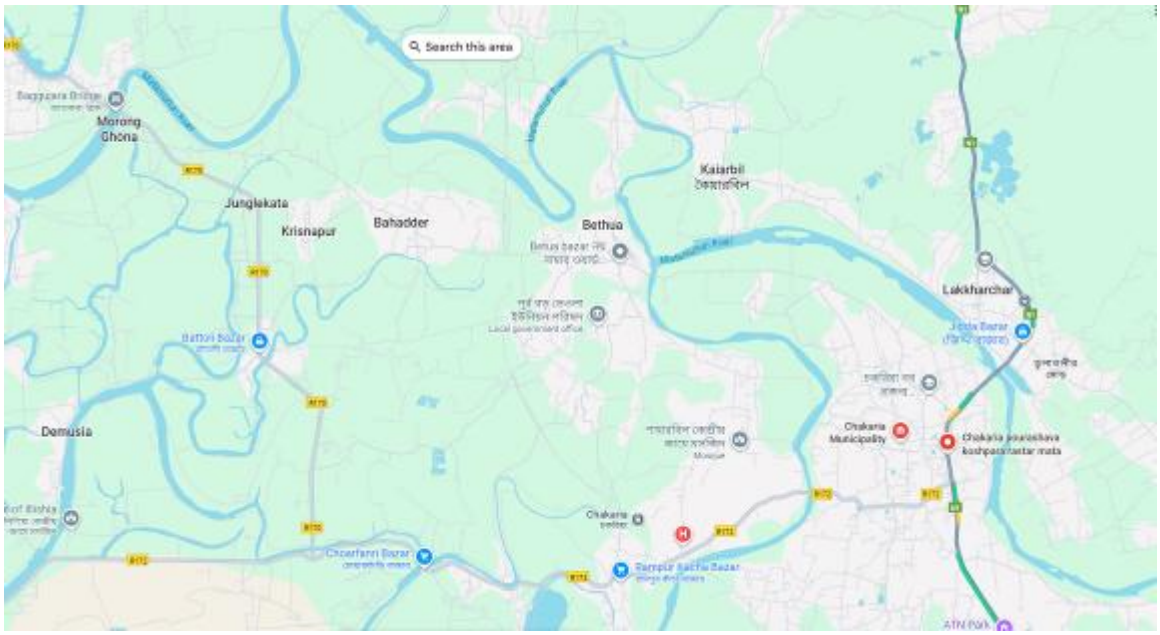

Figure 3.1.4: Natural drainage pattern of Chakaria Pourashava [Source: Google map]

Air Quality and Dust

Ambient air quality data have not been found. Air seems to be clean [RUTDP, Feasibility Study, 2022 and Field survey by Design, Supervision and Management Consultants Team, 2025]. However, in the subproject area, degradation of the air quality is mainly due to emission from the vehicles. The dusty and rough surfaces of the road also generate dust during vehicle and pedestrian movement. Open burning of the waste materials and roadside disposal of the wastes also cause air quality degradation. The subproject activities may degrade the air quality of the subproject area though the impacts are anticipated to be insignificant.

Noise Level

Noise is one of the important issues for the quality of the environment in the subproject area. In the subproject area, noise is mainly generated from the moving vehicles, undue use of horns and crowded people in the Bazar area [RUTDP, Feasibility Study, 2022 and Field survey by Design, Supervision and Management Consultants Team, 2025.] The subproject area is the urban area of the Pourashava. Hence, vehicles such as trolleys, pick-up, trucks, motor cycles, CNG, rickshaws and private cars are frequently passes through the road. These vehicles generate noise in the subproject area. However, they are within the tolerable limits in most cases. Furthermore, in the subproject activities, mixer machine, vibrator machine, mechanical compaction machine, steel cutter, hydraulic excavator may create localized noise nuisance though the impacts are anticipated to be within the tolerable limits.

Solid Waste Management

The Solid waste management in Chakaria Pourashava is a critical environmental and public health issue, severely strained by a high volume of waste generation from both its permanent residents and a massive, fluctuating tourist population. The municipality generates an estimated 200-220 tons of solid waste per day, a figure that can surge to over 250 tons during peak tourist seasons (World Bank, 2021). The current management system is ill-equipped to handle this load. The Pourashava has an own dumping station situated Boniar Chora area area. The collected waste is transported to a crude; non-sanitary dumpsite located on the banks of the Matamuhuri River. This open dumping method is a major source of pollution, as harmful leachate contaminates the surrounding soil, groundwater, and the river itself, which flows directly into the ecologically sensitive Bay of Bengal. Furthermore, a significant portion of the uncollected waste is disposed of indiscriminately into drains, canals, and open spaces, which is a primary cause of the city's severe drainage congestion and water logging problems (Local Government Engineering Department, 2018). The lack of modern waste management infrastructure, such as a sanitary landfill, composting facilities, or robust recycling programs,

means the current system is unsustainable and poses a significant threat to the environmental integrity and touristic appeal of Chakaria. Therefore, improper solid waste disposal by the community people creates severe public health hazards and environmental degradation. [*Field survey by Design, Supervision and Management Consultants Team, 2025*.]

3.2 Biotic Environment

Flora and Fauna

The flora and fauna of Chakaria Pourashava, while heavily impacted by dense urbanization, reflect a blend of coastal, homestead, and remnant hill-forest biodiversity. The natural flora is most visible along the coastline, where salt-tolerant and sand-binding species are crucial for dune stabilization. These include the Jhau tree (Casuarina equisetifolia), Nishinda (Vitex negundo), and the resilient beach morning glory (Ipomoea pes-caprae). The town's homestead gardens and roadside plantations feature a mix of common fruit-bearing and ornamental trees such as the mango (Mangifera indica), jackfruit (Artocarpus heterophyllus), coconut palm (Cocos nucifera), and various Ficus species (Ficus religiosa, Ficus benghalensis). In the low hills flanking the Pourashava, remnant patches of vegetation may include species like the Garjan (Dipterocarpus turbinatus) and Chapalish (Artocarpus chaplasha), though these are under severe pressure (IUCN Bangladesh, 2015).

The fauna within the Pourashava is now dominated by species adapted to urban and semi-urban environments. Avian fauna is the most conspicuous, with common sightings of House Crows (*Corvus splendens*), Common Mynas (*Acridotheres tristis*), and Black Kites (*Milvus migrans*). The coastal location makes it a vital area for shorebirds and gulls, especially during winter migration, when various species, including the Brown-headed Gull (*Chroicocephalus brunnicephalus*), can be observed along the shoreline. Mammalian presence within the town itself is largely limited to smaller, adaptable species like the Common House Rat (*Rattus rattus*) and the House Shrew (*Suncus murinus*). Reptiles are represented by common species such as the Garden Lizard (*Calotes versicolor*) and the Checkered Keelback snake (*Fowlea piscator*), which inhabit gardens and drainage areas. While the broader Chakaria region is known for significant wildlife, including elephants and various primates, the fauna within the municipal boundaries is a stark reflection of habitat loss due to urban expansion (IUCN Bangladesh, 2015).

3.3 Socio-economic and Socio-cultural Environment

Land Use Pattern, Status of Housing and Built-up Infrastructure

The subproject area consists of the peri-urban area of the Pourashava and the land use pattern is Highly densely populated residential area with commercial activities. The built-up infrastructure includes mainly pucca, semi-pucca and tin-shed residential houses and shops,

educational institutions, industries, religious centers, hospital and health care center, trade and commerce (Bank and Insurance), community center, business centers (market and bazar, hotel and restaurant).

Beneficiary Population

The subproject area covers jurisdiction area of the ward 3, 5 and 8 of Chakaria Pourashava. As per information by the municipality Total Population- 35,400 will be benefited directly and many others indirectly (Chakaria Pourashava: At a glance)

Education

In the subproject area, literacy among the population is about literacy rate of 84.06%. (BBS -2022) Educational Institute; primary school -14 High school 9 Collage – 4 and Madrasha - 6 (Chakaria Pourashava: At a glance) in the Pourashava. This is Higher than the national average 74.66% (BBS -2022) Literacy rate among males is still higher than females.

Tribal Communities

There is no ethnic minority community settlement in the subproject influence area those resembles indigenous peoples per the World Bank ESS-7 on Indigenous Peoples. Therefore, no measure needed for indigenous peoples' development.

Land Acquisition and Resettlement

Private land acquisition is not needed. The expansion of the roads will not impact any private land. The assessment has confirmed that widening both sides can be accomplished without affecting private property, as the shoulders and slopes will provide the additional space needed for the extension. Addressing these issues will enhance the resilience and functionality of the infrastructure, ultimately benefiting the community. The Pourashava authority has engaged local residents to facilitate the subproject's implementation. The community and roadside property owners have expressed support for the construction work. Residents will remove belongings affecting road clearing, but if any objections arise, the Project Management Unit (PMU) and Design and Supervision Management (DSM) team will investigate and act according to the Resettlement Policy Framework (RPF).

Principal Livelihoods and Economic Activities

The subproject area is now inhabited by the mixed occupational people where major income comes from non-farm activities such as; small business, Agriculture, Fisheries, enterprises, Government and non-government job, day labor, industrial labor, transport vehicle ownership and others.

Cultural Heritage and Protected Areas

Within the influence area of the subproject, there is historical site sus as; Dolhazara Safari Park, Chawarfari Mangrove Forest., educational institutions and religious center bring cultural values to the community people.

4 ES IMPACT, MITIGATION AND ENHANCEMENT MEASURES

4.1 Risk Classification Methodology

The assessment of effects, identification of impacts and subsequent considerations of any incorporated mitigation measures will largely depend on the extent and duration of change, the number of people or size of the resource affected and their sensitivity to the change. Potential impacts can be both negative and positive (beneficial), and the methodology defined below will be applied to define both beneficial and adverse potential impacts.

The standards for determining significance are generally specific for each environmental and social aspect but the magnitude of each potential impact is defined along with the sensitivity of the receptor. Generic principles for defining magnitude and sensitivity used for the Project are summarized below.

Environmental & social risk classification considers relevant potential risks and impacts, such as:

- ✓ Category, location, sensitivity and scale of the Project including the physical considerations of the Project; nature of infrastructure (e.g., urban roads, drains, bridges and culverts, kitchen markets, super markets, community centers, bus/ truck terminals, amusement parks/ landscaping, public toilets etc.); volume of waste management and disposal;
- ✓ The nature and magnitude of the potential ES risks and impacts, including impacts on green field sites; impacts on brown field sites including (e.g., rehabilitation, maintenance or upgrading activities); the nature of the potential risks and impacts (e.g., whether they are irreversible, unprecedented or complex); resettlement activities; presence of Indigenous Peoples; and possible mitigation measures considering the mitigation hierarchy;
- ✓ The capacity and commitment of the borrower to manage such risks and impacts in a manner consistent with the ESSs, including the country's policy, legal and institutional framework; laws, regulations, rules and procedures applicable to the Project sector, including regional and local requirements; the technical and institutional capacity of the Borrower; the Borrower's track record of past Project implementation; and the financial and human resources available for management of the Project;
- ✓ Other areas of risk that may be relevant to the delivery of ES mitigation measures and outcomes, depending on the specific Project and the context in which it is being developed, including the nature of the mitigation and technology being proposed, considerations relating to domestic and/or regional stability, conflict or security.

4.1.1 Assigning Risk

Risk or impact classification considers the assessment of magnitude (Table 4.1.2.1), quality or sensitivity of the receiving environment and social receptor (Table 4.1.3.1) to determine the significance of each potential impact established using the risk classification matrix given in Table 4.1.1.1 below. In accordance with the level of risk ES risk classification can be divided into four distinctive categories- High, Substantial, Moderate and Low.

Table 4.1.1.1: Assessment of Risk Classification

Magnitude of Potential impact	Sensitivity of Receptors				
	Very Severe	Severe	Mild	Low	Negligible
Very High	**High**	**High**	**Substantial**	**Substantial**	**Moderate**
High	**High**	**High**	**Substantial**	**Moderate**	**Low**
Moderate	**Substantial**	**Substantial**	**Moderate**	**Low**	**Low**
Low	**Moderate**	**Moderate**	**Low**	**Low**	**Low**
Nil	**Moderate**	**Low**	**Low**	**Low**	**Low**

4.1.2 Magnitude of Impact

The assessment of magnitude shall be undertaken in two steps. Firstly, the key issues associated with the RUTDP are categorized as beneficial or adverse. Secondly, potential impacts shall be categorized as Very High, High, Moderate and Low based on consideration of the parameters such as:

- ✓ Ability of people and ecosystem to cope with change
- ✓ Spatial extent of the potential impact;
- ✓ Duration of the potential impact;
- ✓ Timing of effects experienced;
- ✓ Likelihood of potential impacts occurring;
- ✓ Relationship of project activities to impacts from other sources in landscape

The magnitude of potential impacts of the Project shall be identified according to the categories outlined in Table 4.1.2.1.

Table 4.1.2.1: Parameters for Determining Magnitude of Impact

Parameter	Very High	High	Moderate	Low	Nil
Ability of people and ecosystem to cope with change	The capacity of ecosystem and people to cope with the impact is not certain	The resilience and adaptive capacity to the impacts is regenerative with extensive management	Ecosystem can cope with the changes with specific planning and management	Ecosystem can cope with the changes with limited responses	Ecosystem can quickly cope with the changes with limited responses
Spatial extent of the potential impact	Widespread far beyond site specific project boundaries	Beyond immediate Project components, site boundaries or local area	Within project boundary	Specific location within Project component or site boundaries with no detectable potential impact	within Project component or site boundaries with no impact
Duration of potential impact	Long term (more than 20 years)	Medium Term Lifespan of the Project (5 to 10 years)	Less than Project lifespan	Temporary with no detectable potential impact	No potential impact
Timing of effects experienced	Potential impact is effectively permanent, requiring considerable intervention to return to baseline	Potential impact requires a year or so with some interventions to return to baseline	Baseline returns Naturally or with limited intervention within a few months	Baseline remains constant	No impact on baseline
Likelihood of potential impacts occurring	Occurs under typical operating or construction Conditions (Certain)	Occurs under worst case (negative impact) or best case (positive impact) operating conditions (Likely)	Occurs under abnormal exceptional or emergency conditions (occasional)	Unlikely to occur	Will not occur
Relationship of project activities to impacts from other sources in landscape	The activity will cause several effects and difficult to predict and manage with all of its negative impact	The activity will cause effects and relatively easier to predict and manage its negative impact	The activity will cause effects and easy to predict and manage	Temporary with detectable potential impact	No impact

After completion, RUTDP is expected to improve and increase the resilient urban facilities and make a positive impact on business transaction and proceeds which will accelerate the urbanization process.

4.1.3 Sensitivity of Receptor

The sensitivity of a receptor shall be determined based on review of the population (including proximity/numbers/vulnerability) and presence of features on the site or the surrounding area. Standards for determining receptor sensitivity of the Project's potential impacts are outlined in Table 4.1.3.1.

Table 4.1.3.1: Criteria for Determining Sensitivity

Sensitivity Determination	Definition
Very Severe	Vulnerable receptors with little or no capacity to absorb proposed changes or minimal opportunities for mitigation.
Severe	Vulnerable receptors with little or no capacity to absorb proposed changes or limited opportunities for mitigation.
Mild	Vulnerable receptor with some capacity to absorb proposed changes or moderate opportunities for mitigation
Low	Vulnerable receptor with good capacity to absorb proposed changes or/and good opportunities for mitigation
Negligible	Vulnerable receptor with very good capacity to absorb proposed changes or/and very good opportunities for mitigation

4.2 ES Risk Assessment for the Subproject

Analyzed the level of impacts for the subproject activities, Table 4.2.1 gives a summary assessment for ES risk based on the method explained in Section 4.1.

Table 4.2.1: Summary of ES Risk Assessment for the Subproject

Activity / Potential Impact	Relevant ESS		Impact Characteristics (When not mitigated)						Magnitude & Sensitivity of Impact		Risk Ratings (when not mitigated)
		Positive + /Negative -	*Impact on Ecosystem*	*Spatial extent*	*Duration*	*Timing*	*Likelihood*	*Relationship*	*Magnitude*	*Sensitivity*	
Planning & Design Phase											
Site Clearance	ESS 1, 3, 6	(-)	L	M	L	M	L	L	M	L	M
Involuntary Resettlement	ESS 5	(-)	L	L	L	L	L	L	L	L	L
Flora & Fauna	ESS 1, 6	(-)	L	L	L	L	L	L	L	L	L
Community Health & Safety	ESS 1, 4	(-)	M	M	M	M	M	L	M	M	M
Waste Management	ESS 1, 3	(-)	L	L	L	L	L	L	L	L	L
Contractor Selection	ESS 1	(-)	L	L	L	M	M	L	M	M	M
Labour Sourcing	ESS 2	(-)	L	L	L	M	M	L	M	M	M
Gender Based Violence (GBV)	ESS 1, 2, 4	(-)	L	L	M	M	M	M	L	M	L
Construction Phase											
Air Quality	ESS 1, 3	(-)	M	M	L	M	M	L	M	M	M
Noise and Vibration	ESS 1, 3	(-)	M	M	M	M	H	M	M	M	M
Water Quality	ESS 1, 3	(-)	M	M	M	M	M	L	M	M	M
Soil Quality	ESS 1, 3	(-)	L	L	L	L	L	L	L	L	L
Impact on Vegetation	ESS 1, 3	(-)	L	L	L	L	L	L	L	L	L
Traffic Congestion	ESS 1, 4	(-)	M	M	M	M	M	M	M	M	M
Occupational Health & Safety	ESS 1, 2	(-)	M	L	L	L	M	L	H	M	M

Activity / Potential Impact	Relevant ESS		Impact Characteristics (When not mitigated)						Magnitude & Sensitivity of Impact		gs (whe n not
Community Health & Safety	ESS 1, 4	(-)	M	M	M	M	M	M	M	M	M
Livelihoods	ESS 1	(+)	M	L	M	M	H	M	M	M	M
Demolition and Construction wastes	ES 1,3	(-)	L	L	L	L	L	L	M	M	M
Impacts on SEC	ESS 7	(-)	L	L	L	L	L	L	L	N	L
Cultural Heritage	ESS 8		N	-	-	-	-	-	-	-	-
Operation & Maintenance Phase											
Drainage	ESS 1, 3	(-)	M	M	L	M	M	M	L	L	L
Water quality	ESS 1, 3	(-)	M	M	M	L	M	M	M	M	M
Air Quality and Noise Level	ESS 1, 3	(-)	M	M	M	M	M	M	M	M	M
Environmental pollution from solid waste	ESS 1, 3	(-)	M	M	M	M	M	M	L	L	L
Traffic movement	ESS 1, 4	(-)	H	M	M	M	M	M	H	M	M
Public health and safety	ESS 1, 2	(-)	M	M	M	M	M	M	M	M	M
Employment and commercia activities	ESS 1, 4	(+)	M	M	M	M	M	M	M	M	M

Impact Characteristic:		
Very High/ High/ Moderate/ Low/ Nil	:	VH/H/M/L/N
Magnitude and Sensitivity of Impact:		
VH/H/M/L/N	:	Very High/High/Moderate/Low/Nil
VS/S/M/L/N	:	Very Severe/Severe/Mild/Low/Negligible
Risk Ratings:		
H/S/M/L	:	High /Substantial / Moderate / Low

All the sites that are proposed for all these components are predefined, so no significant changes of land use are involved; all these components will be built/developed in smaller sites, construction induced impacts will not be spread over large areas; no complex nature of works are involved and OHS protocol are relatively easier to maintain. All potential impacts during the construction phase are considered amenable by moderate to low mitigation measures that are both available and feasible. Similarly, many operation-phase impacts can be avoided or greatly minimized by sensible design decisions. Considering the overall assessment, the ES risks associated with the investments have been determined as 'Moderate Risk'. Moreover, standard ESCoPs are effective in avoiding any significant negative impacts in relation to all these sites.

4.3 Summary of Possible Effects and Impacts of the Subproject

From the overhead study, it seems that the subproject has minor impacts on the environment. Development of the RCC road and RCC drain with allied works may temporarily affect the roadside water bodies due to construction activities. The physicochemical components will be disturbed due to the subproject activities during the construction phase. The subproject

activities may degrade the air and noise level to a limited extent. The inputs that may affect the environment will be mainly at construction phase and limited within the subproject boundary. Nevertheless, the impacts will be temporary and localized and limited and fundamentally manageable through the appropriate mitigation measures. The generated solid wastes due to the subproject activities should be properly collected and disposed in a designated dumping site. The labor shed and stack yard should be in a designated place. Likewise, there is significant adverse impact anticipated at the operational stage. The physico-chemical components like- air quality and noise level may be deteriorated due to vehicles emission and horns. Furthermore, safety concerns are an important issue for both the construction and operation phases that should be considered properly to avoid any potential safety risks. The subproject site is the urban area of the Pourashava, so during construction the subproject will have negligible impact in traffic congestion. To minimize the impact subproject activities will be performed section wise, place traffic/ cautionary sign to avoid undue traffic congestion and accidents and inform the local people about the subproject activities.

In addition, no such negative social impacts were identified. None of private land acquisition is needed. Rather, due to site clearance few roadside tin-shed, semi-pucca and pucca structures and boundary wall and fencing need to be removed partially. The Pourashava authority has consulted with the owners of these structures. The local people and owners of those structures have no objection regarding the implementation of the subproject. An agreement has been signed by the Pourashava and the local people regarding the subproject implementation. The local people agreed to remove their structures for their future benefit. Even so, any objection from the affected person, the DSM will investigate the actual situation. Then, measures will be taken as per the requirements of the Resettlement Policy Framework (RPF), LMP of the project. There is no indigenous community in the Pourashava area, and no such people will be affected by the proposed sub project. In the subproject influence area, no cultural, religious or heritage sites are found. The migration to and temporary settlement of laborers in the subproject, referred to as labor influx, carries an array of potentially positive and negative impacts in terms of demands.

4.4 ES Impact Assessment and Mitigation Measures for Subproject Activity

The environmental and social impacts for subproject components (RCC road, single vent culvert and RCC drain with allied works) are a function of the activities that take place during project preparation, construction and operation of the subproject and considering the environmental and social attributes of the local setting. The people, communities, socio-economic condition, physio-chemical condition as well as biological condition such as ecosystems that may be affected by the subproject activities (receptors); their sensitivity to

influences such as noise, disturbance & emissions; water & soil contamination and drainage congestion, community health & safety, livelihoods, traffic movement and employment and commercial activities etc., and their ability to mitigate and adapt the changes. The significance of impacts depends on the comparison of activities and receptors in specific locations. This section describes some specific impacts due to the subproject activities and their mitigation measures.

4.4.1 Dismantle Work, Site Clearing, Excavation Work and Earth Work (ESS 2, 3 & 4)

The road improvement work with drain consists of dismantle of the existing roads (RCC roads), drain, site clearing work (clearing of the wastes materials generated due to dismantle work and removal of the unsuitable materials) and earth work (earth excavation, earth filling work, back filling etc.). These works lead dust blowing, improper disposal of the wastes, noise and vibration which may disturb the local people.

Mitigation Measures

- Proper care will be taken by the contractor during dismantle work, excavation work, earth work and disposal work to avoid any undue disturbances to the nearby people;
- Avoid loss of the topsoil for the earth filling work;
- Cover the exposed earth works with tarpaulin/fabric;
- Disposal of soil and construction wastes at the roadside vacant place near permanent dumping station situated Boniar Chora area.

4.4.2 Tree Feeling, Clearing of the Vegetation and Ecological Impact (ESS 6)

There are a few numbers (28 numbers) of planted and naturally grown roadsides trees [rain Tree, Mehegoni tree etc.] will be felled down and roadside vegetation will be cleared due to implementation of this subproject.

Mitigation and Enhancement Measures

- Considering the space availability 200 nos. of the local fruits, flowers, medicinal and ornamental trees will be planted to compensate the ecological imbalance and enhance the environmental sustainability in and around the subproject area to be caused by felling down of trees and clearing of roadside naturally grown vegetation;
- The trees will be planted at the proposed roads side area (Preferably at both sides or one side of proposed roads with link roads) where space is available and or anywhere Pourashava owned suitable places within the influence area of the subproject and the recommended trees are - Mango, Jackfruit, Jam, Segun, Rain Tree, Shil Koroi, Kathbadam, Kadom, Neem, Arjun, Amloki, Horitoki, Bohera, Mahogany, Palm Tree, Polash, Krisnachura, Radhachura, Jarul, Sonalu, Bokul, Shimul etc. (proposed sapling

height is minimum 1m and comprising protection, fencing and conservation up to project defect liability period);

- Planting many trees will enhance the ecological condition of the area after their successful growth.

Table 4.4.2.1: Details of Tree Plantation (Plant size, procedures, fencing and monitoring method)

Plant Selection / **Height and Spacing**	**Planting and Fencing Details**	**Follow Up Take Care**
• Most types of trees average height should be **more than 1meter** which equals **more than 3ft.** at the time of planting; • As all trees height are not same, at the time of some specific tree plantation Pourashava and Contractor should communicate with Consultant Team; • Tree plantation spacing should be **3m c/c** from one tree to another tree	Preparation of pit by earth work in excavation of 600 x 600 x 450 mm size pit for plantation, applying cow dung mixing with loamy silty soil and excavated earth, planting the plants, tightened with 1800 mm long borrak bamboo post by jute rope including supply of tools and plants etc. all complete as per direction of the E-I-C including providing Muli bamboo tree guard by 1200 mm long and 500 mm dia of best quality muli bamboo including supplying, preparation, fitting and fixing Muli bamboo split 2 mm in size having 75 mm x 75 mm a square holes with 2 mm wide bamboo splits strengthen with 4 Nos. 2 mm wide bamboo split in both sides tightened with G.I wire fitted with 3 Nos. 63 mm diaborrak bamboo post of 1800 mm long of which 600 mm will be driven into earth by digging hole followed by fill back including cost of tools and plants etc. all complete as per direction of the E-I-C.	• ***Watering:*** needs two times in a day; Prefer especially rainy season for tree plantation if it is in other season then proper watering is needed; • Needs weed out grass and other unnecessary vegetation • Need regular monitoring by Pourashava

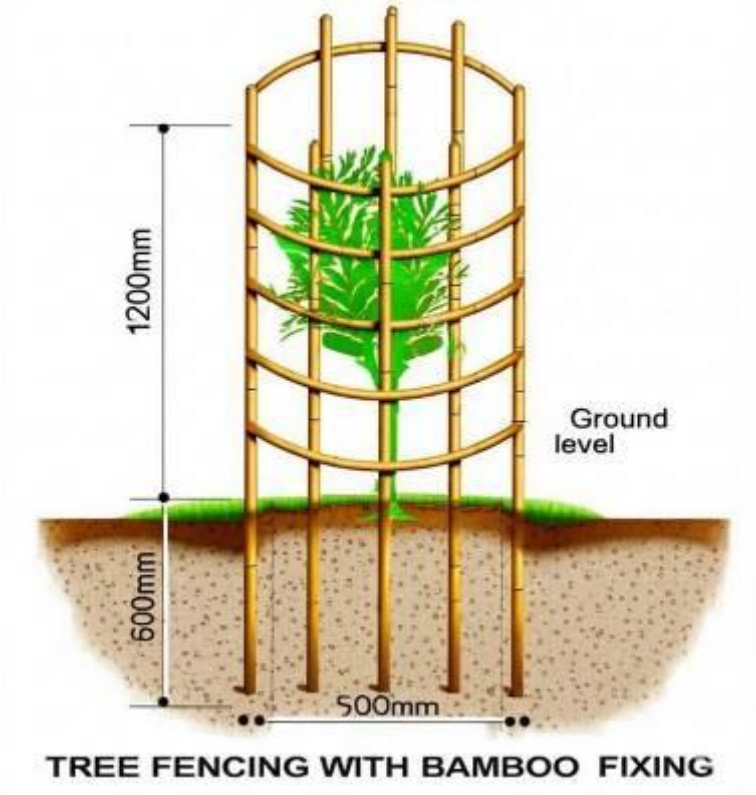

Figure 4.4.2.1: Drawing of Tree plantation procedure with bamboo fencing

4.4.3 Sand filling, Back Filling and Reinforced Cement Concrete Works for RCC Road and drain

The major impact for this activity is destroying **Air Quality and generating Dust (ESS 3 & 4)** in and around the subproject boundary. During construction phase, air pollutants will be emitted from the equipment and construction vehicles are expected to remain low. Local residents in the vicinity of the work sites will be temporarily disturbed by the limited dust effluence. The overall impacts, however, are expected to remain low.

Furthermore, this activity also may be impacted on **Noise and Vibration (ESS 3 & 4)** within the subproject boundary and the intensity is limited. Noise and vibration caused by the equipment and movement of the construction vehicles may temporarily disturb nearby residents. In this subproject, sensitive areas like roadside residence, Govt. and non-government agencies, educational institutes and religious centers are likely to be affected by noise nuisance, though the impacts are anticipated to be limited.

In addition, this activity also may be impacted on **Water Quality (ESS 3)**. The water quality may deteriorate if the construction materials, sand, construction wastes, effluent from the work camps, and food wastes are dumped in the roadside ditches, Matamuhuri River.

Mitigation Measures

- Water should be sprayed at the work site and camp site area for dust control;
- Ensure sprinkle and cover stockpiles of the loose materials (e.g., fine aggregates);
- Maintain adequate moisture content of soil and sand for transportation, compaction, bed preparation, backfilling and handling;
- Avoid use of dust generating equipment (which produce significant amount of particulate matter) far from the local residents;
- Ensure that all subproject vehicles are in good operating condition;
- Transportation of the construction materials have to be carried during the scheduled times, and mainly during the day in off-peak time;
- If applicable and needed, all powered mechanical equipment and machinery will be fitted with noise abating gear such as mufflers for effective sound reduction;
- Proper construction management including waste management as well as providing training of the operators and other workers should avoid throwing any pollutant substances to the water bodies;
- Construction waste will be disposed of properly (not in water bodies or lowland), for which contractor will be responsible;
- Disposal of soil and construction wastes at the roadside vacant place near permanent dumping station situated Boniar Chora area.

4.4.4 Occupational Health and Safety (ESS 2)

The most important risks associated with the construction activities are listed below:

- Exposure to the sunlight- workers are being exposed to the sun for long hours;
- Exposure to the high temperature, and humidity for a long time resulting in dehydration;
- Contact with the hazardous substances and wastes pose risks of the infections and diseases;
- Risk of the poor air quality due to the dust;
- Risk of the collision (traffic);
- Risks from head loads for carrying soil, construction materials and construction equipment;
- Risks of the using of the machineries in motion;
- Risk associated to the sudden bad weather working conditions.

General Requirements for the Workers' Health and Safety

The key salient features of the general requirements for the workers' health and safety stated are presented in **Table 4.4.4.1**

Table 4.4.4.1: General Requirements for the Workers Health and Safety

Issues	Requirements
Health and Hygiene	• Cleanliness at the site premises and workers living places and at the Labor Shed; • Arrangement of the proper ventilation and temperature at the Labor Shed; • Protection against dust and furnace by using of the nose masks and covering of the head and body; • Proper disposal of the wastes and effluents; • Introduce waste bins for the solid waste management system.
Safety and First Aid Box	• Using of the personal protective equipment (helmet, gloves, goggles, nose mask, safety boots); • Precautions during work on or near machineries in motion; • Head loads are prohibited; • First aid facilities should be provided and maintained; • The first aid kit should include adhesive bandages, regular strength pain medication, gauze, and low-grade disinfectant.
Compensation for Accidents at Work	• Contractors will bear medical treatment costs. If any sever accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation- (the amount of the compensation should be fixed considering the type of accidents).
Dust and Fumes	• For any dust, fumes, or other impurities likely to be injurious to the workers, effective measures shall be taken to prevent their accumulation and its inhalation by the workers.
Overcrowding	• No labor room should be overcrowded.
Latrines and Urinals	• Sufficient latrines shall be provided; • Latrines shall be maintained in clean and sanitary condition; • Latrines shall be adequately lighted and ventilated.
Disposal of Wastes and Effluents	• Proper disposal system for the solid waste and effluent is required; • Waste bins must be provided by the contractor at labor shed.

4.4.5 Pollution from the Construction Materials, Equipment and Vehicles (ESS 3)

Dumping of the construction spoils, including accidental leakage of the oil, grease, and fuel in equipment yards is a significant hazard. Both surface and groundwater might be polluted from these contaminants. Air pollution and dust may affect the nearby settlement which is generated from fine aggregate and vehicles. Even the people engaged for the construction activities might endanger the physical and human habitats of the area.

Mitigation Measures

- Safe transport, storage, and disposal provisions for the construction materials, and the equipment have to be carried out in order to avoid the accidental spillage and loss;
- Maintain adequate moisture content of soil and sand during transportation, compaction and handling;

- Carry the materials especially loose soil and sand with adequate cover;
- Fuels, lubricants, and other hazardous materials should store over raised platforms and not directly on the ground;
- Disposal of soil and construction wastes at the roadside vacant place near permanent dumping station situated Boniar Chora area.

4.4.6 Impacts on Community and Common Property Resources (ESS 4)

Through comprehensive study, it is revealed that impacts are expected not to be severe and to be largely manageable. The following **Table 4.4.6.1** presents impacts on socio-economic environment and common property resources.

Table 4.4.6.1: Impacts on Social Environment and Common Property Resources

Components	Impacts on IECs	Impact Significance
Community Perception	The local community people welcome this subproject and there is no visible objection from them.	Significant (+ve)
Employment and Business Opportunity	Community feels happy because the construction works will create work opportunity for the local people for the skilled and non-skilled labor. The subproject will create business opportunity for the equipment and **materials suppliers**.	Significant (+ve)
Community Order and Security	This subproject activity does not create any severe security problems to the local community and community people.	Minor (-ve)
Possible damage to existing infrastructure and facilities	Degradation of the existing road infrastructure by the construction equipment/vehicles used in this subproject.	Minor (-ve)
New infrastructure and facilities	Improvement of the existing road will increase municipality infrastructure facilities.	Moderate (+ve)
Labor Habitat	Most of the labors will stay at the Labor shed which will have impacts on the environment relates to the generation of the solid wastes, effluent, and water consumption.	Moderate (-ve)
Health Care	Workers may suffer from the dehydration problems, respiratory problem, and other health hazards.	Minor (-ve)
Accident	In case of road accidents by the vehicles to be used for the transportation may have serious negative impact.	Significant (-ve)

Mitigation Measures

- Conduct dissemination with the local community about the subproject details;
- Continue liaison with the community leaders in order to maintain the community support;
- Engage local contractor and local people as much as possible for positive perception of the local community;
- Follow traffic rules to avoid any accidents;
- Transportation and mobilization of the equipment and construction materials avoiding peak hours and scheduled time;
- Ensure first aid facilities and effective use of personal protective equipment where applicable.

4.4.7 Voluntary Dispossession of Land for Civil Works

The Pourashava authority has consulted with the owners of these structures. The local people and owners of those structures have no objection regarding the implementation of the subproject. An agreement has been signed by the Pourashava and the local people regarding the subproject implementation. The local people agreed to remove their structures for their future benefit. However, in case of any objection from the affected person, the DSM will investigate the actual situation. Then, measures will be taken as per requirements of the Resettlement Policy Framework (RPF),

In absence of any well-recognized policy by the Government of Bangladesh on the Small Ethnic communities (i.e., Indigenous Peoples), following the World Bank's policy ESS 7 on Indigenous Peoples, the ethnic minority communities and their relevant representatives' stakeholders will be fully engaged in the project activities. Consultations based on the principle of 'Free, Prior and Informed Consultations (and Consent)' (FPIC) will be key tool in engaging the SECs.

4.4.8 Labor Influx and Anticipated Impacts

The labor force and associated goods and services required for the construction of infrastructure civil works under this subproject cannot be fully supplied locally. The migration to and temporary settlement of laborers in the subproject, referred to as labor influx, carries an array of potentially positive and negative impacts in terms of demands on public infrastructure, utilities, housing and sustainable resource management and the strain on social dynamics.

Labor influx effects on host communities include positive impacts such as:

- The subproject activities will generate work opportunities for the local people and supplying of the construction materials, equipment, food and other necessary stuffs to the campsite;

- Improved infrastructure and public service access and availability whereby subproject investment catalyzes larger allocation of resources to a region, stimulating the development or expansion of infrastructure and public services.

Critical negative social risks include:

- Increase in criminal activity and alcohol and drug abuse, domestic violence, political attachment and violence, smuggling and robbery etc.;
- Increase in gender-based violence, including eve teasing, sexual harassment etc.;
- Increases in communicable diseases, including respiratory problems, diarrheal diseases, vector-borne diseases (e.g., malaria), and sexually transmitted infections (e.g., HIV/AIDS, syphilis, gonorrhea, hepatitis B);
- Conflicts arising from increased demand on existing infrastructure, services, and utilities, including transportation, health, education, water and sanitation, waste management, public utilities and community, religious, and recreational facilities and loss of land for access routes.

The general environmental impacts of labor influx include pressure on the natural resources such as using of the water, electricity, other fuel for cooking, loss of land for the labor establishment, depletion of the water supply, sewage and waste water generation, degradation of the air quality, waste generation, increased demands on the local energy and resources and noise pollution effects. The following safeguard measures are recommended to avoid any risk of labor influx:

- Inform local people about the subproject activities;
- Liaison with the community leaders in order to get community support;
- Engage local people as much as possible to minimize workers from outsiders;
- Monitor workers attitude and behavioral matter;
- Monitor the workers movement for avoiding any unexpected social activities (robbery, crime, political attachment and conflicts, drugs abuse);
- Inform and use local administration to get support if needed;
- Inform local utilities service providers (such as for new electricity connection REB or any other department);
- Ensure effective use of natural resources such as water, electricity, fuel, wood etc.

4.4.9 Impacts on Traffic Movement

The subproject side is moderately busy area and urban of the municipality. Roads are mainly used for the motorized and non-motorized vehicles. The proposed subprojects are moderately busy with the heavy traffic movement. Light motorized vehicles (Bike and electric Rickshaw-van, CNG rickshaw, motorcycle, cars, mini-pick-up etc.) and heavy motorized vehicles (trucks, mini-bus, bus, van etc.) are using the road usually. In addition, the alternative and connecting

roads are adequate to diversify the traffic volume. Hence, during construction, the subproject will have negligible impact in traffic congestion. In addition, to minimize the impact subproject activities will be performed section wise.

During construction phase, interruption of the traffic movement and impact on the local traffic system due to the subproject activities will be monitored closely. Then separate traffic management plan will be provided if required. However, the following safeguard measures are recommended to minimize the impacts associated to the traffic movement:

- Inform local people about the subproject activities;
- Inspire local people to use connecting and diversion roads;
- Ensure schedule deliveries of material/ equipment during off-peak hours;
- Place traffic sign/cautionary sign to avoid undue traffic congestion and associated traffic control measures to limit possible disruption;

The place of construction works should be fenced off with fences if required and should be isolated from general public access and marked with signs to ensure safe movement.

4.5 Public Consultation (PCM) and Participation

In the context of formulating the Environmental and Social Assessment (ESA), participatory Public Consultation (PCM) was conducted in the subproject site. The Pourashava Officials, Engineers and local individuals and Consultant participants participated. Informal Public Consultation (PCM) were conducted involving the participants. In addition, walk-through informal group consultations and individual interviews were also held. The local communities were informed about subproject interferences including their benefits. Suggestions made by the participants were listed and incorporated in the ESMP accordingly.

The attendance at the meetings is shown in **Appendix V.**

Photograph 4.5.1: Stakeholder Meeting and Public Consultation (PCM) at Chakaria Pourashava

4.5.1 Issues Raised by the Participants

The participants raised the issues related to the infrastructure development of Chakaria Pourashava. They emphasized the subproject selection for the future development and also discussed the procedure for the quality construction work. In the FGD, the participants discussed the requirements for Pourashava's future infrastructure development through a list of the subprojects. As per the participant's opinion, the major environmental and social problems in the Chakaria Pourashava are related to drainage congestion, sanitation problem, road communication system. They have also stated that water logging in the low-lying areas within the Pourashava area is another major problem. The participants also emphasized minimization of the environmental and social impacts during construction phase.

4.5.2 Feedback, Suggestions and Recommendations of the Participants

The participants were presented with feedback, suggestions, and recommendations listed below:

- The Public Consultation (PCM) results confirmed that an improved Road communication network, drainage is needed for future development of Chakaria Pourashava;
- Local people also believed that the importance of the area would be grown and various economic activities would be started in the area after the subproject implementation;
- Local people also showed strong expectation for the increased opportunities for employment for unskilled or semi-skilled labor in the construction work;
- Most of the participants stated that the number of sub project that have been selected for each financial year is insufficient;
- The participants also addressed the solid waste management issue to reduce environmental, social and public health hazards;
- The participants suggested Pourashava Officials to ensure quality construction works by the contractors;
- The participants stated that the construction work should be performed following the ESMP to minimize air quality degradation, noise level and solid waste generation;
- The participants emphasized on the capacity building workshops to enhance knowledge;
- The participants also suggested that construction works should be scheduled properly to avoid any undue disturbances to the nearby people.

5 ENVIRONMENTAL AND SOCIAL MANAGEMENTPLAN (ESMP)

The purpose of the Environmental and Social Management Plan (ESMP) is to ensure that the activities are undertaken in a responsible and non-detrimental manner. The ESMP will guide the environmentally sound construction of the sub-project and ensure efficient lines of communication between the Project Management Unit (PMU, LGED), Project Implementation Unit (PIU) of Chakaria Pourashava, DSM consultant team and the contractors.

5.1 Access to Information

The environmental assessment report should be translated into Bengali and disseminated locally. The copies of the report (both in English and Bengali) will be sent to all the concerned field offices of the LGED and Chakaria Pourashava. It will also be made available to the public. The final assessment report will also be uploaded in the LGED website and the World Bank website after approval.

5.2 Institutional Arrangement for Environmental and Social Compliance

In the institutional arrangement procedure, Project Director (PD), Team Leader (TL) will directly involve. The PD and TL would be supported by DSM, Environmental Specialist and Social Management Specialist. The Pourashava Officials, especially members of Infrastructure Improvement Section, would be responsible for supporting the construction supervisions well as environmental and social management with the facilitation of DSM consultants. The civil works contractors will implement the environmental mitigation measures.

The PMU, with the facilitation of Environmental Specialist and Social Management Specialist will submit the monthly and quarterly progress reports on Environmental and Social Compliances to the World Bank.

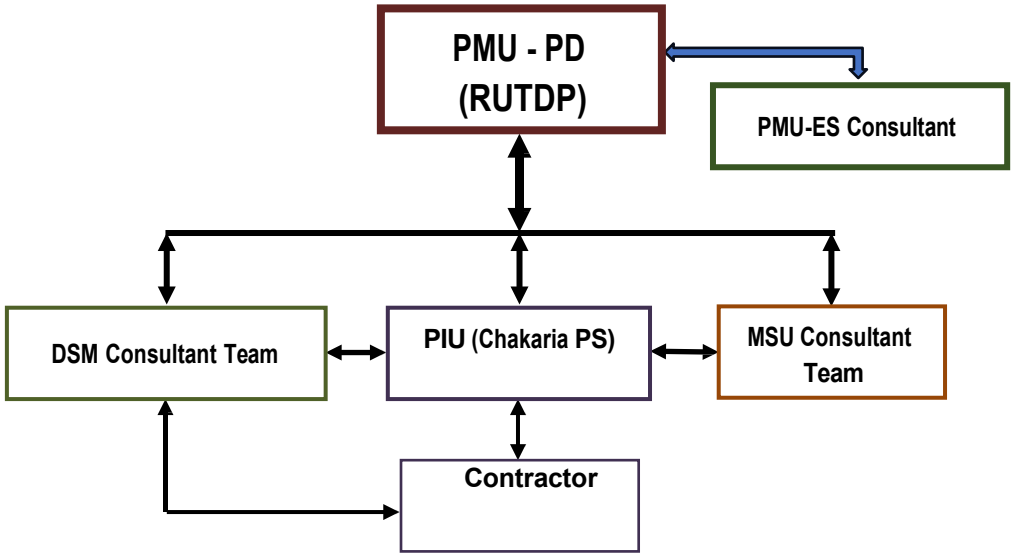

Figure 5.2.1: Environmental and Social Compliance Team (Tentative)

5.3 Capacity Building

Municipal Support Unit (MSU) is responsible for providing all capacity building training to concerned PIUs officials, PMU officials and others. In consultation with PMU a demonstration training program will be conducted by MSU LGED with help of DSM consultant team& PMU consultants to build the capability of the PIUs concerned officials and DSM field staffs. Participants from Chakaria Pourashava will be attended. Under the demonstration training program, PMU and DSM team will organize an introductory course for preparing them on: (i) Environmental and Social Screening, (ii) ESMP Implementation, including environmental and social monitoring requirements related to mitigation measures; and (iii) taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures to be found during the course of the implementation.

A separate capacity building workshop would be conducted for the Chakaria Pourashava Officials and members of Infrastructure Improvement Section. The contractor would be also included in the training program to enhance the Environmental and Social as well as community awareness and orientation among the workers. A detailed training manual will be developed by the Environmental Safeguard Specialist and Social Management Specialist. Hence, the existing manual will be reviewed and modification will be done as per requirement.

5.4 Emergency Response and Disaster Management

Disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular the preparedness, response and recovery to lessen the impact of disasters. Emergency Preparedness Planning (EPP) and Contingency Planning (CP) are the processes of disaster management plan for developing strategies, arrangements, and procedures to address the humanitarian needs of those adversely affected by the crisis. There are four main types of disasters, namely: Natural Disasters, Environmental Emergencies, Complex Emergencies and Pandemic Emergencies.

For RUTDP activities, Chakaria Pourashava would identify the immediate needs, prioritize the tasks and identify resource requirements to address the humanitarian needs of those adversely affected by the crisis.

5.5 Environmental and Social Management Action Plan

The activity wise anticipated environmental impacts and corresponding mitigation measures have been outlined in ***Table 5.5.1*** and ***Table 5.5.2***.

Table 5.5.1: ESMP during Construction Phase and Corresponding Mitigation and Enhancement Measures

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Construction and operation of labor shed for the workers (Workforce and labor shed management)	Generation of sewage and solid waste may degrade quality of the adjacent water bodies and surrounding environment	• Construction of sanitary latrine considering 15 persons for one toilet at the labor shed and separate toilet for male and female; • Erection of “no litter” sign, provision of waste bins (introduce separate waste bins for organic and inorganic wastes); • Ensure wastes (solid wastes and other forms of the wastes) disposal at the roadside vacant place near permanent dumping station situated Boniar Chora area.	Contractor Monitoring- Primarily by Pourashava Secondarily by PMU, LGED and DSM
	Health of workers	• Conduct formal and unofficial discussion to increase awareness about hygiene practices among the workers; • Ensure availability and access to first-aid equipment and medical supplies for the workers.	
	Possible development of labor camp into permanent settlement	• Contractor to remove labor camp at the completion of contract.	
	Outside labor force causing negative impact on health and social well-being of local people	• Ensure that contractor employ local work force to provide work opportunity to the local people and conduct formal and unofficial awareness program for the health and social well-being of the local people.	
General construction work	Drainage congestion and flooding	• Ensure provision for adequate drainage of storm water if needed; • Ensure provision for pumping of congested water if needed; • Ensure adequate monitoring of drainage effects, especially if construction works are carried out during the wet season.	Contractor Monitoring- Primarily by Pourashava Secondarily by PMU, LGED and DSM
	Air pollution	• Check regularly and ensure that all the subproject vehicles are in good operating condition; • Ensure contractor spray water on dry surfaces regularly to reduce dust generation; • Maintain adequate moisture content of the soil and sand used for transportation, bed preparation, compaction and backfilling; • Ensure contractor sprinkle and cover stockpiles of loose materials (e.g., fine aggregates); during transportation of loose materials, it should be covered by tarpaulin or other measures. • Ensure contractor avoid use of equipment at site and far from the local residents, which produce significant amount of particulate matter.	
	Traffic congestion, effect on traffic and pedestrian safety	• Ensure schedule deliveries of materials/ equipment during off-peak hours; • Construction will be section wise and alternative/diversion route should be identified; • Place traffic/ cautionary sign to avoid undue traffic congestion and accidents; • Inform the local people about the subproject activities.	

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	Noise pollution	• In front of the road side sensitive infrastructures i.e., religious centers, construction work should be performed considering the prayer time; • Check and maintenance the equipment properly; • Avoid using of construction equipment producing excessive noise at night; • Regulate use of horns and avoid undue use of hydraulic horns in subproject vehicles.	Contractor Monitoring- Primarily by Pourashava Secondarily by PMU, LGED and DSM
	Water and soil pollution	• Prevent discharge of fuel, lubricants, chemicals and wastes into adjacent water bodies like ponds, ditches and Khal through existing drain.	
	Accidents	• Conduct formal and informal discussion for creating awareness about the accidents; • Provide PPEs and ensure using of the personal protective equipment by the workers.	
	Felling of trees, clearing of vegetation and ecological disturbances	• 200 nos. of trees will be planted to compensate the felled down trees and enhanced the environmental sustainability of the surrounding area, preferably local fruits, timber, medicinal and ornamental trees in and around the subproject site where space is available and any other Pourashava owned suitable places in and around the subproject influence area where space is available.	
	Spills and leaks of oil, toxic chemicals	• Proper handling of lubricating oil and fuel so that it does not fall on the soil and water body; • Collection, proper treatment, and disposal of the spills.	
All construction works	Beneficial impact on employment generation	• Employ local people in the subproject activities as much as possible; • Give priority to poor people living within subproject area in subproject related works (e.g., excavation and other works, which do not require skilled manpower).	
	Possible complaints and suggestion from the local people and stakeholder about the subproject activities	• Use existing grievance registrar and complaints box that has been already delivered in the City Corporation.	
	General degradation of the environment	• Ensure environmental enhancement measures such as tree plantation and traffic/cautionary sign will be provided	
Environmental impacts due to key construction activities and corresponding mitigation measures for RCC roads and drains with allied works			
Dismantle work / Excavation / Earth work	Generation of solid and construction wastes due to the dismantle works; Generation of loose soil due to the earth excavation work.	• Cover exposed earth works with much fabric; • Ensure wastes (solid wastes and other forms of the wastes) disposal at the roadside vacant place near permanent dumping station situated Boniar Chora area.	

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	Accidents	• Carefully operate the hydraulic excavator; • Operate the hammer carefully for the dismantle work.	Contractor Monitoring- Primarily by Pourashava Secondarily by PMU, LGED and DSM
	Air pollution	• Regular maintenance of the equipment to avoid black smoke emission.	
	Possible damage of road side infrastructure due to earth excavation for drain construction	• Ensure drum sheet palisading work for shallow depth to stabilize the structure; • Ensure plunk palisading work for shallow depth to stabilize the structure; • Ensure bolly drive or similar protective works to stabilize the structure.	
Sand filling for road & Back filling work for drain	Air and dust pollution affecting nearby settlements	• Maintain adequate moisture content of soil during transportation, compaction and handling; • Carry the materials especially loose soil and sand with adequate cover.	
Cutting and welding of the reinforcement	Noise pollution due to rod cutter and welding machine if any	• Avoid using of rod cutter and wielding machine at night; • Avoid prolonged exposure to noise (produced by equipment) by workers.	
	Potential health and safety risks from rod cutter and welding machine if any	• Ensure use of the personal protective equipment's (helmet, goggles, gloves, safety boot); • Availability and access to first-aid equipment and medical supplies in case of any accidents.	
RCC (Reinforcement Cement Concrete) work	Air pollution due to black smoke emission from concrete mixer machine and vibrator machine	• Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission.	
	Noise nuisance from concrete mixer machine and vibrator machine	• Avoid operation of the concrete mixer and vibrator machine at night; • RCC work should be avoided at schooling and prayer time; • Inform local people about casting work and potential impacts.	
Environmental impacts due to key construction activities and corresponding mitigation measures for Street light			
Setting up the pole and electrical connection	Potential health and safety risks	• Inform the local authority to switch off power during connection; • Ensure use of the PPEs.	
Source of electricity and equipment	Reduce of resource i.e., use of electricity	• Provision of renewable energy (solar panel electrification) and use of environmentally friendly equipment (LED bulb rather than CFL bulb).	

Table 5.5.2: ESMP during Operational Phase and Corresponding Mitigation and Enhancement Measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Operation of the RCC road	× Increase in traffic speed and accidents; × Increased traffic congestion due to movement of increased number of vehicles; × Damage to road by movement of heavy vehicles; spillage of water to bitumen road surface.	• Better traffic management and installation of road safety measures; • Avoid movement of heavy loaded vehicles that may exceed the load carrying capacity of the road; • Avoiding spillage of water on road from vehicles carrying fish/ fresh produce (through monitoring, creation of awareness).	Monitoring- Pourashava
	× Increased air and noise pollution affecting surrounding areas	• Traffic management, increased vehicle inspection	
Operation of RCC drain	Pollution of downstream water body due to disposal of polluted water from the drain	• Ensure installation of septic tank by the household people in all establishment; • Stop connecting sanitation facilities to storm drain directly.	
	Possible backflow of water through drainage canal causing water logging	• Proper maintenance and cleaning of the drain and outfalls (khals/canals, primary drain) on regular basis.	
	Possible degradation of the water quality	• Raising awareness among the beneficiaries, "Do not through solid waste, plastics and sanitary waste into the water body".	
Operation and maintenance for street light	Accident due to collapse of the arms, electric bulbs and poles;	• Monthly checking and maintenance of the arms, switch box, electric bulbs; if needed; • Provision of automatic shut-down the switch, lamps during thunder storm and other natural disasters.	
	Traffic congestion, traffic problems for maintenance works;	• Schedule deliveries of materials/ equipment during off-peak hours;	
	Beneficial impact on employment generation for maintenance works.	• Engage local people for the maintenance activities.	

5.6 Environmental and Social Monitoring Plan

Environmental and Social Monitoring Plan for this subproject will help to evaluate the extent and severity of environmental and social impacts against the predicted impact and the performance of environmental and social protection measures. This is primarily monitored by the DSM – Safeguards Team (Environmental and Social Safeguard Specialist) and based on their monitoring report PMU Safeguards Team will review. The following ***Table 5.6.1*** and ***Table 5.6.2*** have been recommended for the key environmental indicators.

Table 5.6.1: Matrix Table of Monitoring Plan (Visual observation during construction phase)

Monitored Parameter/ Issues	Monitoring method/ Key aspects	Location of monitoring	Period &Monitoring Frequency
Safety orientation & training of workers	Frequency of training and orientation of workers for safety	Sub-project site	• Once in a month • Reporting: Once in a month
Personal Protective Equipment and safety equipment	Ensure every single person involved in the activities wear and use safety equipment	Sub-project site	• Daily • Reporting: Once in a month
Worker's health	Monitoring process of worker's health	Sub-project site	• Daily • Reporting: Once in a month
Sanitation & drinking water facility to the workers	Availability of safe drinking water and sanitation to the workers	Sub-project site	• Daily • Reporting: Once in a month
Incident record & reporting	Documented record of all incident, accident and its remedial process	Sub-project site	• Daily • Reporting: Once in a month
Site security	Isolation of site from general access	Sub-project site	• Daily • Reporting: Once in a month
Bulletin/ announcement boards/ prohibition signs	Visible in good condition or not	Sub-project site	• Daily • Reporting: Once in a month
Equipment /vehicles	-Switched-off diesel engines when not in use; - Search any possible leakage; - Fuelling.	Sub-project site	• Daily • Reporting: Once in a month
Dust	Dust is visible or not	Sub-project site	• Daily • Reporting: Once in a month
Oil waste generation and disposal	Quantity of oily waste, storage and disposal	Sub-project site	• Daily • Reporting: Once in a week
Solid waste generation	Quantity of solid wastes and disposal	Sub-project site	• Daily • Reporting: Once in a month
Drainage facilities	Provision of open /closed surface drainage if needed	Sub-project site	• Monthly • Reporting: Once in a month
Gender equity	No discrimination regarding payment	Sub-project site	• Once in a month • Reporting: Once in a month
Child labour	No child will be engaged in the activities	Sub-project site	• Daily • Reporting: Once in a month

Handling of hazardous materials	Fuelling, storage, operation	Sub-project site	• Daily • Reporting: Once in a month

Table 5.6.2: Matrix Table of Monitoring Plan (Analytical Monitoring during construction phase)

Monitored Parameter/ Issues	Monitoring method/Key aspects	Location of monitoring	Period &Monitoring Frequency
Air quality	• Visually - black smoke; • Sampling; • Analysis at laboratory; • Data analysis of merits determination by using quality standards; • Through digital instruments.	Subproject site	• Twice during construction period; • Reporting: Once in a month based on field inspection and immediately after laboratory analysis.
Waste Water quality	• Sampling; • Analysis at laboratory; • Data analysis of merits determination by using quality standards.	Subproject site	• Once during construction period; • Reporting: Once in a month based on field inspection and immediately after laboratory analysis.
Noise level	• Through digital instruments	Subproject site	• Twice during construction period • Reporting: Once in a month based on field inspection and immediately after noise level measurement.

In addition, a comprehensive Environmental Compliance Monitoring checklist has been prepared that is enclosed in ***Appendix-I***.

5.7 Cost of Environmental and Social Enhancement Works in BOQ

Considering the environmental and social impacts and their mitigation measures for this subproject, several items are included in the BOQ for environmental and social management. The estimated cost for the environmental and social management budget is elaborated in ***Table 5.7.1.***

Table 5.7.1: Environmental Measurement Budget

Item No.	Description of the Works	Unit Rate (BDT)	Qty (Number)	Amount (BDT)
esme-1	Dust suppression measures by water spraying throughout the construction period in and around the subproject sites, uncovered aggregates and loose materials such as stockpiles of the sand, excavated earth etc.	Lumpsum		50,000.00
esme-2	Air quality (SPM, PM 10, PM 2.5) measurement. It can be measured from the pre-approved public institute/ university twice (2) at two (2) locations in and around the subproject boundary during construction phase for overall subprojects construction activities	10,000.00	2x2x3	120,000.00

esme-3	Noise level measurement. It can be measured from the pre-approved public institute/ university twice (2) at three (03) different locations in and around the subproject boundary during construction phase for overall subprojects construction activities	5,000.00	2x3x1	30,000.00
esme-4	Water quality (pH, BOD5 and NH3) measurement of the two (2) outfalls & 2 locations at sources for drains. It can be measured from the pre-approved public institute/ university once during construction period.	10,000.00	1x4x3	120,000.00
esme-5	Prevention of the spillage and leakage of the polluting materials (Detailed procedure will be given in the ESMP)	Lumpsum		25,000.00
esme-6	Campsite wastes disposal facility during the construction period (collection, transportation, and dumping of the wastes at the roadside vacant place near Boniar Chora area.: 2 nos (1 no. for the organic wastes and 1 no. for the inorganic wastes disposal facility)	20,000.00	2.00	40,000.00
esme-7	Campsite water supply facilities: Preferably 1 no. of tube well at the labor campsite (Depending on the site condition, DSM consultant will assist the contractor for selecting the option)	20,000.00	1.00	20,000.00
esme-8	Campsite sanitation facilities: 2 nos. of the toilets preferably sanitary toilets at the labor campsite (1 no. for women and 1 nos. for men)	20,000.00	2.00	40,000.00
esme-9	a) Providing safety gear packages like hand gloves, spectacles for eye protection, ear plug, helmets, masks, visible jacket, safety shoes for at least 50 persons (40 workers and 10 visitors)	3,000.00	50.00	150,000.00
	b) One first aid box with necessary accessories (contractor is responsible for providing necessary medicines, saline as per requirement during construction period)	2,500.00	1.00	2,500.00
esme-10	Tree plantation to compensate the felled down trees and enhance the ecological condition in the subproject area-preferably local fruits, flowers, medicinal and ornamental trees - Mango/ Jam/ Jackfruit/ Kathbadam/ Shimul/ Polash/ Jarul/ Sonalu/ Kadom/ Satim/ Kanth Golap/ Neem/ Arjun/ Amloki/ Horitoki/ Bohera/ Mahogany/ ShilKoroi/ Babla/ Gamari/ Segun/ Garjan/ Bannyan Tree/ Palm Tree (including protection, fencing and conservation during project defect liability period): Preferably at both sides of the Vorora Name falok to Malipara Name falok road around the subproject influence area where space is available-200nos. of the trees (Tree plantation detailed will be given in the ESMP)	750.00	200.00	150,000.00
esme-11	Cautionary signs- 12 nos.	2,500.00	12	30,000.00
	Total			**777,500.00**

After approval to revise the cost estimate has lengthy complex procedure. Hence, as per project ESMF, PMU suggestion and experience from other LGED projects, adequate budget has been allocated for the environmental and social management for the mitigation and enhancement measures.

The subproject activities such as earth work, sand filling, black smoke emission from the subproject vehicles & equipment, dust generating and fine particles spreading through the air from cement works etc. may degrade the air quality in the subproject area. In addition,

mechanical compactor, hydraulic excavator, concrete mixer, mechanical vibrator, drum truck and subproject vehicles generate noise nuisance to the surrounding area. Hence, the budget includes analytical monitoring for air quality and noise level. The budget also includes provision for laboratory analysis of wastewater in order to assess the quality of waste water to be discharged.

Plenty of space is available for the tree plantation. Hence, to compensate the felled down trees and to enhance the ecological condition, adequate budget for tree plantation is also included. The budget for labor shed and site office construction is included in the civil works items. Therefore, it is not included in the environmental budget. It should be noted that the contractor will be paid as per actual work done.

5.8 Grievance Redress Mechanism

A grievance as a complaint of one workers/ parties with respect to wages and allowances, conditions of work, and interpretation (ILO). The Grievance Redress Mechanism is related to resolving the risks and adverse impacts of the subproject. It addresses APs' concerns and complaints promptly, using an understandable and transparent process that is also gender responsive, and culturally appropriate. It should be readily accessible to all segments of the affected people at no cost and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

LGED has its own Grievance Redress Procedure (GRP), which operates to address any dissatisfaction and complaints by the local people regarding its activities. This procedure is being applied to address any complaints or grievances through negotiations with the community leaders and representatives of the APs during implementation of the RUTDP.

The GRM aimed to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the subproject. Project specific Grievance Redress Mechanism (GRM) will be established at Chakaria Pourashava to receive, evaluate and facilitate the solution of APs concerns, complaints and grievances concerning the social and environmental performance of the subproject. Grievance Resolution Process all complaints and suggestions will be received formally in the Pourashava Office by the GRC Member Secretary. A sample Grievance Redress Form has been prepared and already sent to Chakaria Pourashava. An intake register will be maintained at the office of the Member Secretary. Member Secretary will record the details of the grievances in the intake register for documentation and ensure impartiality, fairness, and transparency. The intake register will have data and information columns including (i) Case no., (ii) Date of receipt, (iii) name, type of complaint, grievance, (iv) father's name, husband's name, (v) sex, (vi) complete address of the person raising the complaint, grievance, (vii) main objection (loss of land, property, or entitlement), (viii) detailed complaint story, (ix) expectation with documentary evidence and previous records of similar grievances, etc.(Detailed Grievance Redress Mechanism is appended in other associated documents namely LMP, SEP, RPF, and SEVCF which could be followed during project operations).

6 CONCLUSIONS AND RECOMMENDATIONS

The subproject intervention has ecologically minor impact due to chop-down trees and clearing of roadside naturally grown vegetation. However, to compensate the felled down trees and to enhance the ecological condition, tree plantation is included in the subproject area. No land acquisition is needed for the subproject implementation. The adverse impacts on the physicochemical components will be localized and limited within the subproject boundary. Again, the traffic congestion will be impacted moderately because the subproject is situated within the urban area of the Pourashava. It is also anticipated that the adverse impacts are largely manageable if proper mitigation, compensation and enhancement measures are entirely implemented. Furthermore, safety concerns are an important issue for both the construction and operation phases that should be considered properly to avoid any potential safety risks. This subproject will have positive impacts in terms of the generation of the employment opportunities and business activities by supplying construction materials and equipment at construction phase and by providing extended business activities at operation phase. In fact, the anticipated impacts due to the subproject activities are relatively moderate in comparison to the significant benefits that will derive due to the implementation of the subproject.

A few key recommendations are outlined below:

- ESMP should be available in the site during construction phase;
- Regular field visit by PMU, DSM and Pourashava responsible officials will be needed for the effective implementation of the ESMP;
- Equipment should be checked by the Pourashava engineer and DSM consultant prior to work;
- To minimize occupational health and safety risks, it is highly recommended to adapt mechanical system where appropriate;
- Contractor will ensure availability of the PPEs to the workers;
- First aid box with relevant medicine should be available at site;
- The contractor is responsible for the proper disposal of the generated wastes materials from the subproject sites and campsite;
- Inform the local inhabitants about the subproject activities and safety measures would be taken for the pedestrian and traffic movement;
- Contractor will monitor behavioral matter of the workers to avoid any undue risks related to labor influx;
- Proper maintenance is needed for the planted trees by the contractor during the project defect liability period.

It should be noted that the environmental and social assessment report is a live document. Hence, due to changing circumstances during the construction phase if any, there might be minor adaptation needed for environmental, health and safety issues.

7 REFERENCES

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Appendix - I: Important Environmental and Infrastructural Features

During site visit, the environmental and infrastructural features within the subproject area were collected. Conditional survey has also been conducted for designing the subproject. Hence, survey data is also used for preparing the report. The major environmental and infrastructural features listed for the subproject within 100m of the both sides from the center line of the road at 100 m longitudinal intervals. The key findings of the site visit are given below.

Table (a): Major Environmental and Infrastructural Features at Chiringa Baitush Road to Bashghat road at Ch. 0+000m to 0+560m (Link- Society Para Road)

Chainage(m)	Left	Right	Major Social and Environmental and Infrastructural Feature
0+100	√		Boundary wall, Boundary wall, Pole
		√	Shop, House, Pole, Boundary wall
0+200	√		2 Std Building, House, Tree, Wall, Tree, Pole
		√	House, Pole, Boundary wall, Tree, Shop, Tree
0+300	√		House, Boundary wall, House, Tree
		√	2 Std Building, Tree
0+400	√		2 Std Building, Tree
		√	2 Std Building, Tree
0+410	√		Madrasa
		√	House
0+410	√		House Tree
		√	House

Table (b): Major Environmental and Infrastructural Features at South Karia Ghona PIO culvert to Showdagar Ghona Alauddin Road at Ch. 0+000m to 1+550m

Chainage(m)	Left	Right	Major Social and Environmental and Infrastructural Feature
0+100	√		Reel Bridge, Electric Pole-1 No's, Shop
		√	Tin Shead Bera, Tree-20 No's, House-3 No's
0+200	√		Electric Pole-2 No's, Tree-10 no's, Low Land
		√	Electric Pole-1 No's, Low Land, Low Land
0+300	√		Electric Pole-1 No's, Tree-60 No's, Low Land
		√	Tree-60 No's, Electric Pole-1 No's, House
0+400	√		Tin Shead Bera, Shop, Low Land
		√	Electric Pole-1 No's, Tree-45 No's, Tin Saed Bera
0+500	√		Electric Pole-1 No's, Mosque Boundary wall, Tree-20 No's
		√	Low Land, Tin House-1 Nos, PIO Bridge
0+600	√		Tin House-1 Nos, Low Land, Tree-20 No's
		√	Low Land, Tree, House-1 Nos,
0+700	√		Tree-300 Nos, Low Land
		√	3 No's Tin House, Low Land, Tree-20 No's
0+800	√		Low Land
		√	Low Land
0+900	√		Low Land, Tree-3 No's
		√	Low Land
0+1000	√		Tree-2 No's, Low Land
		√	Low Land
0+1100	√		Low Land
		√	Low Land
0+1200	√		Tin House 1 No's
		√	Low Land
0+1300	√		Tin House 1 No's, Low Land
		√	Low Land
0+1400	√		Low Land
		√	Low Land

0+1500	√		Low Land
		√	Low Land
0+1600	√		Low Land
		√	Low Land
0+1700	√		Low Land
		√	Low Land
0+1740	√		Low Land
		√	Low Land

Table (c): Major Environmental and Infrastructural Features at Batakhali Namar jailepara road to Torojghat station via Leader Haider Ali house road at Ch. 0+000m to 0+770m

Chainage(m)	Left	Right	Major Social and Environmental and Infrastructural Feature
0+100	√		House, House
		√	Land, House, Tree
0+200	√		House
		√	House
0+300	√		Land, House,Tree
		√	House,Tree
0+400	√		Land,House,Tree
		√	Land,Tree
0+500	√		House,Tree
		√	House,Mosque
0+600	√		House, House
		√	Land, House, Tree

Appendix - II: Environmental Screening

Environmental Screening Checklist, as adopted in Appendix C of the Environmental and Social Management Framework (ESMF) of the RUTDP, was administered for identifying the impacts and their extents. The screening data and information designed for the subproject has been formulated and are shown in below.

Summary Screening Results and Decisions

Name of Pourashava	Chakaria Pourashava
Name of the Sub-project	i. Improvement of RCC road and drain from Chiringa Baitush Road to Bashghat Road at (Ch. 0+000m to 0+560m); ii. Improvement of RCC Road from South Karia Ghona PIO culvert to Showdagar Ghona Alauddin Road at (Ch. 0+000m to 1+550m) iii. Improvement of RCC Road and drain from Batakhali Namar Jailepara Road to Torojghat Station via Leader Haider Ali House Road at (Ch. 0+000m to 0+770m) iv. Improvement of RCC Road from Moddachakaria Govt. Primari School to Kadinga Pukur Road (Ch. 0+000m to 0+600 m.)
Sub-project type	Road, Drain with allied works.
Package No.	RUTDP/CHO/2024-25/W-01
Location	Chiringa Baitush Road, Bashghat Road, Kadinga Pukur Road, Leader Haider Ali House Road, Batakhali Namar Jailepara Road
Ward No.	3,5 & 8
Subproject activities:	RCC road and drain with footpath, Dismantle Work, Site Clearing, Excavation Work and Earth Work, pumping and bailing out water (RCC drain), CC and RCC works (RCC drain),
Number of beneficiaries	11,850
Sub-project Category by E&S risks	According to ECR 2023: Green □ Yellow □ Orange □√ Red □ Not Listed □ According to WB ESF Risk Classification: High Risk □ Substantial Risk □ Moderate Risk □√ Low Risk □
Subproject qualifies for investment?	[1] Yes √ / [2] No
If yes, detailed ESIA required or not?	[1] Required [2] Not required √
Other E&S plans separate of ESMP	[1] Labor Management Plan; [2] Cultural Heritage Management Plan; [3] Construction Camp Management Plan; [4] Resettlement Plan; etc. Not Required

A. Land Readiness of the Subproject (ESS 5)

A.1	**Subproject Position:**
	Subproject type: [1] Completely new infrastructure, [2] Replacement/improvement of existing infrastructure √, [3] Rehabilitation of existing infrastructure **Design dimension [length, width, area]: 3480m road and drain** **Available area in possession (dimension):** **Proposed area (dimension):**
A.2 Current use of the land proposed for the subproject civil works	√ [1] Fully same as proposed for the subproject [2] Partially same and the rest is under occupation by private people [3] New land under different use as proposed for the subproject
A.3 In case of [1] under A.2 above, a) Number of current formal private users of the land/building	: N/A
b) Will there be a need to relocate them to allow construction works?	[1] Yes, / [2] No √
c) If yes, how many of them?	: _____
A.4 In case of [2] under A.2 above, a) Number of current formal private users of the land/building	***N/A*** : _____
b) Number of current informal private users of the land/building	: _____
c) Will there be a need to relocate them to allow construction works?	: [1] Yes, / [2] No
d) If yes, how many of them?	: _____
A.5 In case of [3] under A.2 above, What is the ownership of the land?	[1] Existing land owned by PSV/CC [2] Other public/Khas land [3] Private land
A.6 In case of [1] or [2] under A.5 above, a) Number of current formal private users of the land/building	***N/A*** :
b) Number of current informal private users of the land/building	:
c) Will there be a need to relocate them to allow construction works?	: [1] Yes, / [2] No
d) If yes, how many of them?	:
A.7 In case of [3] under A.5 above, Which method will be used for acquisition of land?	***N/A*** [1] Involuntary acquisition of land [2] Negotiated settlement [3] Voluntary donation with agreed terms [4] Voluntary contribution with compensation [5] The scheme will not be taken

B. Environmental and Social Risk Screening

I. Subproject Settings:

Would the subproject severely affect any of the following environmentally sensitive areas?
[If yes, the subproject location may be revised.]

Screening Questions	YES	NO	Remarks
a) Cultural heritage site		√	
b) Protected Area (Forest/ Sundarbans/ National Park)		√	
c) Wetland (Beel, Haor)		√	
d) Wildlife sanctuary		√	
e) Buffer zone of protected area		√	
f) Special area for protecting biodiversity		√	
g) Mangrove		√	

II. ES Risk Screening:

ES Risk Screening in accordance with the Environmental and Social Standards (ESS)

ESS	Screening Questions	YES	NO	Risk Level				Remarks
				Low	Moderate	Substantial	High	
ESS 1	Will the sub-project activities affect vulnerable groups?		√					
ESS 2	*Will there be migrant workers housed in labor camps at site? (Anticipated number, if yes)*	√						60 people
	Will there be local workers employed for subproject civil works? (Anticipated number, if yes)	√						50 people
	Will there be women employed in construction works at site?	√						80 people
	Will the activities pose occupational health and safety risks to construction workers?	√			√			
	Whether the activities may induce any risks of sexual exploitation, abuse and harassment (SEAH)?		√					
	Are the activities likely to affect working conditions, particularly in terms of employment, compliance with labor and other laws pertaining to non-discrimination, equal opportunity, child labor, and forced labor of direct, contracted and third-party workers?		√					
	Is there any suitable location for labor camp?	√		√				
	Will there be any suppliers on a continuous basis during the subproject implementation?		√					

ESS	Screening Questions	YES	NO	Risk Level				Remarks
				Low	Moderate	Substantial	High	
ESS3	Will the activities create air pollution which would require special controls in order to ensure compliance with the Bangladesh standards?	√		√				
	Will the noise levels impact particularly sensitive receptors (hospitals, schools, local population centers, natural habitats,)?	√		√				
	Is there any risk of groundwater pollution?		√					
	Is there any risk of surface water pollution?	√		√				
	Will the activity generate water effluents (wastewater) that may require special treatment, control or the water management permit?		√					
	Will the activity generate solid waste that may be considered hazardous, difficult to manage, or may be beyond the scope of regular household waste?		√					
	For construction of culverts, will there be disturbance or modification of existing drainage channels (rivers, canals) or surface water bodies (wetlands, marshes)?		√					
	For installation of tube wells, is there any chance to create hindrance to water bodies that are used for irrigation?		√					
	For sanitary latrine construction, is there any drinking water source near 30 feet distance of the toilet?		√					
	Possibility of stagnant water bodies in borrow pits, quarries, etc., encouraging mosquito breeding and other disease vectors?		√					
	Will the resources used by activities likely to create scarcity of local resources e.g., of water, electricity, gas etc.?		√					
	Is there any suitable location identified for storage of raw materials	√			√			
	Will the activities increase soil erosion and/or sedimentation?	√		√				
	Is there any negative impact on soil stability and compactness?		√					
	Will there be any interruption of the natural flow of river, canal or any stream?		√					
	Are the drains likely to be used for disposal of domestic sewage?	√		√				
	Is there any chance of waterlogging/ insufficient drainage?	√		√				

ESS	Screening Questions	YES	NO	Risk Level				Remarks
				Low	Moderate	Substantial	High	
	Will there be traffic disturbances due to construction material transport and other project movements?	√			√			
	Will there be increased noise due to transportation of equipment and construction materials?	√		√				
	Will there be any deep excavation requiring shoring/protection of edges and safety of nearby structures?		√					
	Will there be any piling work generating vibration and affecting safety of nearby structures?		√					
	Do the sub-project interventions include construction, reconstruction or demolition works?	√			√			
	Has the sub-project site had any seismic risk (historically)?		√					
ESS 4	Is there any impact on fish migration and navigation?		√					
	Are the activities likely to induce potential social conflicts?		√					
	Is there any chance of destruction of homestead land?		√					
	Will the activities potentially generate risks and impacts on the health and safety of the affected communities, including impacts on ecosystem services affecting the local community health and safety?	√		√				
	Will the proposed activity disrupt access to health services?		√					
	Will there be potential risks posed by the security arrangements and potential conflicts at the sub-project site between the workers and the affected community?		√					
ESS 5	Will any agricultural land be used for the sub- project civil works?		√					
	Will there be any negative effects on rare (vulnerable), threatened or endangered species of flora or their habitat?		√					
	Will there be any negative effects on wildlife habitat, populations, corridors or movement?		√					
ESS 6	Will there be any destruction of trees and vegetation?	√		√				28 nos. of common local trees will be felled down & a few roadside natural vegetation will be cleared
	Will there be any negative effects on locally important or valued ecosystems?		√					
ESS 7	Are there any indigenous/ ethnic communities residing within or adjacent to the sub-project site?		√					

ESS	Screening Questions	YES	NO	Risk Level				Remarks
				Low	Moderate	Substantial	High	
	If yes, then answer the following questions:							
	i. Are the indigenous people involved in the planning and implementation of the scheme?							
	ii. Will any indigenous/ ethnic household/ individual get negatively impacted by the sub-project?							
	iii. Is there any chance that the sub-project will pose cultural threat to the indigenous/ ethnic communities?							
ESS 8	Will there any negative impact on historically or culturally important sites/structures (mosques, graveyard, monuments, etc.)?		√					
	Any other, please mention							

C. Summary of the Possible Environmental and Social Impacts:

From the overhead study, it seems that the subproject has minor impacts on ecology. Development of the road and drain may temporarily affect the roadside water bodies due to construction activities. The physicochemical components will be disturbed due to the subproject activities during the construction phase. The subproject activities may degrade the air and noise level to a limited extent. The inputs that may affect the environment will be mainly at construction phase and limited within the subproject boundary. Nevertheless, the impacts will be temporary and localized and limited and fundamentally manageable through the appropriate mitigation measures. The generated solid wastes due to the subproject activities should be properly collected and disposed in a designated dumping site. The labor shed and stack yard should be in a designated place. Likewise, there is significant adverse impact anticipated at the operational stage. The physico-chemical components like air quality and noise level may be deteriorated due to vehicles emission and horns. Furthermore, safety concerns are an important issue for both the construction and operation phases that should be considered properly to avoid any potential safety risks.

This subproject will have positive impacts in terms of the generation of the employment opportunities and business activities by supplying construction materials and equipment at construction phase and by providing extended business activities at operation phase.

Appendix - III: Environmental and Social Codes of Practice (ESCoPs)

- **ESCoP 1 (Waste Management):** Contractor shall be responsible for the safe transportation and disposal of the wastes generated due to the subproject activities. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor shall • Develop waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing construction and submit to DSM for approval. • Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less environmental impact. • Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach. • Segregate and reuse or recycle all the wastes, wherever practical. • Prohibit burning of solid waste • Collect and transport non-hazardous wastes to all the approved disposal sites. Vehicles transporting solid waste shall be covered with tarps or nets to prevent spilling waste along the route • Train and instruct all personnel in waste management practices and procedures as a component of the environmental induction process. • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable. • Place a high emphasis on good housekeeping practices. • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal.
Hazardous Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor shall • Collect chemical wastes in 200-liter drums (or similar sealed container), appropriately labeled for safe transport to an approved chemical waste depot. • Store, transport and handle all chemicals avoiding potential environmental pollution. • Store all hazardous wastes appropriately in bunded areas away from water courses. • Make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. • Collect hydrocarbon wastes, including lube oils, for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • Construct concrete or other impermeable flooring to prevent seepage in case of spills.

- **ESCoP 2 (Fuels and Hazardous Substances Management):** Contractor shall take preventive measures for fuels and hazardous substances management. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Fuels and hazardous goods	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous goods/materials on-site, and potential spills from these goods may harm the environment or health of construction workers.	The Contractor shall • Prepare spill control procedures and submit the plan for DSM approval. • Train the relevant construction personnel in handling of fuels and spill control procedures. • Store dangerous goods in bunded areas on a top of a sealed plastic sheet away from watercourses. • Refueling shall occur only within bunded areas. • Make available MSDS for chemicals and dangerous goods on-site. • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by DoE. • Provide absorbent and containment material (e.g., absorbent matting) where hazardous material is used and stored and personnel trained in the correct use. • Provide protective clothing, safety boots, helmets, masks, gloves, goggles, to the construction personnel, appropriate to materials in use. • Make sure all containers, drums, and tanks that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. Check for leakage regularly to identify potential problems before they occur. • Store hazardous materials above flood plain level. • Put containers and drums in temporary storages in clearly marked areas, where they will not be run over by vehicles or heavy machinery. The area shall preferably slope or drain to a safe collection area in the event of a spill. • Put containers and drums in permanent storage areas on an impermeable floor that slopes to a safe collection area in the event of a spill or leak. • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution. • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials. • Return the gas cylinders to the supplier. However, if they are not empty prior to their return, they must be labeled with the name of the material they contained or contain, information on the supplier, cylinder serial number, pressure, their last hydrostatic test date, and any additional identification marking that may be considered necessary.

- **ESCoP 3 (Water Resources Management):** Contractor shall take all steps to protect environment (water resources) and avoid causing all types of public hazards during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Hazardous Material and Waste	Water pollution from the storage, handling and disposal of hazardous materials and general construction waste, and accidental spillage.	The Contractor shall • Follow the management guidelines proposed in EC0Ps 1 and 2. • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables.
Discharge from	During construction both	The Contractor shall

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction sites	surface and groundwater quality may be deteriorated due to construction activities in the river, sewerages from construction sites and work camps. The construction works will modify groundcover and topography changing the surface water drainage patterns of the area including infiltration and storage of storm water. These changes in hydrological regime lead to increased rate of runoff, increase in sediment and contaminant loading, increased flooding, groundwater contamination, and effect habitat of fish and other aquatic biology.	• Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site • Divert runoff from undisturbed areas around the construction site • Stockpile materials away from drainage lines • Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an approved waste disposal site or recycling depot • Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site. Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This shall be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil Erosion and siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies.	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion • Ensure that roads used by construction vehicles are swept regularly to remove sediment • Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust. Increase the watering frequency during periods of high risk (e.g., high winds)
Construction activities in water bodies	Construction works in the water bodies will increase sediment and contaminant loading, and effect habitat of fish and other aquatic biology.	The Contractor shall • Dewater sites by pumping water to a sediment basin prior to release off site – do not pump directly off site • Monitor the water quality in the runoff from the site or areas affected by dredge plumes, and improve work practices as necessary • Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables. • Use environment friendly and nontoxic slurry during construction of piles to discharge into the river. • Reduce infiltration of contaminated drainage through storm water management design • Do not discharge cement and water curing used for cement concrete directly into water courses and drainage inlets.
Drinking water	Groundwater at shallow depths is contaminated with arsenic and hence not suitable for drinking purposes.	The Contractor shall • Pumping of groundwater shall be from deep aquifers of more than 300 m to supply arsenic free water. Safe and sustainable discharges are to be ascertained prior to selection of pumps. • Tube wells will be installed with due regard for the surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross contamination • All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	Depletion and pollution of groundwater resources	• Install monitoring wells both upstream and downstream areas near construction yards and construction camps to regularly monitor the water quality and water levels. • Protect groundwater supplies of adjacent lands

- **ESCoP 4 (Drainage Management):** Contractor shall take all steps to protect drainage congestion due to construction and avoid causing all types of public threats during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Excavation and earth work, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	The Contractor shall • Prepare a program for prevent/avoid standing waters, which DSM will verify in advance and confirm during implementation • Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line • Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there • Rehabilitate road drainage structures immediately if damaged by contractors' road transports. • Build new drainage lines as appropriate and required for wastewater from construction yards connecting to the available nearby recipient water bodies. Ensure wastewater quality conforms to the relevant standards provided by DoE, before it being discharged into the recipient water bodies. • Ensure the internal roads/hard surfaces in the construction yards/construction camps that generate has storm water drainage to accommodate high runoff during downpour and that there is no stagnant water in the area at the end of the downpour. • Construct wide drains instead of deep drains to avoid sand deposition in the drains that require frequent cleaning. • Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion. • Protect natural slopes of drainage channels to ensure adequate storm water drains. • Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem. • Reduce infiltration of contaminated drainage through storm water management design.
Ponding of water	Health hazards due to mosquito breeding	The Contractor shall • Do not allow ponding/storage of water especially near the waste storage areas and construction camps • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.

- **ESCoP 5 (Soil Quality Management):** Contractor shall take preventive measures for spilling from the construction equipment and materials to protect soil at construction period. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Filling of Sites with dredge spoils	Soil contamination will occur from drainage of dredged spoils	The Contractor shall • Ensure that dredged sand used for land filling shall be free of pollutants. Prior to filling, sand quality shall be tested to confirm whether soil is pollution free. Sediments shall be properly compacted. Top layer shall be the 0.5 m thick clay on the surface and boundary slopes along with grass. Side Slope of Filled Land of 1:2 shall be constructed by suitable soils with proper compaction as per design. Slope surface shall be covered by top soils/ cladding materials (0.5m thick) and grass turfing with suitable grass. • Leaching from the sediments shall be contained to seep into the subsoil or shall be discharged into settling lagoons before final disposal. • No sediment laden water in the adjacent lands near the construction sites, and/or wastewater of suspended materials excessive of 200mg/l from dredge spoil storage/use area in the adjacent agricultural lands.
Storage of hazardous and toxic chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor shall • Strictly manage the wastes management plans proposed in ECP1 and storage of materials in ECP2 • Construct appropriate spill contaminant facilities for all fuel storage areas • Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals • Train personnel and implement safe work practices for minimizing the risk of spillage • Identify the cause of contamination, if it is reported, and contain the area of contamination. The impact may be contained by isolating the source or implementing controls around the affected site • Remediate the contaminated land using the most appropriate available method to achieve required commercial/industrial guideline validation results.
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.

ESCoP 6: Erosion and Sediment Control

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of Construction sites	Cleared areas and slopes are susceptible for erosion of top soils that affects the growth of vegetation which causes ecological imbalance	The Contractor shall • Reinstate and protect cleared areas as soon as possible. • Mulch to protect batter slopes before planting • Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turnings/tree plantations.
Construction activities and material stockpiles	The impact of soil erosion is (i) Increased run off and sedimentation causing a greater flood hazard to the downstream, (ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by erosion and/or deposition of sediment damaging the	The Contractor shall • Locate stockpiles away from drainage lines • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds • Remove debris from drainage paths and sediment control structures • Cover the loose sediments and water them if required • Divert natural runoff around construction areas prior to any site disturbance install protective measures on site prior to

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	spawning grounds of fish, and (iii) destruction of vegetation by burying or gullying.	construction, for example, sediment traps • Control drainage through a site in protected channels or slope drains • Install 'cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion Observe the performance of drainage structures and erosion controls during rain and modify as required.

- **ESCoP 7 (Top Soil Management):** Contractor shall take preventive measures to top soil to use for construction during construction phase. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Earthworks will impact the fertile topsoil that are enriched with nutrients required for plant growth or agricultural development	The Contractor shall • Strip the top soil to a depth of 15 cm and store in stock piles of height not exceeding 2m. • Remove unwanted materials from top soil like grass, roots of trees and similar others. • The stockpiles will be done in slopes of 2:1 to reduce surface runoff and enhance percolation through the mass of stored soil. • Locate topsoil stockpiles in areas outside drainage lines and protect from erosion. • Construct diversion channels and silt fences around the topsoil stockpiles to prevent erosion and loss of topsoil. • Spread the topsoil to maintain the physio-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites • Prior to the re-spreading of topsoil, the ground surface will be ripped to assist the bunding of the soil layers, water penetration and revegetation.
Transport	Vehicular movement outside ROW or temporary access roads will affect the soil fertility of the agricultural lands	The Contractor shall • Limit equipment and vehicular movements to within the approved construction zone • Construct temporary access tracks to cross concentrated water flow lines at right angles • Plan construction access to make use, if possible, of the final road alignment • Use vehicle-cleaning devices, for example, ramps or wash down areas.

- **ESCoP 8 (Topography and Landscaping):** Contractor shall take all steps to protect environment (Topography and Landscaping) due to construction activities and avoid causing all types of public nuisance during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Land clearing and earth works	Flood plains of the existing Project area will be affected by the construction of various project activities. Construction activities especially earthworks will change topography and disturb the natural rainwater/flood water drainage as well as will change the local	The Contractor shall • Ensure the topography of the final surface of all raised lands (construction yards, approach roads, access roads, bridge end facilities, etc.) are conducive to enhance natural draining of rainwater/flood water; • Keep the final or finished surface of all the raised lands free from any kind of depression that insists water logging • Undertake mitigation measures for erosion control/prevention by grass-turfing and tree plantation, where there is a possibility of rain-cut that

	landscape.	will change the shape of topography. • Cover immediately the uncovered open surface that has no use of construction activities with grass-cover and tree plantation to prevent soil erosion and bring improved landscaping.

ESCoP 9: Sand Extraction

Project Activity/ Impact Source	**Environmental Impacts**	**Mitigation Measures/ Management Guidelines**
Sand extraction	Sand extraction can potentially impact the aquatic habitat, water quality, and key aquatic species and their food availability.	The Contractor shall • not extract sand from the river bed in long continuous stretches; alternate patches of river bed will be left undisturbed to minimize the potentially negative impacts on the aquatic habitat. • not collect large quantities of sand from any single location • not excavate deeper than 3 m at any single location. • not carry out sand extraction near chars that have sensitive Habitats • not carry out sand extraction during the night particularly near the chars • obtain approval from DSM before starting sand extraction from any location. • carry out sand extraction from sand bars to the extent possible. • maintain record of all sand extraction (quantities, location shown on map, timing, any sighting of key species) • provide silt fences, sediment barriers or other devices around the extraction areas to prevent migration of sediment rich water in to the river channels. • refuel of barges and boats with a proper care to avoid any spills. • make available spill kits and other absorbent material at refueling points on the barges.
		• properly collect, treat and dispose the bilge water from of barges, and boats. • regularly service all waterborne plant as per the manufacturer's guidelines and be inspected daily prior to operation. DSM will: • carry out survey of the area prior to sand extraction • identify any sensitive receptors/habitats (e.g., turtle nesting area, bird colony) at or near the proposed sand extraction locations. • determine 'no-go' areas for sand extraction, based upon the above survey, • monitor the activity to ensure that the contractor complies with the conditions described earlier. • survey the area after sand extraction to identify any leftover impacts.

- **ESCoP 10 (Air Quality Management):** Contractor shall take all steps to protect environment (Air Quality) and avoid causing all types of public irritations during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels.	The Contractor shall • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition. • Operate the vehicles in a fuel-efficient manner • Cover haul vehicles carrying dusty materials moving outside the construction site Impose speed limits on all vehicle movement at the worksite to reduce dust emissions • Control the movement of construction traffic • Water construction materials prior to loading and transport • Service all vehicles regularly to minimize emissions • Limit the idling time of vehicles not more than 2 minutes.
Construction machinery	Air quality can be adversely affected by emissions from machinery and combustion of fuels.	The Contractor shall • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors • Focus special attention on containing the emissions from generators • Machinery causing excess pollution (e.g., visible smoke) will be banned from construction sites • Service all equipment regularly to minimize emissions • Provide filtering systems, duct collectors or humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling, cement dumping, circulation of trucks and machinery inside the installations
Construction activities	Dust generation from construction sites, material stockpiles and access roads are a nuisance in the environment and can be a health hazard.	The Contractor shall • Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g., high winds). Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted • Minimize the extent and period of exposure of the bare surfaces • Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site • Restore disturbed areas as soon as practicable by vegetation/grass-turfing • Store the cement in silos and minimize the emissions from silos by equipping them with filters. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations • Crushing of rocky and aggregate materials shall be wet-crushed, or performed with particle emission control systems.

- **ESCoP 11 (Noise and Vibration Management):** Contractor shall take all steps to protect environment (Noise and Vibration) and avoid causing all types of public nuisance during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Appropriately site all noise generating activities to avoid noise pollution to local residents • Use the quietest available plant and equipment • Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines) • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment. • Install acoustic enclosures around generators to reduce noise levels. • Fit high efficiency mufflers to appropriate construction equipment • Avoid the unnecessary use of alarms, horns and sirens.
Construction activities	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment.	The Contractor shall • Notify adjacent landholders prior any typical noise events outside of daylight hours • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions • Employ best available work practices on-site to minimize occupational noise levels • Install temporary noise control barriers where appropriate • Notify affected people if major noisy activities will be undertaken, e. g. pile driving • Plan activities on site and deliveries to and from site to minimize impact • Monitor and analyze noise and vibration results and adjust construction practices as required. • Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.

- **ESCoP 12 (Protection of Flora):** Contractor shall take all steps to protect Flora and avoid causing all types of ecological annoyances during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Vegetation clearance	Local flora is important to provide shelters for the birds, offer fruits and/or timber/fire wood, protect soil erosion and overall keep the environment very	The Contractor shall • Reduce disturbance to surrounding vegetation • Use appropriate type and minimum size of machine to avoid disturbance to adjacent vegetation. • Get approval from supervision consultant for clearance of vegetation.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	friendly to human living. As such damage to flora has wide range of adverse environmental impacts.	• Make selective and careful pruning of trees where possible to reduce need of tree removal. • Control noxious weeds by disposing of at designated dump site or burn on site. • Clear only the vegetation that needs to be cleared in accordance with the plans. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill and construction of diversion roads, etc. • Do not burn off cleared vegetation – where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. Mulch provides a seed source, can limit embankment erosion, retain soil moisture and nutrients, and encourage regrowth and protection from weeds. • Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. • Avoid work within the drip-line of trees to prevent damage to the tree roots and compacting the soil. • Minimize the length of time the ground is exposed or excavation left open by clearing and re-vegetate the area at the earliest practically possible. • Ensure excavation works occur progressively and revegetation done at the earliest • Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction • Supply appropriate fuel in the work caps to prevent fuel wood collection

- **ESCoP 13 (Protection of Fauna):** Contractor shall take all steps to protect Fauna and avoid causing all types of ecological annoyances during implementation. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The location of construction activities can result in the loss of wild life habitat and habitat quality.	The Contractor shall • Limit the construction works within the designated sites allocated to the contractors • Check the site for animals trapped in, or in danger from site works and use a qualified person to relocate the animal.
	Impact on migratory birds, its habitat and its active nests	The Contractor shall • Not be permitted to destruct active nests or eggs of migratory birds • Minimize the tree removal during the bird breeding season. If works must be continued during the bird breeding season, a nest survey will be conducted by a qualified biologist prior to commence of works to identify and located active nests • Minimize the release of oil, oil wastes or any other substances harmful to migratory birds to any waters or any areas frequented by migratory birds.
Vegetation clearance	Clearance of vegetation may impact shelter, feeding and/or breeding and/or physical destruction and severing of habitat areas	The Contractor shall • Restrict the tree removal to the minimum required. • Retain tree hollows on site, or relocate hollows, where appropriate • Leave dead trees where possible as habitat for fauna • Fell the hollow bearing trees in a manner which reduces the potential for fauna mortality. Felled trees will be inspected after felling for fauna and if identified and

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		readily accessible will be removed and relocated or rendered assistance if injured. After felling, hollow bearing trees will remain unmoved overnight to allow animals to move of their own volition.
Construction camps	Illegal poaching	The Contractor shall • Provide adequate knowledge to the workers regarding protection of flora and fauna, and relevant government regulations and punishments for illegal poaching.

- **ESCoP 14: Protection of Fisheries**

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities in River and Floodplain Water	The main potential impacts to fisheries are hydrocarbon spills and leaks from riverine transport and disposal of	The Contractor shall • Ensure the riverine transports, vessels and ships are well maintained and do not have oil leakage to contaminate river water. • Contain oil immediately on river in case of
	wastes into the river and floodplain water	accidental spillage from vessels and ships and in this regard, make an emergency oil spill containment plan to be supported with enough equipment, materials and human resources • Do not dump wastes, be it hazardous or non-hazardous into the nearby water bodies or in the river.
	The main potential impacts to aquatic flora and fauna River are increased suspended solids from earthworks erosion, sanitary discharge from work camps, and hydrocarbon spills	The Contractor shall • follow mitigation measures proposed in ECoP 3: Water Resources Management and EC4: Drainage Management
Construction activities on the land	Filling of ponds for site preparation will impact the fishes	The Contractor shall • Inspect any area of a water body containing fish that is temporarily isolated for the presence of fish, and all fish shall be captured and released unharmed in adjacent fish habitat • Install and maintain fish screens etc. on any water intake with drawing water from any water body that contains fish.

- **ESCoP 15 (Road Transport and Road Traffic Management):** Contractor shall responsible for the implementation of the road transport and road traffic management measures mentioned in the ESMP. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities	The urban infrastructure construction / rehabilitation works may traffic congestion, effect on traffic and pedestrian safety	The Contractor shall • Ensure schedule deliveries of materials/ equipment during off-peak hours; • Place traffic/ cautionary sign to avoid undue traffic congestion and accidents; • Selection of alternative routes, where possible for sub-project vehicles; • Depute flagman for traffic control; • Arrange for signal light at night; • Inform the local people about the subproject activities.
	Accidents	The Contractor shall • Prepare an emergency plan for dealing with accidents

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		causing accidental sinking of the vessels and ships • Ensure sufficient equipment and staffs available to execute the emergency plans • Provide appropriate lighting to barges and construction vessels.

- **ESCoP 16 (Construction Camp Management):** Contractor shall maintain the work camp and construction sites in clean and tidy conditions and shall ensure standard facilities. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor shall • Locate the construction camps at areas which are acceptable from environmental, cultural or social point of view. • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. • Submit to the DSM for approval a detailed layout plan for the development of the construction camp showing the relative locations of all temporary buildings and facilities that are to be constructed together with the location of site roads, fuel storage areas (for use in power supply generators), solid waste management and dumping locations, and drainage facilities, prior to the development of the construction camps. • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters
Construction Camp Facilities	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor shall provide the following facilities in the campsites: • Adequate housing for all workers • Safe and reliable water supply. Water supply from deep tube wells of 300 m depth that meets the national standards • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. Provide separate latrines and bathing places for males and females with total isolation by walls or by location. The minimum number of toilet facilities required is one toilet for every ten persons. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. Both sides of roads are to be provided with shallow v drains to drain off storm water to a silt retention pond which shall be sized to provide a minimum of 20 minutes retention of storm water flow from the whole site. Channel all discharge from the silt retention pond to natural drainage via a grassed swale at least 20 meters in length with suitable longitudinal gradient. • Paved internal roads. Ensure with grass/vegetation coverage to be made of the use of top soil that there is no dust generation from the loose/exposed sandy surface. Pave the internal roads of at least haring-bond bricks to suppress dusts and to work against possible muddy surface during monsoon. • Provide child crèches for women working construction site. The crèche shall have facilities for dormitory, kitchen, indoor and outdoor play area. Schools shall be attached to these crèches so that children are not

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		deprived of education whose mothers are construction workers • Provide in-house community/common entertainment facilities dependence of local entertainment outlets by the construction camps to be discouraged/prohibited to the extent possible.
Disposal of waste	Management of wastes is crucial to minimize impacts on the environment	The Contractor shall • Ensure proper collection and disposal of solid wastes within the construction camps • Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level. • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment/vehicles needed. • Dispose organic wastes in a designated safe place on daily basis. At the end of the day cover the organic wastes with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, are not attracted. One may dig a large hole to put organic wastes in it; take care to protect groundwater from contamination by leachate formed due to decomposition of wastes. Cover the bed of the pit with impervious layer of materials (clayey or thin concrete) to protect groundwater from contamination. • Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children to enter and play with. • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
Fuel supplies for cooking purposes	Illegal sourcing of fuel wood by construction workers will impact the natural flora and fauna	The Contractor shall • Provide fuel to the construction camps for their domestic purpose, in order to discourage them to use fuel wood or another biomass. • Made available alternative fuels like natural gas or kerosene on ration to the workforce to prevent them using biomass for cooking. • Conduct awareness campaigns to educate workers on preserving the protecting the biodiversity and wildlife of the project area, and relevant government regulations and punishments on wildlife protection.
Health and Hygiene	There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.	The Contractor shall • Provide adequate health care facilities within construction sites. • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse. • Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals. • Initial health screening of the laborers coming from outside areas • Train all construction workers in basic sanitation and health care issues and safety matters, and on the specific hazards of their work • Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis • Complement educational interventions with easy access

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		to condoms at campsites as well as voluntary counseling and testing • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during monsoon. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices
Safety	In adequate safety facilities to the construction camps may create security problems and fire hazards	The Contractor shall • Provide appropriate security personnel (police / home guard or private security guards) and enclosures to prevent unauthorized entry in to the camp area. • Maintain register to keep a track on a head count of persons present in the camp at any given time. • Encourage use of flameproof material for the construction of labor housing / site office. Also, ensure that these houses/rooms are of sound construction and capable of withstanding wind storms/cyclones. • Provide appropriate type of firefighting equipment suitable for the construction camps • Display emergency contact numbers clearly and prominently at strategic places in camps. • Communicate the roles and responsibilities of laborers in case of emergency in the monthly meetings with contractors
Site Restoration	Restoration of the construction camps to original condition requires demolition of construction camps.	The Contractor shall • Dismantle and remove from the site all facilities established within the construction camp including the perimeter fence and lockable gates at the completion of the construction work. • Dismantle camps in phases and as the work gets decreased and not wait for the entire work to be completed • Give prior notice to the laborers before demolishing their camps/units • Maintain the noise levels within the national standards during demolition activities • Different contractors shall be hired to demolish different structures to promote recycling or reuse of demolished material. • Reuse the demolition debris to a maximum extent. Dispose remaining debris at the designated waste disposal site. • Handover the construction camps with all built facilities as it is if agreement between both parties (contactor and land-owner) has been made so. • Restore the site to its condition prior to commencement of the works or to an agreed condition with the landowner. • Not make false promises to the laborers for future employment in O&M of the project.

- **ESCoP 17 (Cultural and Religious Issues):** Contractor shall take preventive measures at Cultural and Religious sites during construction period and implementation of the mitigation measures mentioned in the ESMP. The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of	The Contractor shall • Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	knowledge on cultural issues cause social disturbances.	certain construction activities causing disruptions or access restriction. • Do not block access to cultural and religious sites, wherever possible • Restrict all construction activities within the foot prints of the construction sites. • Stop construction works that produce noise (particularly during prayer time) shall there be any mosque/religious/educational institutions close to the construction sites and users make objections. • Take special care and use appropriate equipment when working next to a cultural/religious institution. • Stop work immediately and notify the site manager if, during construction, an archaeological or burial site is discovered. It is an offence to recommence work in the vicinity of the site until approval to continue is given by the DSM/PIU. Provide separate prayer facilities to the construction workers. • Show appropriate behavior with all construction workers especially women and elderly people • Allow the workers to participate in praying during construction time • Resolve cultural issues in consultation with local leaders and supervision consultants • Establish a mechanism that allows local people to raise grievances arising from the construction process. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works so as to maintain effective surveillance over public health, social and security matters

- **ESCoP 18 (Worker Health and Safety):** Contractor shall be responsible for providing personal protective equipment and first aid facilities as per requirements; contractor also shall bear medical treatment costs for any accidents. If any severe accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation- (the amount of the compensation should be fixed considering the type of accidents). The detail code of practice will be-

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g., noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc.), (ii) risk factors resulting from human behavior (e.g., STD, HIV etc.) and (iii)	The Contractor shall • Implement suitable safety standards for all workers and site visitors which shall not be less than those laid down on the international standards (e.g., International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guidelines') and contractor's own national standards or statutory regulations, in addition to complying with the national standards of the Government of Bangladesh (e.g., `The Bangladesh Labor Code, 2006') • Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas, • Provide personal protection equipment (PPE) for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	road accidents from construction traffic.	• Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations and proper performance of their job • Appoint an environment, health and safety manager to look after the health and safety of the workers • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters.
	Child and pregnant labor	The Contractor shall • not hire children of less than 14 years of age and pregnant women or women who delivered a child within 8 preceding weeks, in accordance with the Bangladesh Labor Code, 2006
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	• Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations shall be easily accessible throughout the place of work • Document and report occupational accidents, diseases, and incidents. • Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice. • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures. • Provide awareness to the construction drivers to strictly follow the driving rules • Provide adequate lighting in the construction area and along the roads
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	• The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECoP 17 Construction Camp Management • Adequate ventilation facilities • Safe and reliable water supply. Water supply from deep tube wells that meets the national standards • Hygienic sanitary facilities and sewerage system. The toilets and domestic waste water will be collected through a common sewerage. • Treatment facilities for sewerage of toilet and domestic wastes • Storm water drainage facilities. • Recreational and social facilities • Safe storage facilities for petroleum and other chemicals in accordance with ECoP 2 • Solid waste collection and disposal system in accordance with ECP1. • Arrangement for trainings • Paved internal roads. • Security fence at least 2 m height. • Sick bay and first aid facilities
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	• The contractor shall provide portable toilets at the construction sites, if about 25 people are working the whole day for a month. Location of portable facilities shall be at least 6 m away from storm drain system and surface waters. These portable toilets shall be cleaned once a day and all the sewerage shall be pumped from the collection tank once a day and shall be brought to the common septic tank for further treatment.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Contractor shall provide bottled drinking water facilities to the construction workers at all the construction sites.
Other ECoPs	Potential risks on health and hygiene of construction workers and general public	The Contractor shall follow the following ECPs to reduce health risks to the construction workers and nearby community • ECoP 2: Fuels and Hazardous Goods Management • ECoP 4: Drainage Management • ECoP 10: Air Quality Management • ECoP 11: Noise and Vibration Management • ECoP 15: Road Transport and Road Traffic Management • ECoP 16: River Transport management
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor shall • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI) HIV/AIDS. • Train all construction workers in general health and safety matters, and on the specific hazards of their work Training shall consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. • Commence the malaria, HIV/AIDS and STI education campaign before the start of the construction phase and complement it with by a strong condom marketing, increased access to condoms in the area as well as to voluntary counseling and testing. • Implement malaria, HIV/AIDS and STI education campaign targeting all workers hired, international and national, female and male, skilled, semi- and unskilled occupations, at the time of recruitment and thereafter pursued throughout the construction phase on ongoing and regular basis. This shall be complemented by easy access to condoms at the workplace as well as to voluntary counseling and testing.

Appendix - IV: Environmental and Social Monitoring Checklist

An Environmental and Social Monitoring Checklist is far more than a mere formality; it is a dynamic and essential instrument for ensuring accountability and sustainability in World Bank-funded initiatives. Rooted in the Bank's comprehensive Environmental and Social Framework (ESF), this checklist provides a systematic, granular approach to verifying that projects not only meet regulatory compliance but also uphold the highest standards of environmental stewardship and social responsibility. It meticulously covers critical areas such as air quality management—assessing dust suppression, vehicle emissions, and odor control—and noise and vibration mitigation, particularly crucial in proximity to sensitive receptors like residential areas. Water resource management is thoroughly scrutinized, evaluating discharge quality, abstraction rates, and pollution prevention strategies to protect both surface and groundwater. Waste management protocols, encompassing segregation, safe disposal of hazardous materials, and wastewater treatment, are also rigorously monitored.

Beyond environmental parameters, the checklist delves deep into social safeguards. It ensures the equitable treatment of labor, strictly prohibiting child and forced labor, and verifying adherence to fair wages and working hours. Occupational Health and Safety (OHS)

measures are paramount, with checks on PPE provision, safety training, accident reporting, and adequate sanitation for workers. Community health and safety are equally vital, with scrutiny of public access controls, traffic management plans, and emergency preparedness. Furthermore, the checklist is instrumental in monitoring the delicate processes of land acquisition and resettlement, ensuring timely and fair compensation, livelihood restoration, and effective grievance redress mechanisms for affected persons. Protection of cultural heritage, stakeholder engagement, and the specific needs of vulnerable groups, including gender-based violence (GBV) prevention, are also integral components. Ultimately, this detailed monitoring framework serves as a proactive mechanism to identify potential issues, trigger timely corrective actions, and foster transparent communication, thereby safeguarding both environmental integrity and human well-being throughout the project lifecycle.

Local Government Engineering Department

Resilient Urban and Territorial Development Project (RUTDP)

Environmental and Social Compliance Monitoring Form

Subproject Name	i. Improvement of RCC road and drain from Chiringa Baitush Road to Bashghat road at (Ch. 0+000m to 0+560m); ii. Improvement of RCC Road from South Karia Ghona PIO culvert to Showdagar Ghona Alauddin Road at (Ch. 0+000m to 1+550m) iii. Improvement of RCC Road and drain from Batakhali Namar jailepara road to Torojghat station via Leader Haider Ali house road at (Ch. 0+000m to 0+770m) iv. Improvement of RCC Road from Moddachakaria Govt. Primari school to Kadinga Pukur road (Ch. 0+000m to 0+600 m.)
Package No.	RUTDP/CHO/2024-25/W-01
Pourashava Name	Chakaria Pourashava
Approved Estimated Cost in BDT	
Contract Amount in BDT	
Contractor Name	
Date of Commencement	
Target Date of Completion	
Physical Progress (%)	
Financial Progress (%)	
Person Responsible (PIU) (Name, Designation &Phone) for the Overall Subproject Management	
Person Responsible (DSM) (Name, Designation &Phone) for the Overall Subproject Management	
Form Completed by (Name, Designation &Phone)	
Overall Environmental Description of the Subproject	

Part B: Design, Preparation, and Legal Requirements

Environmental and Social Concerns (PMU, PIU & DSM) (Name, Designation & Phone)	PMU-	
	PIU-	
	DSM-	
Subproject Category	DoE-BD-	WB-
Environmental Clearance Received?	Yes	No
ESA Required?	Yes	No
ESA Prepared and Delivered?	Yes	No
ESMP Prepared & Delivered Separately?	Yes	No
Items and Cost of ESMP Implementation Included in the Contract?	Yes	No
ESMP Included in the Procurement Documents?	Yes	No
Inspection Schedule/Last Inspection/Monitoring by PMU Safeguard (Environmental and Social) Concerns	Date-	
	Key findings-	
Inspection Schedule/Last Inspection/Monitoring by PIU Safeguard (Environmental and Social) Concerns	Date-	
	Key findings-	
Inspection Schedule/Last Inspection/Monitoring by DSM Safeguard (Environmental and Social) Specialist/Jr. Safeguard (Environmental and Social) Specialist	Date-	
	Key findings-	

Part C: Key Environmental and Social Impacts

The Subproject Results in any of the following Impacts?	Yes	No	N/A	If yes, is the impact (give observation)		
				Significant	Moderate	Minor
Felling of the trees						
Clearing of the vegetation that increase the risk of increased soil degradation or erosion						
Disturbance of the terrestrial and or aquatic specifies						
Noise pollution						
Air pollution						
Adverse effects on the quantity or quality of the surface water or groundwater						
Production or increase the production of the solid waste						
Drainage congestion						
Water logging that increases the risk of the water related diseases						
Traffic congestion						
Public safety						

Part D: Work Place Environment, Social Safety net and Gender Equity

The Subproject Results in any of the following Impacts?	Yes	No	N/A	Observations
Does the contractor pay to the workers regularly?				
Is there any discrepancy between the male and female workers regarding the wages or salary for the same works?				
Is the contractor complying with the GOB labor law concerning the hiring of the workers?				
Does the contractor engage women labors and does the project have suitable works for them?				
Does the contractor engage child labor (less than 18 years) and aged people (more than 65 years old)?				
Does the contractor force to the workers for the completion of the works?				
Do the workers involve with the political activities, crime, drugs addiction and other forms of unwanted activities?				
Are construction camps adequately equipped with water supply, sanitary toilets, washing facilities and facilities for waste collection and storage?				
Has separate sanitation facilities been provided for women at work camps and the construction site? Do the laborers load heavy items on their heads or shoulders?				
Has the contractor undertaken an awareness program for the sexually transmitted diseases especially for HIV-AIDS and other infectious diseases like TB?				

The Subproject Results in any of the following Impacts?	Yes	No	N/A	Observations
Are first aid kits readily available for the workers at the job site along with the instructions for use?				
Are supervisors or other site personnel trained in the basic first aid emergency response measures?				
Has the contractor provided necessary safety equipment to the workers and training for use?				

Part E: Potential Impacts, Mitigation Measures, and Monitoring Indicator Mentioned in the ESMP

Activity/ Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Monitoring Method	Monitoring Frequency	Implementation Status (Yes/ No / NA)	Impact significance if not implemented				Remarks
						Major	Moderate	Minor	No	
Construction and operation of labor shed for the workers (Workforce and labor shed management)	Generation of sewage and solid waste may degrade quality of the adjacent water bodies and surrounding environment	• Construction of sanitary latrine considering 15 persons for one toilet at the labor shed and separate toilet for male and female; • Erection of "no litter" sign, provision of waste bins (introduce separate waste bins for organic and inorganic wastes); • Ensure wastes (solid wastes and other forms of the wastes) disposal at Boniar Chora area dumping station.								
	Health of workers	• Conduct formal and unofficial discussion to increase awareness about hygiene practices among the workers; • Ensure availability and access to first-aid equipment and medical supplies for the workers.								
	Possible development of labor camp into permanent settlement	• Contractor to remove labor camp at the completion of contract.								
	Outside labor force causing negative impact on health and social well-being of local people	• Ensure that contractor employ local work force to provide work opportunity to the local people and conduct formal and unofficial awareness program for the health and social well-being of the local people.								
General construction works	Drainage congestion and flooding	• Ensure provision for adequate drainage of storm water if needed; • Ensure provision for pumping of congested water if needed; • Ensure adequate monitoring of drainage effects, especially if construction works are carried out during the wet season.								

Activity/ Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Monitoring Method	Monitoring Frequency	Implementation Status (Yes/ No / NA)	Impact significance if not implemented				Remarks
						Major	Moderate	Minor	No	
	Air pollution	• Check regularly and ensure that all the subproject vehicles are in good operating condition; • Ensure contractor spray water on dry surfaces regularly to reduce dust generation; • Maintain adequate moisture content of the soil and sand used for transportation, bed preparation, compaction and backfilling; • Ensure contractor sprinkle and cover stockpiles of loose materials (e.g., fine aggregates); • Ensure contractor avoid use of equipment at site and far from the local residents, which produce significant amount of particulate matter.								
	Traffic congestion, effect on traffic and pedestrian safety	• Ensure schedule deliveries of materials/ equipment during off-peak hours; • Place traffic/ cautionary sign to avoid undue traffic congestion and accidents; • Inform the local people about the subproject activities.								
	Noise pollution	• In front of the road side sensitive infrastructures i.e., religious centers, construction work should be performed considering the prayer time; • Check and maintenance the equipment properly; • Avoid using of construction equipment producing excessive noise at night; • Regulate use of horns and avoid undue use of hydraulic horns in subproject vehicles.								
	Water and soil pollution	• Prevent discharge of fuel, lubricants, chemicals and wastes into adjacent water bodies like ponds, ditches and Khal through existing drain.								
	Accidents	• Conduct formal and informal discussion for creating awareness about the accidents; • Provide PPEs and ensure using of the personal protective equipment by the workers.								

Activity/ Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Monitoring Method	Monitoring Frequency	Implementation Status (Yes/ No / NA)	Impact significance if not implemented				Remarks
						Major	Moderate	Minor	No	
	Felling of trees, clearing of vegetation and ecological disturbances	• 200 nos. of trees will be planted to compensate the felled down trees and enhanced the environmental sustainability of the surrounding area, preferably local fruits, timber, medicinal and ornamental trees at both sides or one side of the proposed roads with link roads where space is available and any other Pourashava owned suitable places in and around the subproject influence area where space is available								
	Spills and leaks of oil, toxic chemicals	• Proper handling of lubricating oil and fuel so that it does not fall on the soil and water body; • Collection, proper treatment, and disposal of the spills.								
All construction works	Beneficial impact on employment generation	• Employ local people in the subproject activities as much as possible; • Give priority to poor people living within subproject area in subproject related works (e.g., excavation and other works, which do not require skilled manpower).								
	Possible complaints and suggestion from the local people and stakeholder about the subproject activities	• Use existing grievance registrar and complaints box that has been already delivered in the Pourashava								
	General degradation of the environment	• Ensure environmental enhancement measures such as tree plantation and traffic/cautionary sign will be provided								
For RCC Road and drain										

Activity/ Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Monitoring Method	Monitoring Frequency	Implementation Status (Yes/ No / NA)	Impact significance if not implemented				Remarks
						Major	Moderate	Minor	No	
Dismantle work / Excavation / Earth work	Generation of solid and construction wastes due to the dismantle works; Generation of loose soil, debris and sediments/ clay soil due to the earth excavation work.	• Cover exposed earth works with much fabric; • Ensure wastes (solid wastes and other forms of the wastes) disposal at Boniar Chora area dumping station								
	Possible damage of road side infrastructure due to earth excavation for drain construction	• Ensure drum sheet palisading work for shallow depth to stabilize the structure; • Ensure plunk palisading work for shallow depth to stabilize the structure; • Bolly drive for deep depth construction works.								
	Accidents	• Carefully handle of the hydraulic excavator.								
	Air pollution	• Regular maintenance of the equipment.								
Sand filling for road & Back filling work for drain	Air and dust pollution affecting nearby settlements	• Maintain adequate moisture content of soil during transportation, compaction and handling; • Carry the materials especially loose soil and sand with adequate cover.								
Cutting and welding of the reinforcement	Noise pollution due to rod cutter and welding machine if any	• Avoid using of rod cutter and wielding machine at night; • Avoid prolonged exposure to noise (produced by equipment) by workers.								
	Potential health and safety risks from rod cutter and welding machine if any	• Ensure use of the personal protective equipment's (helmet, goggles, gloves, safety boot); • Availability and access to first-aid equipment and medical supplies in case of any accidents.								

Activity/ Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Monitoring Method	Monitoring Frequency	Implementation Status (Yes/ No / NA)	Impact significance if not implemented				Remarks
						Major	Moderate	Minor	No	
RCC (reinforcement concrete) work	Air pollution due to black smoke emission from concrete mixer machine and vibrator machine	• Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission.								
	Noise nuisance from concrete mixer machine and vibrator machine	• Avoid operation of the concrete mixer and vibrator machine at night; • RCC work should be avoided at schooling and prayer time; • Inform local people about casting work and potential impacts.								

Prepared by- **Signature-** **Date-**

Copies to 1. PIU
2. SME
3. AME

Appendix - V: Participant List

Resilient Urban and Territorial Development Project (RUTDP)

Local Government Engineering Department (LGED)

Public Consultation and list of Participants

Name of Pourashava: Chakaria District: Cox's Bazar

Location: Chiringa Ward No: 08

Date: 17.05.25 Time: 10, 45 am

SL	Name	Mobile Number	Occupation	Signature
1.	Abu Salam	...0707 97	Business	
2	Zahedul Islam	...	"	
3	Liton Shikder	...	"	
4	Kutub Uddin	...	service	
5	md. Redwan	35	"	
6	Tawhidul Islam	...	Agri	
7	Zulfiker Ali	—	"	
8.	Nurul Islam	—	"	
9	Khairul	—	"	
10	Bahadur	...	service	
11	Mosium bibi	—	H, wife	