Initial Environmental Examination

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Bangladesh: Coastal Towns Climate Resilience Project – Construction and Improvement of Drains in Patuakhali Pourashava

Prepared by the Local Government Engineering Department of the Government of Bangladesh for the Asian Development Bank.

CURRENCY EQUIVALENTS
(as of 15 August 2022)

Currency Unit	=	Bangladesh Taka (BDT)
BDT1.00	=	$0.011
$1.00	=	BDT 93.243

ABBREVIATIONS

ADB	Asian Development Bank
DOE	Department of Environment
EA	executing agency
EIA	environmental impact assessment
ECA	Environmental Conservation Act
ECR	Environmental Conservation Rules
ECC	environmental clearance certificate
EMP	environmental management plan
GOB	Government of Bangladesh
GRC	grievance redress committee
GRM	grievance redress mechanism
IEE	initial environmental examination
MOEFCC	Ministry of Environment and Forests, and Climate Change
NGO	nongovernment organization
O&M	operation and maintenance
ROW	right-of-way
SPS	safeguard policy statement
WHO	World Health Organization

WEIGHTS AND MEASURES

ha	–	hectare
km	–	kilometer
m	–	meter
mg/l	–	milligram per liter
MLD	–	million liters per day
mm	–	millimeter
km/h	–	kilometer per hour

NOTE

In this report, "$" refers to United States dollars.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXECUTIVE SUMMARY

Bangladesh is one of the most vulnerable countries in the world with high exposure to a multitude of climate-related hazards. The natural hazards interact with physical and socioeconomic factors, including its low-lying delta and coastal areas, high population density, poverty levels, and lack of resilient infrastructure, resulting in high disaster risk with widespread impacts on both rural and expanding urban areas. The coastal towns are the most vulnerable to increasing climate risks.

Proposed Coastal Towns Climate Resilience Project (CTCRP). The ADB supported the Coastal Towns Climate Resilience Project (CTCRP) which will strengthen climate resilience and disaster preparedness in 22 (twenty-two) vulnerable coastal pourashavas (project towns) of Bangladesh. The towns were selected based on their vulnerability, population size, density, and level of past investments. The project takes a holistic and integrated approach to urban development and will (i) provide climate-resilient municipal infrastructure, and (ii) strengthen institutional capacity, local governance, and knowledge-based public awareness, for improved urban planning and service delivery considering climate change and disaster risks. Investments will benefit the poor and women. Municipal infrastructure will include (i) elderly (older persons), women, children, and persons with disabilities (EWCD) friendly cyclone shelters constructed with early warning system; (ii) roads including emergency access roads and roads with stormwater drainages, footpath, bridges and culverts rehabilitated, or constructed for improved connectivity, and access to emergency services in the event of disasters triggered by natural hazard, including footpath, drains bridges and culverts which are critical for accessing emergency services; (iii) climate-resilient infrastructure for improved urban flood risk management including stormwater drains, nature-based solutions, water bodies restoration, and integrated waste management (IWM) developed; (iv) gender-responsive and socially inclusive urban public spaces improved; ; and (v) slum improvement programs for basic service improvement implemented in each pourashava following poverty reduction action plan and (vi) EWCD-friendly sanitation facilities constructed for poor households. Slum improvement models currently being implemented in ADB projects, such as the Third Urban Governance and Infrastructure Improvement Project, will be replicated with necessary improvements.[1] Output 1 will also support development of EWCD-friendly socio-economic infrastructures including (i) development of gender responsive markets; (ii) bus terminals; and (iii) other priority roads, bridges, culverts, and boat landing stations.

The project will cover and prioritize the following 22 towns as beneficiaries: Bagerhat, Patuakhali, Morelganj, Mehendiganj, Paikgacha, Kolaroya, Patharghata, Goaranadi, Charfashion, Borhanuddin, Betagi, Jhalokathi, Muladi, Chalna (Dacope), Banaripara, Bedorganj, Shorupkathi, Lalmohon, Nolchiti, Jajira, Kuakata and Bakerganj. The Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) acting through its Local Government Engineering Department (LGED) will be the Executing Agency. Pourashavas are the implementing agencies of the project.

Subproject and Scope. The Construction/Improvement of Drains in Patuakhali Pourashava subproject involves the rehabilitation of 40 existing drainage sections with total length of 12.93 km in seven wards (1, 4 ,5, 6, 7, 8 and 9) of the Pourashava. The subproject activities will involve rehabilitation of these drainages through dredging and other climate proofing protection and stabilization works. Specifically, the works will include the following: (i) excavation of the drainage beds/foundation trenches, (iii) filling the prepared drainage foundation bed with sand; (iv) reinforced cement concrete (RCC) work in foundation/blinding layer of hydraulic structures; and (v) supplying, fitting and fixing in position galvanized drainage

[1] ADB. 2014. *Third Urban Governance and Infrastructure Improvement Project*. Manila.

spouts for bridge decks. The alignments with covered and open drains will be determined during the detailed design and will be included in the updating of this IEE.

Categorization. The proposed subproject is classified as Environmental Category “B” per the ADB SPS as no significant impacts are envisioned and accordingly this Initial Environmental Examination (IEE) has been prepared. This IEE is assessing the environmental impacts and providing mitigation and monitoring measures to ensure that there are no significant impacts because of the proposed subproject implementation.

Description of the Environment. Patuakhali Pourashava has been the study area for this IEE. Available baseline data from various secondary sources were used in the assessment, while other data are to be collected or gathered during the detailed design phase. A summary of baseline conditions is in the following table.

Parameters	**Description**
Topography and Geology	The Pourashava area is located on the southern part of Bengal Basin making a part of Barishal Gravity High. The sedimentary layers are mostly horizontal to sub-horizontal and are free from major tectonic deformation in the fore deep area covering the central part of the basin and this is expressed as river to delta plain topography of the land. From topographic analysis using the Digital Elevation Model concept it has been found that the Reduced Levels inside the region are low, varying from 0.96 to2.23 m, PWD (a surface which is 0.46 m below the Mean Sea Level), with average elevations of around +1.60 m, PWD. The ground level of the entire region is higher than the low tidal water levels observed in Mirjaganj (Payra River).
Climate and meteorology	The annual average rainfall is 1947 mm. The average monthly rainfall variation at Patuakhali BMD station (from 1973 to 2014) shows that the highest and lowest values of rainfall are observed during the months of July (610 mm) and December (7.6 mm) respectively. The average maximum temperature values range from around 29°C (January) to around 36°C (April). Significant fluctuations in average minimum temperatures have been found, which varies from 10.3°C (January) to 24°C (August). Patuakhali has a tropical wet and dry climate. Annual average temperature varies from maximum 24.2°C to minimum 12.0°C. Wind speed in Patuakhali is highest in April (around 167 kph) and the lowest in December (around 49.7 kph).
Hydrology	The Laukathi River is a tidal one with a reported tidal variation of about 2.3m. The normal direction of flow is from east to west. Its northern bank has mild slope. The southern bank is a vast flat char which is frequently flooded during high tide. During low tide, the depth of the river is not so much, with main flow passing close to the northern bank. Not much scientific literature is available on hydrology of this area.
Drainage and Flood Control	Drainage plays a vital role in the management of soil (salinity, soil health) in the polder area. The drainage characteristics have been divided into six classes (excessively drained, well drained, moderately well drained, imperfectly drained, poorly drained and very poorly drained) from the agriculture point of view. Total area of the net cultivable area is under poorly drained condition i.e., land that normally is flooded between

Parameters	Description
	depths of 0 to 90 cm continuously for more than two weeks to few months during the flood season. Timely drainage of water in rainy/monsoon season is the main constraint for growing rabi/dry land crops in the polder area.
Ambient air quality	While there are no available data on ambient air quality in the area, it is perceived that quality is within the standards. There are no undue air emission sources in the area except for limited vehicular emissions from inter-Pourashava traffic which are occasional and limited to a 3-4-meter width on both sides of the market bound roads.
Ambient Noise	Level The enroute area is peri-urban to urban within the location of the proposed works. The noise levels in the Pourashava are similar to that of any small urban area. In the respective locations of the works, noise is due to vehicles, machinery and other related activities, and is normally in the range of 55 to 75 dB(A). No primary survey data of ambient noise is available at the project site. Secondary data indicate that noise level is within the standard.
Groundwater and Surface Water	Quality Ground water quality in the Patuakhali area is influenced by salinity and iron. Water in most shallow aquifer is somewhere arsenic/salinity and all are contaminated with iron, not suitable for drinking purposes. Water collects from river and ponds for irrigation purposes. The lower deep aquifer is found at a depth of 80 m to 100 m. Deep aquifers with fresh water in the Pourashava are exploited to meet the demand of water for inhabitants but that is small. In Patuakhali Pourashava, there are 1 river, 6 canals, 609 ponds and 89 ditches as the sources of surface water. Surface water pollution is originating from the use of insecticide and chemical fertilizers in crop fields. Wash out by rainwater from crop fields to nearest water sources with chemicals is causing water pollution. Cattle bathing and flow of wastewater from domestic use discharge into the ponds, khals and river have also been identified as reasons for surface water contamination. There is no water quality data available for Patuakhali yet.
Natural hazards	Subproject area is in the coastal region fronting the Bay of Bengal in the south. Similar to most areas of Bangladesh, the subproject location has long been exposed to various climatological (e.g., drought), hydrometeorological (e.g., cyclones, storm surge, flood), and other geophysical (e.g., landslides and erosion) hazards. Being in the coastal area makes it susceptible to cyclones and storm surges, floods, medium to high levels of soil salinity, and sea level rise.
Socio-economic conditions	In 2011, the population of the Pourashava was 49,073; the population density is 3,088 persons per km2. Patuakhali Pourashava has been experiencing lower annual average population growth than the national average urban population growth over a long period in the past (1981-2011). The annual population growth rate varies significantly between various inter-census periods. The Pourashava has experienced 1.73 percent annual average population growth rate during the period of 1981-1991, which is higher than other inter-census

Parameters	Description
	periods over a 30-year period between 1981 and 2011. In the region, employed population is engaged in different occupations. According to records, 88% of the populations are engaged in agriculture sector. Here agricultural sector includes farmer, agricultural labor, fishers, day labors, etc. About 5%population is engaged in salaried service sector. It includes population who are employed in the government and private sector.
Land use	Statistics show that there are 70% small landholders, 23% medium landholders and only 6% large landholders. In the study area, arable land is mainly used for crop production. Generally, small and medium landholders cultivate variety of crops in these lands.
Physical cultural resources	The common property resources and/or community facilities in the area are different social amenities e.g. mosques, graveyards, temples, cremation grounds, playgrounds, open water bodies and Eidgahs (place for offering Eid prayers). The local people use these for the purposes of religious, social and cultural gathering. Besides these, the BWDB embankment is also very commonly used for different livelihood purposes i.e. living or takes shelter by the local inhabitants.

The Integrated Biodiversity Assessment Tool (IBAT) was used to determine the presence of protected or key biodiversity areas, and endangered biodiversity species around the subproject site (default area of analysis of 50 km radius). Screening results show that there is no ecologically sensitive area within at least 10-km radius of the subproject location. Seventy-one (71) IUCN Red List species of concern are identified within the 50-km radius default area of analysis. The subproject site is within a developed township area (Patuakhali Pourashava/Town) and surrounded by agricultural lands actively cultivated, communities and other urban infrastructures such as highways; hence the probability of these species being found at the site is very low. This is also confirmed in the IUCN Wildlife Distribution Map for Bangladesh and the Bangladesh Forest Department's map of protected areas.

Assessment of Potential Environmental Impacts and Mitigation Measures. Potential negative environmental impacts during the pre-construction, construction, and operation phases of the subproject were identified. The drainage will involve straightforward construction and is unlikely to cause significant adverse impact. Usual construction-related impacts such as noise, dust generation, vegetation clearing/tree felling, silt generation, soil and water contamination from chemicals spills and leaks, construction waste generation, and occupational and community health and safety risks including the spread of COVID-19, among others, will be localized, temporary and avoidable with the implementation of mitigation measures in the EMP. Design measures for climate change risks such as flooding are also incorporated in the EMP. Management including proper disposal of dredged materials from canals is included in the EMP. Detailed design will ensure that private and common properties, and local physical cultural resources will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. All works will be confined in existing drain alignments, and within existing rights-of-way (ROWs). These are all general impacts of construction in urban areas, and there are well-developed methods of mitigation that are suggested in the Environmental Management Plan (EMP).

Environmental Management Plan. An environmental management plan (EMP) has been developed and included as part of this IEE, which outlines the following: (i) mitigation

measures for environmental impacts during implementation; and (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting. In accordance with this EMP, the Contractor will be required to prepare a site-specific environmental management plan (SEMP). Contractor will submit its SEMP for approval to the project implementation unit (PIU) or divisional/regional office.

The EMP and SEMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. Copies of the EMP and SEMP shall be kept on-site during the construction phase. The Contractor will be responsible for the organization, direction, and execution of environmental management related activities during construction of the proposed subproject. The Contractor will also undertake all activities in accordance with the relevant environmental requirements, including consent documentation and other regulatory and/or statutory and contractual requirements.

Implementation Arrangement. The Ministry of Local Government, Rural Development and Cooperatives through the Local Government Engineering Department (LGED) will be the executing agency. The Pourashavas that will be the recipients of the project are the implementing agencies. LGED will establish a project management unit (PMU) comprising officials including an Environmental Safeguard Officer/Focal Person who is a permanent employee of LGED. The PMU will be strengthened by a project management and supervision consultant (PMSC) team composed of external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. Regional PMUs and project implementation units (PIUs) will be established at the Divisional Level and Pourashava Levels, respectively. For the subproject, Patuakhali Pourashava will serve as the PIU. The PMU, Divisional/Regional Office for Barishal Division and PIU will have responsibility for overseeing subproject management, including overseeing EMP implementation. The PMU will also have the responsibility for obtaining environmental clearance of the subproject (or the overall CTCRP) from the Department of Environment.

The Contractor will be required to (i) obtain all other statutory clearances prior to commencement of civil works; (ii) establish an operational system for managing environmental impacts; (iii) prepare a SEMP based on the EMP of this IEE, and submit to PIU or Divisional/Regional Office for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved SEMP; and (v) implement any corrective or preventative actions set out in safeguards monitoring reports that the PMU will prepare from time to time to monitor implementation of this IEE, EMP, and SEMP. The Contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

Grievance Redress Mechanism. The subproject will adopt the common grievance redress mechanism (GRM) of the overall CTCRP, which will be set up to register grievances of the people regarding technical, social and environmental aspects. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the subproject, as well as readily accessible to all segments of the affected people. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. Procedurally, every grievance or complaint will be resolved at the first tier or Pourashava level. Any unresolved grievances at the first level will be automatically elevated to second-tier or at the Divisional/Regional Office level (or at the Division level) for resolution. Then any

unresolved grievances at the second level will be automatically elevated to the third-tier or PMU level for final resolution. The GRM, notwithstanding, an aggrieved person or complainant shall have access to the country's legal system at any stage. This can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

Information Disclosure and Consultation. The subproject has undertaken meaningful consultations[2] during the project preparatory stage. As part of the process, they were also provided with relevant and sufficient information on the project. Their views were incorporated into the IEE and in the planning and development of the subproject. The IEE and/or the executive summary will be translated in the local language (Bangla) understandable to affected people and other stakeholders and then made available in an accessible place (e.g. community bulletin boards, offices of PMU, Divisional/Regional Office, PIU and Contractor, including any satellite office of Contractor at the subproject site) and will be disclosed to a wider audience via the ADB and project websites. Disclosure will be made locally prior to scheduled consultation/s in order to provide stakeholders time to read and consult with expert/s if needed. The consultation process will be continued and expanded during project implementation, including design period, to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation.[3]

Monitoring and Reporting. PMU, with support from PMSC, will be responsible for monitoring the project implementation and compliance with EMP requirements. The Contractor will submit monthly reports to the PIU/Divisional/Regional Office with jurisdiction over the subproject. The PIU/Divisional/Regional Office will submit quarterly environmental monitoring reports to PMU. The PMU shall consolidate quarterly reports from the PIUs/Divisional/Regional Offices and prepare semi-annual environmental monitoring report (SEMRs) which shall be submitted to ADB. PMU and ADB will post the cleared SEMRs on the project website and ADB website, respectively. ADB will monitor the project on an ongoing basis until project completion.

Conclusion and Recommendations. The Construction/Improvement of Drains in Patuakhali Pourashava will result in significant environmental and socio-economic benefits because of improved drainage facilities. The subproject is unlikely to cause significant adverse impacts to environment and people, and potential negative environmental impacts associated with construction can be mitigated to standard levels without difficulty through proper engineering practice, and the incorporation or application of recommended mitigation measures and procedures in the EMP and SEMP. Consequently, the potential adverse impacts that are associated with the operation of the roads and roadside drains can be mitigated upfront through incorporation of environmental requirements in the detailed engineering design, including climate change adaptation measures.

This IEE has been prepared in accordance with ADB SPS's requirements for projects classified as Category B for the environment. No further special study or detailed environmental assessment needs to be undertaken to comply with ADB SPS. However, per Environmental Conservation Rules of Bangladesh (ECR, 1997), the subproject is categorized as "Orange-B" category. Hence, preparation of an initial environmental examination (IEE) and

[2] Per ADB SPS, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle; (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

[3] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4."

environmental management plan (EMP) is mandatory. Approval of the IEE and EMP and issuance of the Environmental Clearance Certificate (ECC) must be obtained from the DOE prior to award of civil works contracts.

This IEE has been prepared based on preliminary designs of the subproject, and shall be updated by PMU, with support from PMSC, based on final detailed design and submit to ADB for review, clearance, and disclosure. No work can commence until the final IEE is cleared by ADB and provided to the Contractor, and the SEMP is approved by the PIU or Divisional/Regional Office.

I. INTRODUCTION

A. Background

1. The ADB supported the Coastal Towns Climate Resilience Project (CTCRP) which will strengthen climate resilience and disaster preparedness in 22 (twenty-two) vulnerable coastal pourashavas (project towns) of Bangladesh. The towns were selected based on their vulnerability, population size, density, and level of past investments. The project takes a holistic and integrated approach to urban development and will (i) provide climate-resilient municipal infrastructure, and (ii) strengthen institutional capacity, local governance, and knowledge-based public awareness, for improved urban planning and service delivery considering climate change and disaster risks. Investments will benefit the poor and women. Municipal infrastructure will include (i) elderly (older persons), women, children, and persons with disabilities (EWCD) friendly cyclone shelters constructed with early warning system; (ii) roads including emergency access roads and roads with stormwater drainages, footpath, bridges and culverts rehabilitated, or constructed for improved connectivity, and access to emergency services in the event of disasters triggered by natural hazard, including footpath, drains bridges and culverts which are critical for accessing emergency services; (iii) climate-resilient infrastructure for improved urban flood risk management including stormwater drains, nature-based solutions, water bodies restoration, and integrated waste management (IWM) developed; (iv) gender-responsive and socially inclusive urban public spaces improved; and (v) slum improvement programs for basic service improvement implemented in each pourashava following poverty reduction action plan and (vi) EWCD-friendly sanitation facilities constructed for poor households. Slum improvement models currently being implemented in ADB projects, such as the Third Urban Governance and Infrastructure Improvement Project, will be replicated with necessary improvements.[4] The Ministry of Local Government, Rural Development and Cooperatives (MLGRDC) acting through its Local Government Engineering Department (LGED) will be the Executing Agency. Pourashavas are the implementing agencies of the project.

2. Coastal towns are particularly at risk from the impacts of climate change due to high levels of poverty and limited capacity of pourashavas (urban local governments) to invest in resilience. The pourashavas lack resilient infrastructure, clubbed with haphazard urbanization, lack of stormwater drains, poor solid waste management system further worsens the condition of these towns. Most of the coastal towns are situated on the riverbanks of low-lying tidal zones at an average elevation of 1.0–1.5 meters (m) from the sea level[5] and coastal flooding is a key hazard faced by these towns. Inadequate basic municipal infrastructure to respond to increasing climate risk threatens both quality of life and the economic growth of coastal towns. This calls for an integrated approach for coastal town development that promotes risk-informed planning and investment for building resilience.

B. Coastal Towns Climate Resilience Project

3. The project will be aligned with the following impacts: higher and sustainable growth trajectories achieved in the face of the various weather-related natural hazards and risks, and improved livability of coastal towns.[6] The outcome of the project will be climate and disaster resilience of coastal towns strengthened including benefiting the poor and women. The project directly supports achieving project outcomes through three outputs.

4. **Output 1: Municipal infrastructure for resilience improved.** Municipal infrastructure will include (i) 25 elderly, women, children, and persons with disability friendly cyclone shelters

[4] ADB. 2014. *Third Urban Governance and Infrastructure Improvement Project*. Manila.

[5] Sowmen Rahman and Mohammed Ataur Rahman. Climate Extremes and Challenges to Infrastructure Development in Coastal Cities in Bangladesh. Volume 7, March 2015, Pages 96–108

[6] Government of Bangladesh, General Economics Division, Bangladesh Planning Commission Ministry of Planning. 2020. Making Vision 2041 a Reality – Perspective Plan of Bangladesh, 2021–2041. Dhaka.

with early warning system; (ii) 247.7 kms roads with drainage, bridges, and culverts rehabilitated or constructed for improved connectivity and access to emergency services in the event of disasters caused by natural hazards including access to cyclone shelter; (iii) climate-resilient infrastructure including 201.0 stormwater drainages, at least 3 nature-based solutions, water bodies restoration, and 4 integrated waste management (IWM) developed rehabilitated or constructed for improved urban flood risk management including; (iv) gender-responsive and socially inclusive urban public spaces improved; (vi) slum improvement program implemented; and (vi) EWCD-friendly sanitation facilities constructed for poor households. Output 1 will also support development of EWCD-friendly socio-economic infrastructures including (i) local markets; (ii) bus terminals; and (iii) other priority roads, bridges, culverts, and boat landing stations.

5. **Output 2: Resilient livelihood improved.** Output 2 includes: (i) climate vulnerable households covered in the graduation program in six project towns; (ii) women, including person with disabilities, reported increased skills for resilient livelihood; and (iii) inventory of productive assets of vulnerable households documented and insured. The Graduation Approach and Program will be adopted to ensure livelihood resilience.[7]

6. **Output 3: Institutional capacity, governance, and climate-awareness strengthened.** Output 3 includes: (i) risk-informed urban development plans and poverty reduction action plans of project towns submitted to *pourashavas* council; (ii) staff of LGED and pourashavas including 90% eligible women staff reported increased knowledge on climate and disaster risk assessment to inform the urban development plans and to enforce development control regulations linked with natural hazards; (iii) knowledge and capacity of LGED and *pourashavas'* staff including 90% of women staff on nature-based solutions and green solution application developed;[6] (iv) disaster management committee on disaster preparedness measures, cyclone shelter management committees, and standing committees on women and children affairs, poverty reduction and slum improvement in project *pourashavas* operationalized for improving municipal governance and sustainable service delivery;[7] (v) revenues enhancement plan adopted by each project *pourashava* to improve municipal finance systems; (vi) computerized tax records and billing systems made functional; (vii) annual gender responsive operation and maintenance (O&M) plans approved and at least 75% of the required annual budget is allocated and spent; and (viii) gender responsive urban space guidelines developed. Output 3 supports to enhance public awareness, behavior change, and community mobilization in light of emergencies such as coronavirus disease (COVID-19) and cyclone Amphan in 2020. It will also support training and capacity building of LGED and Pourashavas to institutionalize information technology-based remote monitoring through strengthening LGED's geographic information systems section, monitoring and evaluation unit, and project management unit.

7. The proposed CTCRP is to be implemented in 22 *pourashavas* (local governments). District wise location of the CTCRP towns is summarized in Table 1.

Table 1: District wise *Pourashavas* where Project (CTCRP) will be implemented

District	Town (Pourashava)	District	Town (Pourashava)
Barishal	Bakerganj	Bhola	Charfassion
	Mehendiganj		Lalmohan
	Banaripara		Borhanuddin

[7] The graduation program originated in Bangladesh and has since been adopted in several countries as a holistic, time-bound interventions to lift households from poverty through: (i) social assistance to support immediate needs; (ii) livelihood promotion; (iii) financial inclusion; and (iv) social empowerment.

	Muladi	Jhalokathi	Jhalokathi
	Gouranadi		Nalchity
Bagerhat	Bagerhat	Satkhira	Kalaroa
	Morelganj	Khulna	Paikgacha
Patuakhali	Patuakhali		Chalna (Dacope)
	Kuakata	Pirojpur	Swarupkathi
Shariatpur	Zanjira	Barguna	Patharghata
	Bhedarganj		Betagi

C. Purpose of the Initial Environment Examination

8. The objective of the IEE is to provide guidance to LGED, its consultants and contractors on how to design and construct the subproject in an environmentally responsible manner, ensuring that all negative effects are prevented or mitigated, and positive impacts are enhanced.

D. Methodology

9. This IEE report was prepared following the requirements of the ADB SPS, 2009. Site visits, stakeholder consultations, and primary and secondary data collection were conducted to assess the existing environmental conditions of the project site and the potential environmental impacts that may occur during project implementation. Baseline environmental monitoring for air quality, noise level, surface water quality and groundwater quality will be conducted before the start of construction activities. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen potential risks on the protected areas or critical habitat that may exist around the project sites.

10. During the feasibility phase, focus group discussion (FGD) and public consultations were conducted with the representatives, officials and community people for site selection and construction and improvement of drains at the proposed locations. Their views were incorporated into the IEE and in the planning and development of the subproject.

11. The following summarizes the activities conducted in relation to the preparation of this IEE report:

(i) Review of project- and subproject-related documents and literature;
(ii) Site visits to the subproject site to review the existing environmental conditions and develop baseline information for the subproject area;
(iii) Consultation with executing and implementing agencies to discuss subproject components, benefits, and impacts;
(iv) Analysis of typical environmental impacts of subproject components and identification of suitable measures to mitigate potential impacts; and
(v) Review and develop institutional arrangements and capacity building needs for implementation of environmental management and monitoring.

E. Structure of IEE Report

12. The report has been structured in compliance with ADB SPS, 2009.

(i) **Executive Summary.** This chapter describes concisely the critical facts, significant findings, and recommended actions.
(ii) **Introduction.** Presents a brief overview of the assignment along with its background, objectives, scope of work and methodology etc.
(iii) **Policy, Legal, and Administrative Framework.** This chapter discusses the national and local legal and institutional framework within which the

environmental assessment is carried out. It also identifies project-relevant international environmental agreements to which the country is a party.

(iv) **Analysis of Alternative**. Analyzes the environmental situation “With and Without project”.

(v) **Description of the Subproject.** This chapter describes the proposed project; its major components; and its geographic, ecological, social, and temporal context, including any associated facility required by and for the project.

(vi) **Description of Baseline Environment.** This chapter describes relevant physical, biological, and socioeconomic conditions within the study area. It also looks at current and proposed development activities within the project's area of influence, including those not directly connected to the project. It indicates the accuracy, reliability, and sources of the data.

(vii) **Anticipated Environmental Impacts and Mitigation Measures.** This chapter predicts and assesses the project's likely positive and negative direct and indirect impacts to physical, biological, socioeconomic (including occupational health and safety, community health and safety, vulnerable groups and gender issues, and impacts on livelihoods through environmental media, and physical cultural resources in the project's area of influence, in quantitative terms to the extent possible; identifies mitigation measures and any residual negative impacts that cannot be mitigated; explores opportunities for enhancement; identifies and estimates the extent and quality of available data, key data gaps, and uncertainties associated with predictions and specifies topics that do not require further attention; and examines global, transboundary, and cumulative impacts as appropriate.

(viii) **Information Disclosure, Consultation, and Participation**. This chapter (i) describes the process undertaken during project design and preparation for engaging stakeholders, including information disclosure and consultation with affected people and other stakeholders; (ii) summarizes comments and concerns received from affected people and other stakeholders and how these comments have been addressed in project design and mitigation measures, with special attention paid to the needs and concerns of vulnerable groups, including women, the poor, and Indigenous Peoples; and (iii) describes the planned information disclosure measures (including the type of information to be disseminated and the method of dissemination) and the process for carrying out consultation with affected people and facilitating their participation during project implementation.

(ix) **Grievance Redress Mechanism.** This chapter describes the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

(x) **Environmental Management Plan.** This chapter deals with the set of mitigation and management measures to be taken during project implementation to avoid, reduce, mitigate, or compensate for adverse environmental impacts (in that order of priority). It may include multiple management plans and actions (mitigation, monitoring and performance indicators).

(xi) **Monitoring and Reporting.** Outlines the environmental monitoring program and reporting system including the cost of implementing the EMP.

(xii) **Conclusion and Recommendations.** Presents the conclusion and recommendations of the IEE study.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

13. Alongside the ADB Safeguard Policy Statement (SPS, 2009), each component of the project must comply with the relevant legal and policy framework of Government of Bangladesh, such as the Environment Conservation Act 1995 (ECA, 1995) with amendments in 2000, 2002 and 2010, and the Environment Conservation Rules 1997 (ECR, 1997), which are the primary environmental law and rules of the country.

A. ADB Safeguard Policy Statement 2009

14. ADB SPS provides guidance on the environment category of projects based on the degree of anticipated environmental impacts. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process.

15. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. The initial process of categorization involves filling out a sector-specific rapid environmental assessment (REA) checklist. A project is classified based on the most environmentally sensitive component, and assigned with one of the four environmental categories (A, B, C, or FI) defined in the SPS. These categories are as follows:

(i) **Category A:** Project that is likely to have significant adverse environmental impacts which are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.
(ii) **Category B:** Project with potential adverse environmental impacts that are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.
(iii) **Category C:** Project that is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.
(iv) **Category FI:** Project is classified as category FI if it involves the investment of ADB funds to, or through, a financial intermediary.

16. **Screening and Categorization**. Subprojects are to be screened for their expected environmental impacts and are assigned to a specific category. Categorization is to be based on the most environmentally sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, project management unit (PMU) shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered.

17. Initial screening using ADB REA checklist for urban development was conducted for the drains subproject in Patuakhali Pourashava, and results of the rapid assessment show that the project is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB SPS. See **Appendix 1** for the filled REA Checklist. Thus, this IEE report has been prepared following ADB SPS requirements for project with Category B classification.

18. **Environmental Assessment.** Environmental assessment shall include a description of environmental and social baseline to provide an understanding of current conditions forming the benchmark against which subproject impacts are assessed. Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including design and planning stage, construction, operations, decommissioning, and post-closure activities such as rehabilitation or restoration. This IEE may be used as a model document for other future drainage subprojects.

19. **Environmental Planning and Management**. The PMU shall prepare an environmental management plan (EMP) to be included in the IEE report. The EMP shall describe and address the potential impacts and risks identified by the environmental assessment. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the subproject's impact and risks. The EMP shall include the proposed mitigation measures, environmental monitoring and reporting requirements, emergency response procedures, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators.

20. **Public Disclosure**. The PMU shall submit the following to ADB for review and disclosure on ADB website upon receipt of acceptable reports and endorsement from the PMU, so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation:[8]

(i) final IEE upon receipt;
(ii) a new or updated IEE and corrective action plan prepared during subproject implementation, if any, upon receipt; and
(iii) environmental monitoring reports submitted during subproject implementation upon receipt.

21. **Consultation and Participation.** The PMU and PIU shall carry out meaningful consultation9 with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

22. **Grievance Redress Mechanism.** The PMU shall establish a mechanism to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The grievance mechanism shall be scaled to the risks and adverse impacts of the subproject. As of the ADB loan processing for the project, a grievance redress mechanism (GRM) has been established and discussed in detail in Chapter VI below.

23. **Monitoring and Reporting.** The PMU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PMU will identify the necessary corrective actions, and reflect them in a corrective action plan. PMU will prepare and submit

[8] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4." Upon its receipt of acceptable safeguard documents and endorsement by PMU, ADB discloses the same on ADB website.

[9] Per ADB SPS, 2009, meaningful consultation means a process that (i) begins early in the project preparation stage and is carried out on an ongoing basis throughout the project cycle;1 (ii) provides timely disclosure of relevant and adequate information that is understandable and readily accessible to affected people; (iii) is undertaken in an atmosphere free of intimidation or coercion; (iv) is gender inclusive and responsive, and tailored to the needs of disadvantaged and vulnerable groups; and (v) enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue until project completion.

24. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, PMU shall update the environmental assessment and EMP or prepare a new environmental assessment and EMP to assess the potential impacts, evaluate the alternatives, and outline mitigation measures and resources to address those impacts.

25. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMU and PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to subprojects. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

26. **Occupational Health and Safety.** The PMU[10] shall ensure that workers[11] are provided with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii) providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

27. **Community Health and Safety.** The PMU shall ensure to identify and assess the risks to, and potential impacts on, the safety of affected communities during the design, construction, operation, and decommissioning of the project, and will establish preventive measures and plans to address them in a manner commensurate with the identified risks and impacts.

28. PMU shall ensure to apply preventive and protective measures for both occupational and community health and safety consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.[12] PMU shall also adhere to necessary protocols in response to emerging infectious diseases such as the corona virus disease (COVID-19) consistent with the guidelines of relevant government healthcare agencies and the World Health Organization.

[10] In case where responsibility is delegated to subproject contractors during construction phase, PMU shall ensure that the responsibilities on occupational health and safety as described herein are included in the contract documents.

[11] Including nonemployee workers engaged by LGED through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

[12] World Bank Group, 2007. *Environmental, Health, and Safety General Guidelines*. Washington, DC.

29. **Physical Cultural Resources**. The PMU is responsible for siting and designing the subproject to avoid significant damage to physical cultural resources. Such resources likely to be affected by the subproject will be identified, and qualified and experienced experts will assess the subproject's potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process. When the proposed location of a subproject component is in areas where physical cultural resources are expected to be found as determined during the environmental assessment process, chance finds procedures shall be included in the EMP.

30. **Environmental Audit.** When the subproject involves existing activities or facilities, PMU is responsible to ensure that relevant external experts will perform environmental audits to determine the existence of any areas where the subproject may cause or is causing environmental risks or impacts. If the subproject does not foresee any new major expansion, the audit constitutes the environmental assessment for the subproject.

31. **Bidding and Contract Documents.** IEE, which contains the EMP, shall be included in bidding and contract documents and verified by PIU. The PMU and PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[13] and (ii) to submit to PIU, for review and approval, a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation, among others as may be required. No work can commence prior to approval of SEMP. A copy of the EMP and/or approved SEMP will be always kept on site during the construction period. Non-compliance with, or any deviation from, the conditions set out in the EMP and/or SEMP constitutes a failure in compliance and shall require corrective actions.

32. **Conditions for Award of Contract and Commencement of Work.** PMU shall not award any works contract under the subproject until (i) relevant provisions from the EMP are incorporated into the works contract; (ii) this IEE is updated to reflect subproject's detailed design and PMU has obtained ADB's clearance of such updated IEE; and (iii) DOE-approved IEE (i.e., IEE in compliance with ECR, 1997) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMU shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the works contract; and (ii) this IEE is updated to reflect subproject's detailed design and PMU has obtained ADB's clearance for such updated IEE.

B. National Environmental Legislations

33. **Environmental Conservation Act (ECA), 1995.** Provides for the conservation of environment, improvement of environmental standards and control and mitigation of environmental pollution. In line with these provisions of the Act, the Environmental Conservation Rules, 1997 have been framed. This act provides for (i) remedial measures for injury to ecosystem; (ii) provides for any affected person due to environmental pollution to apply to Department of Environment (DOE) for remediation of the damage; (iii) discharge of excessive environmental pollutants; (iv) inspection of any activity for testing any equipment or plant for compliance to the environment act, including power to take samples for compliance;

[13] Contractors to comply with (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the project sites.

(v) power to make rules and standards with reference to environment; and (vi) penalty for non-conformance to environment act under the various sections.

34. **Environmental Conservation Rules (ECR), 1997**. The Rules outline the processes and requirements of environmental clearances for specific type of projects indicated therein and stipulates that "no industrial unit or project shall be established or undertaken without obtaining, in the manner prescribed by rules, an ECC from the Director General" of the DOE. Schedule 1 of the Rules classifies industrial units and projects into four categories according to their site and impact on the environment, namely (i) green, (ii) orange-A, (iii) orange–B, and (iv) red. The rules specify the procedures for issuing ECC for the various categories of projects. Table 2 summarizes the requirements for environmental clearance application for each category.

Table 2: Summary Environmental Clearance Application Requirements Per Category[a]

Category	Requirements
Green	(i) Completed Application for Environmental Clearance Certificate (ECC); (ii) Payment of the appropriate fee based on Schedule 3 of Environmental Conservation Rules (ECR), 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); and (v) No objection certificate from the local authority.
Orange-A	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); (v) No objection certificate from the local authority; (vi) Prior issued location clearance certificate (LCC) from Department of Environment (DOE); (vii) Process flow diagram; (viii) Layout plan (showing location of effluent treatment plant (ETP); (ix) Effluent discharge arrangement; and (x) Outlines of the plan for relocation and rehabilitation (if applicable).
Orange-B	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) Report on the feasibility of the project (if still being proposed); (iv) Report on the initial environmental examination (IEE) of the project, including process flow diagram, layout plan (showing ETP), design of ETP of the project (if still being proposed); (v) Report on the environmental management plan (EMP); (vi) No objection certificate from the local authority; (vii) Prior issued LCC from DOE; (viii) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; (ix) Outline of the relocation and rehabilitation plan (where applicable); and (x) Other necessary information as may be required.
Red	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) Report on the feasibility of the project (if still being proposed); (iv) Report on the IEE of the project and the terms of reference (TOR) for environmental impact assessment of the project; or environmental impact assessment (EIA) report on the basis of the TOR previously approved by DOE, including process flow diagram, layout plan (showing ETP), design of ETP of the project (if still being proposed); (v) Report on the EMP; (vi) No objection certificate from the local authority;

Category	Requirements
	(vii) Prior issued LCC from DOE; (viii) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; (ix) Outline of the relocation and rehabilitation plan (where applicable); and (x) Other necessary information as may be required.

[a] A Guide to Environmental Clearance Procedure, DOE, Bangladesh Ministry of Environment and Forests, August 2010.

35. Schedule 1 of ECR, 1997 provides the classification for industrial projects and types of development that are common in Bangladesh. Table 3 indicates the subproject's category and its likely classifications based on this schedule.

Table 3: Government of Bangladesh Classification of the Subproject

No.	Subproject	Component	Equivalent in Schedule I of Environmental Conservation Rules	Department of Environment Classification
1.	Roadside Drains	Roadside drains	Construction/reconstruction, extension of roads and road provisions (including roadside drains)	Orange – B

[a] The equivalent in the schedule is too broad. The Orange – B classification is adopted based on all similar infrastructure projects of ADB and other multilateral lenders in Bangladesh.

36. Based on the ECR 1997, the subproject is required to secure an ECC.

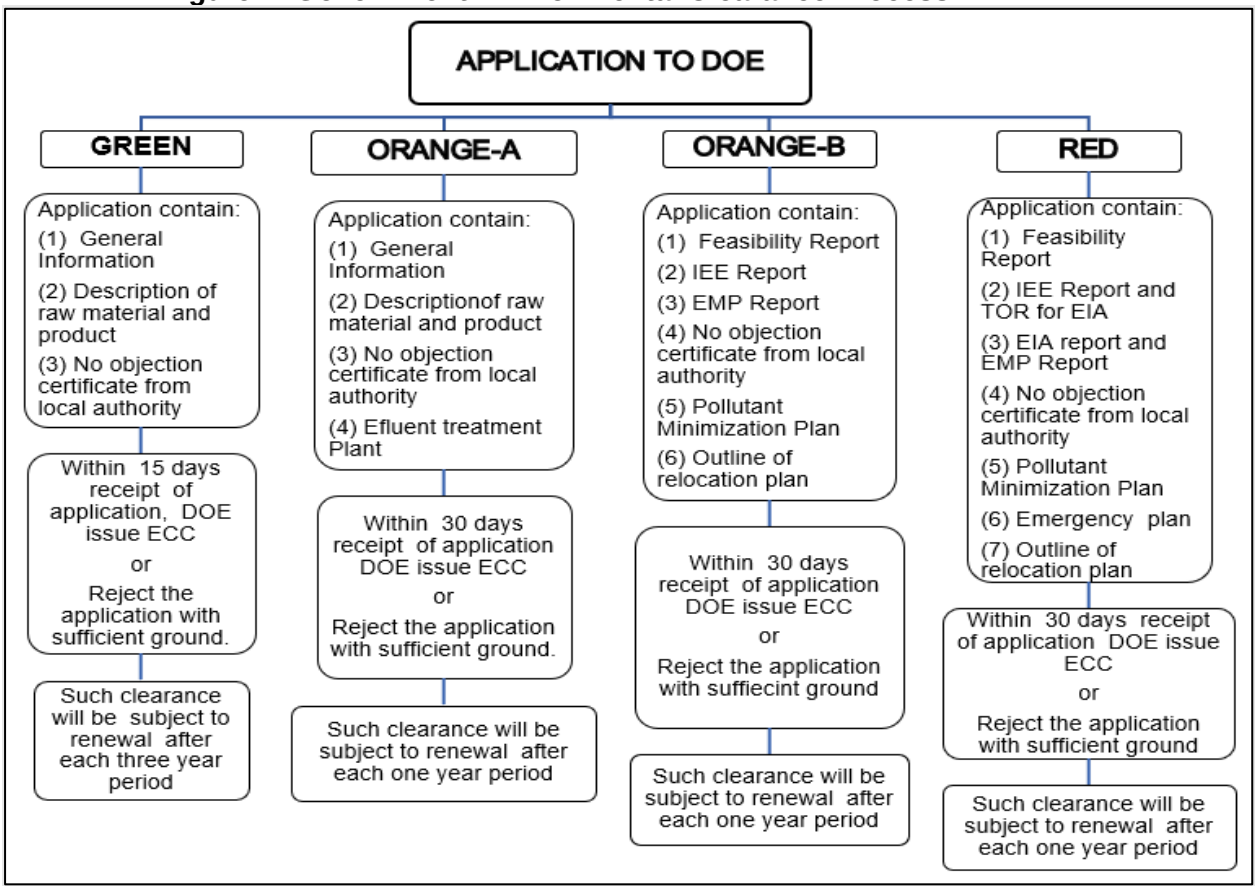
37. **Application for Environmental Clearance**. The application and requirement for issuance of ECC are described in the ECR, 1997 and summarized in Table 2. This involves the completion and submission of an application using a form available from the DOE website,14 which is revised from time to time. The accomplished application form is submitted to DOE together with requirements as enumerated in Table 2. The proponent is also required to pay equivalent application fee prescribed in Schedule 13 of ECR, 1997.

38. The ECC is issued within 30 days from receipt of the application by DOE. Such ECC is required to be renewed every year from the date of its effectivity. For the project, PMU is responsible for application for ECC. Each subproject will obtain its corresponding ECC depending on the requirements per ECR 1997, and approval should be obtained before contract award.

39. Figure 1 shows the summary of review process and timelines set under ECR, 1997, leading to the issuance of environmental clearance certificate (ECC) by DOE.

[14] Government of Bangladesh. Department of Environment.

Figure 1: Government Environmental Clearance Process



DOE = Department of Environment, ECC = environmental clearance certificate, EIA = environmental impact assessment, EMP = environmental management plan, IEE = initial environmental examination, TOR = terms of reference.

40. **Other relevant government laws and regulations.** The implementation of subprojects proposed under the project will be governed by government environmental acts, rules, policies, and regulations. Table 4 summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management, including applicable international environmental agreements.

Table 4: Relevant Government Laws and Regulations

Laws, Regulations, and Standards	Details	Relevance to the Project
National Environmental Policy, 2018	The central theme of the policy is to ensure protection and improvement in environment. The policy gives a thrust to sustainable development and long-term use of natural resources. The National Environment Policy contains policy statements and strategic options with regard to population and land-use management, management and utilization of natural resources and other socio-economic sectors, as well as the necessary arrangements for the implementation of the policy.	Subproject will have site-specific impacts and will require implementation of mitigation measures to ensure protection and improvement of the environment.

Laws, Regulations, and Standards	Details	Relevance to the Project
Environment Court Act, 2000 and subsequent amendments in 2003	Establishment of Environment Court for trial of an offence or for compensation under environmental law, such as environment pollution.	Option to affected persons for grievances related to environmental safeguards.
National Safe Drinking Water Supply and Sanitation Policy of 1998	Ensures access to safe water and sanitation services at an affordable cost	Pourashava and water sanitation authorities will take actions to prevent wastage of water. They will take necessary steps to increase public awareness to prevent misuse of water Pourashava shall be responsible for solid waste collection, disposal and their management
National Water Act 2013 Water Rule 2018	Ensures Bangladesh water sources are free from any type of pollution. Pollution from water in urban outfalls and reservoirs, e.g., lakes, canals, ponds and ditches may result in amenity losses, fisheries depletion, health problems and fish and aquatic species contamination.	The subproject will implement measures (e.g. septage treatment) to ensure that water source pollution is avoided.
Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of natural waterbodies such as lakes, ponds, beels, khals, tanks, etc. affected by man-made interventions or other causes. Prevents the filling of publicly owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment. Prevents unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.	The related works for subproject may impact natural water bodies. The subprojects' EMPs ensure measures are in place to protect natural water bodies and prevent draining or filling into these water bodies during construction.
National Land Use Policy, 2001	Sets out guidelines for improved land-use and zoning regulations. The main objective of this policy is to ensure criteria-based uses of land and to provide guidelines for usage of land for the purpose of agriculture, housing, afforestation, commercial and industrial establishments, rail and highway and for tea and rubber gardens.	Compliance with land use and zoning regulations
Bangladesh Labor Law, 2006	It is a comprehensive law covering labour issues such as: conditions of service and employment, youth employment, benefits including maternal benefits, compensation for injuries, trade unions and industrial relations, disputes, participation of workers in company's profits, regulation of safety of dock workers, penalty procedures, administration and inspection.	Compliance to provisions on employment standards, occupational health and safety, welfare and social protection, labor relations and social dialogue, and enforcement. Prohibition of employment of children and adolescents.

Laws, Regulations, and Standards	Details	Relevance to the Project
	This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable environment for working. It also includes rules on registration of labourers, misconduct rules, income and benefits, health and fire safety, factory plan	
Bangladesh Labor Rules, 2015	Includes rules on registration of laborers, misconduct rules, income and benefits, health and fire safety, factory plan	Contractors to implement occupational health and safety measures Contractor will be liable for compensation for work-related injuries
The Pourashava Act 2009 / Ordinance issued for the amendment of local government (municipality) ordinance, 2009 and 2010; The Pourashava Ordinance, 1977; Municipal Administration Ordinance, 1960	Provides guidance for subproject integrated community and workers health and hygiene at the construction and operation and maintenance stages of the project	Coordinate with Pourashava committees on disaster management measures, water and sanitation and waste management
Bangladesh Climate Change Strategy and Action Plan of 2009	Enhances the capacity of government ministries, civil society and private sector to meet the challenges of climate change	Integrate adaptation measures for buildings in consideration of extreme climatic events
Building Construction (Amendment) Act and Building Construction Rules, Bangladesh National Building Code	Regulates technical details of building construction and to maintain standards of building construction	Follow specifications to ensure structural integrity of buildings
Standing Order on Disaster, 1999 (Updated 2019)	Enhances capacity at all tiers of government administrative and social structures for coping with and recovering from disasters	Geographical information system (GIS) technology will be applied at the planning stage to select location of cyclone shelter considering habitation, communication facilities, distance from the nearest cyclone center, etc. Advice from the concerned District Committee should be obtained prior to final decision
National Disaster Management Act of 2012	Establishes a framework for managing disasters in a comprehensive way.	Setting-up emergency response procedures

Laws, Regulations, and Standards	Details	Relevance to the Project
Public Health (Emergency Provisions) Ordinance, 1994	The ordinance calls for special provisions with regard to public health. Whereas an emergency has arisen, it is necessary to make special provision for preventing the spread of human disease, safeguarding public health and providing them adequate medical service and other services essential to the health of respective community and workers in particular during the construction related work.	Relevant especially during the construction phase
The Employees State Insurance Act, 1948	It must be noted that health, injury and sickness benefit should be paid to people, particularly respective workers at workplace under the Act.	Relevant to the welfare of workers under the project.
Solid Waste Management Rules 2021	The Rules provides a comprehensive set of rules based on national 3R strategy and other national and international policies and guidelines pertaining to solid waste management. It defines the roles and responsibilities of relevant government ministries and agencies, including local government authorities and other stakeholders in implementing solid waste management undertakings. It also includes the environmental requirements necessary for these undertakings, provision of incentives for the promotion of sustainable waste management practices, etc.	The subproject will generate solid wastes and will implement measures to comply with the IWM rules.

EMP = environmental management plan, LGI = local government institutions.

C. International Environmental Agreements

41. Table 5 below lists the relevant international environmental agreements that the government is party to, and their relevance to the subproject.

Table 5: International Environmental Agreements Relevant to the Subproject

International Environmental Agreement	Signed/Year Ratified	Details	Relevance
United Nations Framework Convention on Climate Change (UNFCCC)	22.10.2001 13.11.2003 (amended)	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The subproject is subject to the impact of climate change. Engineering designs of the subprojects consider climate change impacts, such as flooding and temperature rise. A climate change assessment is a part of the project processing, which covers all subprojects.
Paris Convention on	1983	Parties to ensure the protection and conservation of the cultural	The subproject location is not an archaeological or historical site.

Protection of the World Cultural and Natural Heritage, 1972		and natural heritage situated on territory of, and primarily belonging to, the State	However, the related works with the subproject may impact undiscovered cultural and natural heritage relics during construction phase. The environmental management plans (EMPs) of subprojects ensure measures for chance finds.

42. **Gaps in the ADB SPS, 2009 requirements and government laws and regulation on environmental assessment.** There are no major gaps between the ADB SPS, 2009 requirements and the GoB's requirements on environmental assessment. Screening, categorization, environmental assessment and environmental management plan preparation, implementation and compliance monitoring are required. However, analysis of alternatives and public consultation and disclosure are not mandatory under the GoB's ECR (1997).

43. **Applicable Environmental Standards**. The ECR, 1997 also provides the environmental standards applicable to the project. Schedule 2 of the ECR presents the national standards for ambient air quality and Schedule 4 of the ECR presents the national standards for ambient noise. Following requirements of ADB SPS, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

44. The tables below show the comparison of the national standards and internationally recognized standards, including the applicable standards to be followed under the project per ADB SPS requirements.

Table 6: Applicable Ambient Air Quality Standards for Bangladesh Projects

Parameter	Bangladesh Ambient Air Quality Standard (µg/m^3)[a]	WHO Air Quality Guidelines (µg/m^3)	
		Global Update[b] 2005	Second Edition[c] 2000
TSP	200 (8-h)	-	-
PM_{10}	50 (1-year) 150 (24-h)	50 (24-h) 500 (10-min)	-
$PM_{2.5}$	15 (1-year) 65 (24-h)	10 (1-year) 25 (24-h)	-
SO_2	80 (1-year) 365 (24-h)	20 (24-h) 500 (10-min)	-
NO_2	100 (1-year)	40 (1-year) 200 (1-h)	-
CO	10,000 (8-h) 40,000 (1-h)	-	10,000 (8-h) 100,000 (15-min)
Lead	0.5 (1-year)		
Ozone (O_3)	235 (1-h) 157 (8-h)	100 (8-h)	

ADB = Asian Development Bank, CO = carbon oxide, h = hour, µg/m^3 = microgram per cubic meter, min = minute, NO_2 = nitrogen dioxide, $PM_{2.5}$ = particulate matter 2.5, PM_{10} = particulate matter 10, SO_2 = sulfur dioxide, TSP = total suspended particle, WHO = World Health Organization.

[a] Based-on SRO 220-Law 2005 (Amendment of Schedule 2 of ECR, 1997). Air Quality Management Project of Bangladesh http://www.doe-bd.org/aqmp/standard.html
[b] IFC World Bank Group. 2007. *Environmental, Health and Safety General Guidelines*. Washington, D.C.
[c] WHO Regional Office for Europe. 2000. *Air Quality Guidelines for Europe, Second Edition*. Copenhagen.

Table 7: Ambient Noise Quality Standards

Receptor/ Source	National Noise Standard Guidelines, 1997[a] (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_q in dBA)	
	Day	**Night**	**07:00 – 22:00**	**22:00 – 07:00**
Industrial area	75	70	70	70
Commercial area	70	60	70	70
Mixed Area	60	50	55	45
Residential Area	50	40	55	45
Silent Zone	45	35	55	45

[a] Schedule 4 of ECR, 1997.
[b] WHO. 1999. Guidelines for Community Noise**;** World Bank Group. 2007. Environmental, Health and Safety General

Table 8: Applicable Standards for Sound Originating from Motor Vehicles or Mechanized Vessels (Schedule 5 of ECR, 1997)

Category of Vehicles	Unit	Standards	Remarks
*Motor Vehicles (all types)	dBa	85	As measured at a distance of 7.5 meters from exhaust pipe.
		100	As measured at a distance of 0.5 meter from exhaust pipe.
Mechanized Vessels	dBa	85	As measured at a distance of 7.5 meters from the vessel which is not in motion, not loaded and is at two thirds of its maximum rotating speed.
		100	As measured at a distance of 0.5 meter from the vessel which is in the same condition as above.

* At the time of taking measurement, the motor vehicle shall not be in motion and its engine conditions shall be as follows:-

(a) Diesel engine – maximum rotating speed.

(b) Gasoline engine –at two thirds of its maximum rotating speed and without any load.

(c) Motorcycle – If maximum rotating speed is above 5000 rpm; two-thirds of the speed, and if maximum rotating speed is less than 5000 rpm, three-fourth of the speed.

Table 9: Applicable Drinking Water Quality Standards for Bangladesh Projects

National Standards for Drinking Water (Schedule 3, Rule 12B of ECR 1997)			WHO Guidelines for Drinking Water Quality 4th Edition incorporating the first addendum, 2017
Parameter	**Unit**	**Standards**	
Aluminum	mg/l	0.2	None established
Ammonia (NH_3)	mg/l	0.5	None established
Arsenic	mg/l	0.05	0.01
Barium	mg/l	0.01	1.3
Benzene	mg/l	0.01	0.01b
BOD5 20°C	mg/l	0.2	-
Boron	mg/	1.0	2.4
Cadmium	mg/l	0.005	0.003
Calcium	mg/l	75	-
Chloride	mg/l	150 – 600a	None established

National Standards for Drinking Water (Schedule 3, Rule 12B of ECR 1997)			WHO Guidelines for Drinking Water Quality 4th Edition incorporating the first addendum, 2017
Carbon tetrachloride	mg/l	0.01	0.004
1,1-Dichloroethylene	mg/l	0.001	-
1,2-Dichloroethylene	mg/l	0.03	0.05 (1,2-Dichloroethene)
Tetrachloroethylene	mg/l	0.03	0.04 (tetrachloroethene)
Trichloroethylene	mg/l	0.09	0.02 (trichloroethene)
Pentachlorophenol	mg/l	0.03	0.009
2,4,6 -Trichlorophenol	mg/l	0.03	0.2 (2,4,6 trichlorophenol)
Chlorine (residual)	mg/l	0.2	0.2c
Chloroform	mg/l	0.09	0.3
Chromium (hexavalent)	mg/l	0.05	0.05
Chromium	mg/l	0.05	0.05
COD	mg/l	4	-
Coliform (fecal)	n/100 ml	0	Must not be detectable in any 100 ml sample
Coliform (total)	n/100 ml	0	Must not be detectable in any 100 ml sample
Color	Hazen unit	15	None
Copper	mg/l	1	2
Cyanide	Mg/l	0.1	None
Detergents	mg/l	0.2	-
DO	mg/l	6	-
Fluoride	mg/l	1	1.5
Hardness (as $CaCO_3$)	mg/l	200 – 500	-
Iron	mg/l	0.3 – 1.0	-
Kjeldahl nitrogen (total)	mg/l	1	-
Lead	mg/l	0.05	0.01
Magnesium	mg/l	30 – 35	-
Manganese	mg/l	0.1	-
Mercury	mg/l	0.001	0.006
Nickel	mg/l	0.1	0.07
Nitrate	mg/l	10	50
Nitrite	mg/l	<1	3
Odor	mg/l	Odorless	-
Oil and grease	mg/l	0.01	-
pH	--	6.5 – 8.5	-
Phenolic compounds	mg/l	0.002	-
Phosphate	mg/l	6	-
Phosphorus	mg/l	0	-
Potassium	mg/l	12	-
Radioactive materials (gross alpha activity)	Bq/l	0.01	-
Radioactive materials (gross beta activity)	Bq/l	0.1	-
Selenium	mg/l	0.01	0.04
Silver	mg/l	0.02	-
Sodium	mg/l	200	
Suspended particulate matters	mg/l	10	-
Sulfide	mg/l	0	-
Sulfate	mg/l	400	-

National Standards for Drinking Water (Schedule 3, Rule 12B of ECR 1997)			WHO Guidelines for Drinking Water Quality 4th Edition incorporating the first addendum, 2017
Total dissolved solids	mg/l	1,000	-
Temperature	°C	20-30	-
Tin	mg/l	2	-
Turbidity	NTU	10d	-
Zinc	mg/l	5	-

[a] In coastal area 1000. Reference: Bangladesh Gazette, Addendum, August 28,1997 Source: Department of Environment (DOE).

[b] For substances that are considered carcinogenic, the guidance value is the concentration in drinking water associated with an upper-bound excess lifetime cancer risk of 10^{-5} (one additional case of cancer per 100,000 of the population ingesting drinking water containing the substance as the guidance value for 70 years). Concentrations associated with upper-bound estimated excess lifetime cancer risks of 10^{-4} and 10^{-6} can be calculated by multiplying and dividing, respectively, the guideline value by 10 (WHO, 2017).

[C] For effective disinfection, there should be residual concentration of free chlorine of $\geq$ 0.5 mg/l after at least 30min contact time at pH < 8.0. A chlorine residual should be maintained throughout the distribution system. At the point of delivery, the minimum residual concentration of free chlorine should be 0.2 mg/l.

[d] The FS advises producing treated water that conforms to WHO guidelines and Bangladesh drinking water quality ECR 1997. One of the two most important parameters reduced by the WTP is turbidity (the other is microbiological matter, by providing a multi-stage barrier). In Section 10.3, the FS quotes WHO and Bangladesh standards of 10 and 5 NTU respectively. We recommend that the turbidity in the treated water leaving the WTP should never exceed 1.0 NTU and that the operational guideline should be set at 0.5 NTU, to be achieved 95% of the time. The design of the process units and their controls should accommodate these recommendations. Operational procedures must be devised to achieve these recommendations. Computerized monitoring equipment must be provided and staff trained in its use to display real-time trends and record events. Laboratory staff must monitor, record, and report treated water quality parameters to review past trends and predict operational changes, if required.

[e] If less stringent levels or measures are appropriate in view of specific project circumstances, the executing agency will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

III. DESCRIPTION OF THE SUBPROJECT

A. Subproject Location and Area

45. The proposed drainage will be in Patuakhali Pourashava (Figure 2) which is also a coastal town and district headquarter of Patuakhali district. It is 280 km (through Maowa) away from Dhaka city and well connected through road and water. Patuakhali district is one of the oldest towns and municipalities in the country. Patuakhali municipality was established in 1892, which is located between 22.33456° N to 22.36713° N, 90.330547° E to 90.3036363° E. It is bounded by Dumki upazila on the north, Galachipa, Amtali and Barguna sadar upazilas on the south, Bauphal and Galachipa upazilas on the east, Mirzaganj upazila on the west. Patuakhali is located on the southern bank of Laukathi river in the division of Barishal in Bangladesh. It occupies an area of 27.03 km^2 and consists of 9 wards and 29 mahallas. The subprojects are located in wards no. 1, 4, 5, 6, 7, 8 and 9 respectively.

46. The topography Patuakhali Pourashava is mostly flat. Local differences in elevation generally are less than 1m compared with 2-3m on the Ganges floodplain. The subproject sites are located in existing right of way (RoWs) and government-owned land. There is no natural habitat left at these sites site. There are, as well, no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas either, within or near the locations. Screening with Integrated Biodiversity Assessment Tool (IBAT) confirm that there is no ecologically sensitive area within or adjacent the proposed subproject location. The construction and improvement of drains fall under the residential and commercial areas of the Patuakhali Pourashava. Infrastructure like electric and telephone poles will be affected due to construction activity. In addition, few trees found along the alignments of drains will be cut.

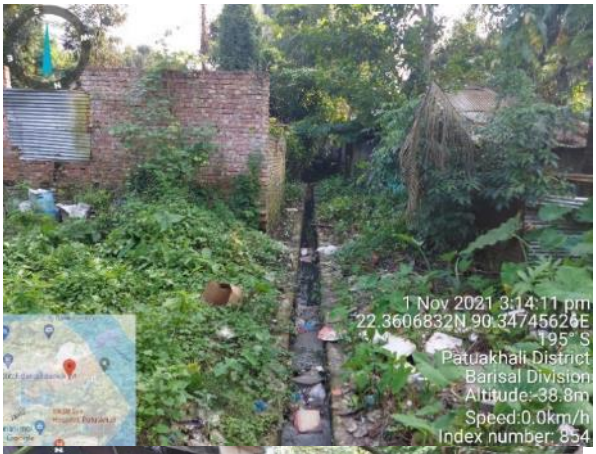
Figure 2: Location Map of Patuakhali Pourashava

B. Existing Condition of Drains

47. Existing drains in the Patuakhali are either kacha or earthen drain. These are silted up with garbage and other materials and the amount of discharge is becoming very low which causes water logging (Table 10).

48. Figure 3 shows on-ground photographs of the existing conditions of natural and man-made drainage canals and receptors likely to be affected in the Pourashava.

Figure 3: Photographs of existing condition at some proposed drainage locations



C. Subproject Scope and Components

49. The drainage subproject will be implemented in Patuakhali Pourashava to provide more accessible, reliable, and climate-resilient drains. The subproject will cover **rehabilitation of 40 nos. RCC drainage sections with total length of 12,930 m spread in different wards (Wards 1, 4, 5, 6, 7, 8 and 9) of the Pourashava**. Rehabilitation works will include dredging of these drainage canals, reinforced cement concrete works, and other climate proofing protection and stabilization works. All these drainages are located within existing rights-of-way (ROWs).

50. Construction activities are to be undertaken during the dry season for efficient rehabilitation works. However, if water logging occurs at any section of the drain that is

scheduled for rehabilitation, pumping and bailing out of the water will be undertaken prior to any construction works. The water will be pumped to the other section/s of the canal where no works is in progress. Pumping will continue as required until the rehabilitation works are completed at the affected section.

51. The alignments with covered and open drains will be determined during the detailed design and will be included in the updated IEE. From hydrologic and hydraulic point of view, four types (A, B, C, D) of drain have been design for the subproject. These are summarized in table below:

Table 10: Drain Types and Design Parameters

Drain Type	Total width (m) including thickness of the side walls	Total depth (m) including thickness of top and bottom slab
A	1.0 – 1.4	1.3 – 2.2
B	1.4 – 1.9	2.0 – 2.6
C	2.0 – 3.0	2.45 – 3.20
D	4.0	2.25 – 3.75

52. A summary of the drainage to be rehabilitated under the subproject is in figure and table below.

Figure 4: Locations of the Proposed Drainage for Rehabilitation

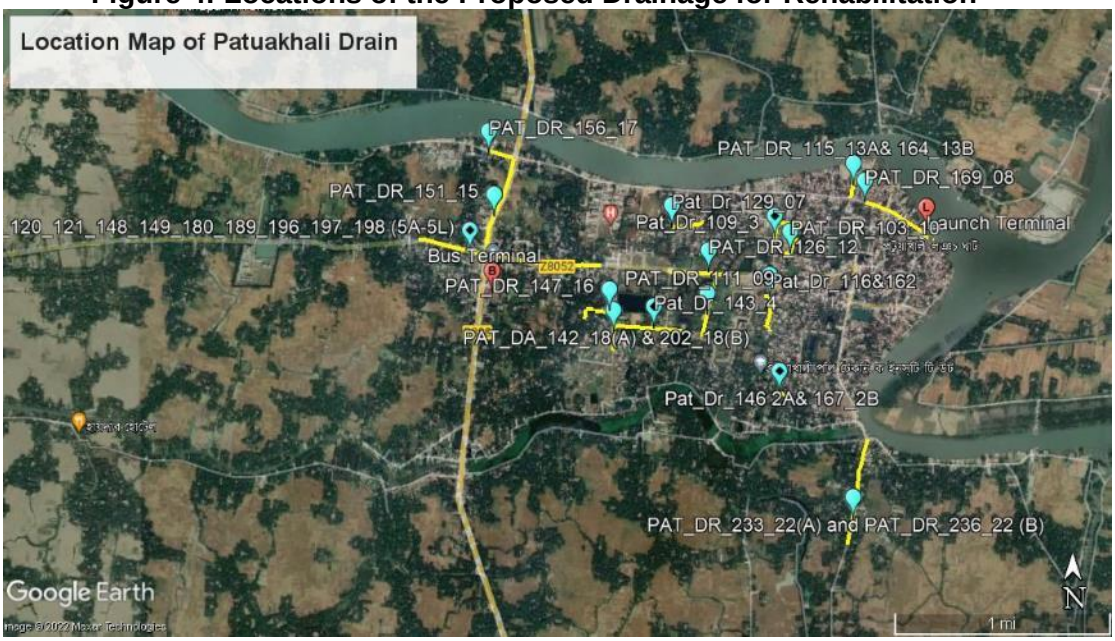


Table 11: Summary Description of Subproject Components

Sl. No.	Drain ID No.	Name of Drains	Existing Condition	Location (Ward No)	Proposed Design Intervention	
					Length (m)	Design Type[a]
e-GP/CTCRP/PATU/21-22/DR/01						
1	116	01.(A) Construction of RCC Drain Starting from Titas Cinema Hall to Polytechnic Institute	Average existing ground level 4.75m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	4	375	Type- B
2	162	01.(B) Construction of RCC Drain Starting from Titas Cinema Hall to Polytechnic Institute	Average existing ground level 2.94m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	4	130	Type- A
3	146	02.(A) Construction of RCC Drain Starting from South Shasbujbag Jamay Mosque to Faruqia Mosque	Average existing ground level 2.94m. Existing earthen drain which is mostly silted up with garbage and other materials.	4	125	Type- A
4	167	02.(B) Construction of RCC Drain Starting from South Shasbujbag Jamay Mosque to Faruqia Mosque	Average existing ground level 3.39m. Existing earthen drain which is mostly silted up with garbage and other materials.	4	175	Type- A
5	109	03. Construction of RCC Drain Starting from West Side of Sher-E-Bangla Girls School to Bepari Bari Canal	Average existing ground level 3.56m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	7	310	Type- A
6	143	04. Construction of RCC Drain Starting from District Jail Turning to Kalatala Housing Gate	Average existing ground level 2.70m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	8	575	Type- A
7	120	05.(A) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 2.20m. Existing earthen drain which is mostly silted up with garbage and other materials.	9	300	Type- A
8	121	05.(B) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 2.04m. Existing earthen drain which is mostly silted up with garbage and other materials.	9	300	Type- A
9	148	05.(C) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 1.70m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	9	300	Type- A
10	149	05.(D) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 1.70m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	9	300	Type- A
11	180	05.(E) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 1.62m . Existing earthen drain which is mostly silted up with garbage and other materials.	9	165	Type- A
12	189	05.(F) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 3.0m . Existing earthen drain which is mostly silted up with garbage and other materials.	9	250	Type- A
13	196	05.(G) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 1.745m . Existing earthen drain which is mostly silted up with garbage and other materials.	9	275	Type- A

Sl. No.	Drain ID No.	Name of Drains	Existing Condition	Location (Ward No)	Proposed Design Intervention	
					Length (m)	Design Type[a]
14	197	05.(H) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 1.97m . Existing earthen drain which is mostly silted up with garbage and other materials.	9	275	Type- A
15	198	05.(I) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Average existing ground level 2.44m. Existing earthen drain which is mostly silted up with garbage and other materials.	9	275	Type- A
		sub-total			4130	
e-GP/CTCRP/PATU/21-22/DR/02						
1	199	05.(J) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Existing ground level 2.46 m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	9	275	Type- A
2	200	05.(K) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Existing ground level 3.69 m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	9	100	Type- A
3	201	05.(L) Construction of RCC Drain Starting from Rustam Mridha Culvert to West Side of Nandokanai Canal via Chowrasta	Existing ground level 3.69 m, Existing earthen drain which is mostly silted up with garbage and other materials.	9	100	Type- A
4	129	07.Construction of RCC Drain Starting from Income tax Office to Mr.Nazrul House/ Modern Press	Existing ground level 3.5m, Existing earthen drain which is mostly silted up with garbage and other materials.	7	200	Type- A
5	169	08.Construction of RCC Drain Starting from Lanch Ghat to Old Registry Pool	Existing ground level 4.22m, Existing earthen drain which is mostly silted up with garbage and other materials.	5	600	Type- A
6	111	09.Construction of RCC Drain Starting from 4 Lane Road to B-Type Bazar	Existing ground level 2.47mThe existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	7	400	Type- B
7	103	10.Construction of RCC Drain Starting from West side of PTI to Sher-e-Bangla School Near Homio Clinic	Existing ground level 1.79m, Existing earthen drain which is mostly silted up with garbage and other materials.	7	175	Type- A
8	123	11.Construction of RCC Drain Starting from Kalatala Babri Mosque to Akan Bari Culvert	Existing ground level 2.49m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	8	375	Type- A
9	126	12.Construction of RCC Drain Starting from DC Banglow to Sonali Bank Turning	Existing ground level 3.38m, Existing earthen drain which is mostly silted up with garbage and other materials.	7	450	Type- A
10	115	13.(A).Construction of RCC Drain Starting from Sikdar Bari to Lawkathi Kheyaghat	Existing ground level 3.58m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	6	200	Type- A
11	164	13.(B).Construction of RCC Drain Starting from Sikdar Bari to Lawkathi Kheyaghat	Existing ground level 3.74m, Existing earthen drain which is mostly silted up with garbage and other materials.	6	300	Type- A
12	127	14.(A).Construction of RCC Drain Starting from Middle Kalatala Road Mini Housing to Sarfuddin Gazi House	Existing ground level 2.38m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	9	200	Type- A

Sl. No.	Drain ID No.	Name of Drains	Existing Condition	Location (Ward No)	Proposed Design Intervention	
					Length (m)	Design Type[a]
13	128	14.(B).Construction of RCC Drain Starting from Middle Kalatala Road Mini Housing to Sarfuddin Gazi House	Existing ground level 1.37m, Existing earthen drain which is mostly silted up with garbage and other materials.	9	300	Type- A
14	151	15.Construction of RCC Drain Starting from Chowrasta to Patuakhali Bridge	Existing ground level 1.58 m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	9	700	Type- C
		sub-total			4375	
e-GP/CTCRP/PATU/21-22/DR/03						
1	147	16.Construction of RCC Drain Starting from Mira Bari of Muktijoddha Road to Katakhali Khal via Sardar Bar	Existing ground level 3.14 m, Existing earthen drain which is mostly silted up with garbage and other materials.	1	300	Type- A
2	156	17.Construction of RCC Drain Starting from Old Ferry Ghat to Patuakhali Bridge	Existing ground level 1.63 m,. Existing earthen drain which is mostly silted up with garbage and other materials.	9	200	Type- A
3	142	18.(A).Construction of RCC Drain Starting from Housing North Gate to Farm Road	Existing ground level 1.93 m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	8	275	Type- A
4	202	18.(B).Construction of RCC Drain Starting from Housing North Gate to Farm Road	Existing ground level 1.85m, Existing earthen drain which is mostly silted up with garbage and other materials.	8	275	Type- A
5	241	19.(A).Construction of RCC Drain Starting from Ex-Councilor Mr.Yunus Mia Hous Turning to Jubok Housing	Existing ground level 1.29 m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	1	500	Type- A
6	242	19.(B).Construction of RCC Drain Starting from Ex-Councilor Mr.Yunus Mia Hous Turning to Jubok Housing	Existing ground level 1.28m, Existing earthen drain which is mostly silted up with garbage and other materials.	1	150	Type- A
7	247	20.(A).Construction of RCC Drain Starting from Hamezuddin Mridha College Cyclone Shelter to Fultala Canal	Existing ground level 1.9 m, Existing bed level 1.84 m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	1	675	Type- A
8	250	20.(B).Construction of RCC Drain Starting from Hamezuddin Mridha College Cyclone Shelter to Fultala Canal	Existing ground level 1.42m, Existing earthen drain which is mostly silted up with garbage and other materials.	1	400	Type- A
9	239	21.Construction of RCC Drain Starting from 2nd Badhghad to Keramatia Mosque via Ex-Councilor Mr.Yunus Mia Hous	Existing ground level 2.2 m. The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	1	800	Type- B
10	233	22.(A).Construction of RCC Drain Starting from 2nd Badhghad to Ishaq Model College	Existing ground level 2.62m, Existing earthen drain which is mostly silted up with garbage and other materials.	1	350	Type- A
11	236	22.(B).Construction of RCC Drain Starting from 2nd Badhghad to Ishaq Model College	Existing ground level 1.76 m, The existing katcha drain is silted up now a days and the amount of discharge is becoming very low which causes water logging.	1	500	Type- A
		sub-total			4425	
		grand total			12930	

[a] See Table 10.

53. Earth-based materials such as gravel, sand, and aggregate, including cement, will be required for the civil works of the subproject, most of which are available in Bangladesh. All earth-based materials including cement will be sourced from government-authorized suppliers and no illegal quarries will be used for the subproject. Table below shows the quantity of earth-based materials and cement required by the packages covered by the subproject.

Table 12: Quantity of Earth-Based Materials

S. No.	Description	Unit	Quantity
1	Sandfill	cu. m.	3,015.61
2	Gravel, aggregates, sand, and cement for concrete works (cement concrete and reinforced cement concrete)	cu. m.	15,795.72

Source: DDS Computation Based on Designs

D. Construction Schedule

54. The schedule of civil works depends on the methodology adopted for construction. In general, the time period will also depend on the resources put in place by the contractor. The package for the rehabilitation of Patuakhali drains is proposed to be implemented by post-qualified contractors under a single envelope single stage bidding process through National Competitive Bidding (NCB) procedures. The drainage rehabilitation works under the subproject will take 12 months to complete.

IV. ANALYSIS OF ALTERNATIVES

56. The primary objective of the "analysis of alternatives" is to identify the location/technology for a particular subproject that would generate the least adverse impact and maximize the positive impacts. The preliminary assessment of the project included an analysis of alternatives, addressing the optimal match between required technical specifications and site conditions, as well as addressing any concerns for environmental, social, and economic features in each location.

57. **"With Project" alternative.** The implementation of the subproject will contribute to physical improvement and socio-economic development in the Pourashava and will eventually lead to better quality of life of the people. Specifically, the alternative of pursuing the subproject ("with project" alternative) have that following advantages:

(i) There will be improved and assured drainage facilities for the residents of Pourashava/District;
(ii) Drainage development will stimulate socio-economic activities and other physical developments of the area. This will catalyze commercial growth in different centers and better business opportunities for locals;
(iii) The primary and secondary drainage development will also contribute to circulation of water vehicles through and around the Pourashava; and
(iv) This alternative will have minimal and avoidable/temporary negative impacts on land use, trees, noise and air pollution during construction and operation phases. Table 13 summarizes the potential negative impacts of the subproject.

Table 13: Negative impact of current proposal on environment and society

Sector	Impact
Land (Government-owned land are to be given priority)	No, construction and improvement of drains will be within existing ROWs in government-owned lands.
Presence Agricultural/crop land	No
Village affected	Close by, no significant impact will occur if EMP is followed
Families affected	Close by, no significant impact will occur if EMP is followed
Local Business affected	Close by, no significant impact will occur if EMP is followed
Loss of structures	Close by, no significant impact will occur if EMP is followed
Impact on Common properties	Close by, no significant impact will occur if EMP is followed
Trees to be chopped down	Possible, avoidance or replacement tree planting will be implemented
Presence of sensitive ecosystem	No
Presence of waterbody	Close by, no significant impact will occur if EMP is followed
Tribal population affected	No

58. **No-project Alternative and Implications.** The "no-project" option means that no drainage improvement/rehabilitation will be implemented in the Pourashava. The "do nothing" or "without the project" option is not viable due to the following factors:

(i) The socio-economic-physical status of the Patuakhali residents would remain unchanged;
(ii) The local skills would remain underutilized as no employment opportunities will be created for local population who would have otherwise worked at the project area;
(iii) Reduced business development due to current bad condition of the drainage network;
(iv) The current erosion rate in the feeder road due to lack of drainage system will remain; and
(v) No project scenario case will also result in environmental and social impacts due to potential catastrophes, pollution, and spread of diseases brought about by waterlogging and flooding incidents.

V. DESCRIPTION OF BASELINE ENVIRONMENT

A. Baseline Information

59. The primary objective in this chapter is to provide an environmental baseline of the proposed drainage construction and improvement sites. Baseline data includes an inventory of physical, ecological and socio-economic parameters. Baseline environmental data presented in this chapter are based on available secondary information. No sampling for air quality, noise and water quality was conducted. Baseline environmental monitoring for such will be conducted before the start of construction. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen the potential risks on the protected areas or critical habitat that may exist around the project sites.

B. Project Influence Area

60. Impacts and risks were analyzed in the context of the project's area of influence, which encompasses the area where the drains will be constructed, immediate vicinity and the location of construction phase facilities such as the worker's camp, storage and disposal areas.

61. The primary impact will be confined mostly within the location of drainage construction areas. Delivery of construction materials to the site would extend the PIA. This means that during transport of construction materials, the impact area is extended along the roads being traversed by the transporting equipment.

C. Physical Environment

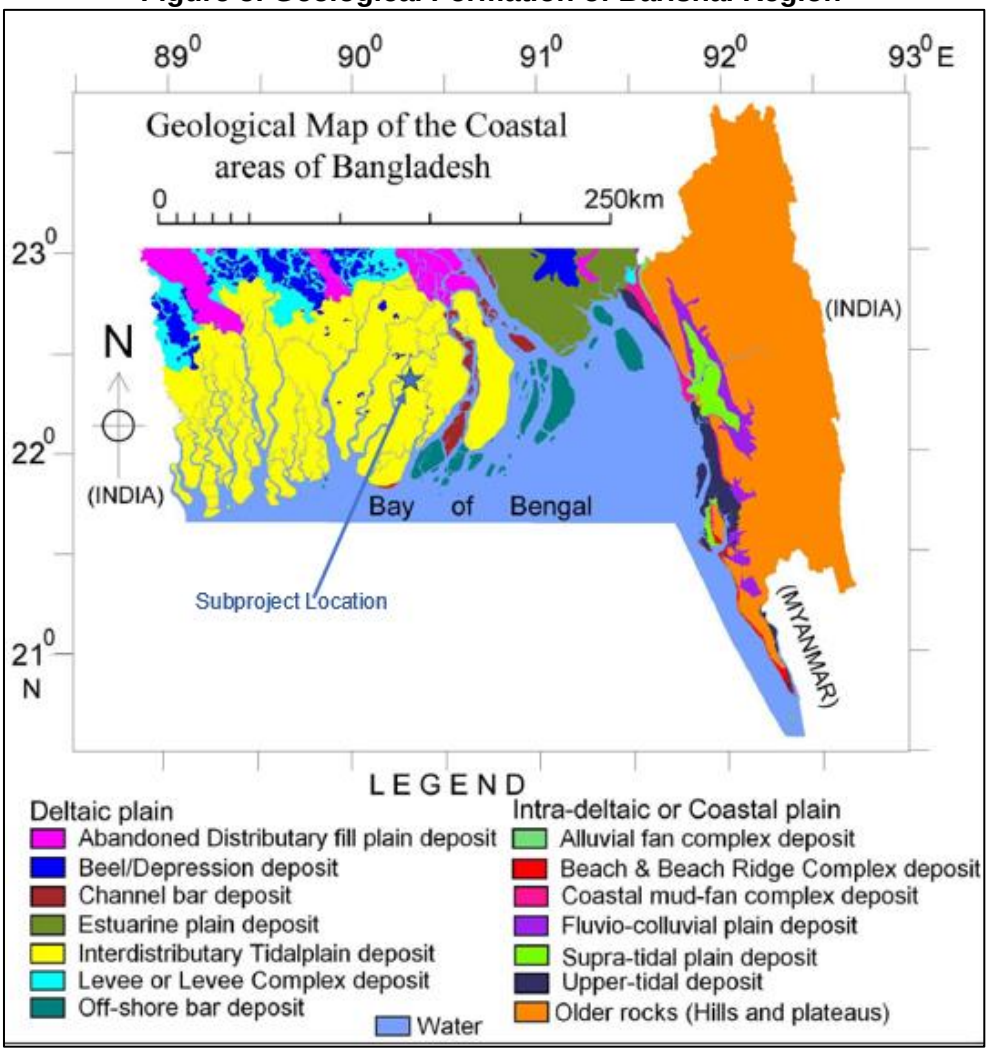
62. **Topography**. Patuakhali Pourashava area is located on the southern part of the Bengal Basin marking a part of Barishal Gravity High. The sedimentary layers are mostly horizontal to sub-horizontal and are free from major tectonic deformation in the fore deep area covering the central part of the basin and this is expressed as river to delta plain topography of the land. From topographic analysis using the Digital Elevation Model (DEM) concept it has been found that the Reduced Levels (RLs) inside the region are low, varying from 0.96 to2.23 m. The ground level of the entire region is higher than the low tidal water levels observed in Mirjaganj (Payra River).

63. Patuakhali Pourashava is same as other Pourashavas (which are on low-floodplain land) in Bangladesh. Pourashava is mainly medium-high land except some low-lying strips, canals and river. The Golachipa River flows on the part of eastern boundary line while the Payra River flows on the western boundary line and these two rivers connected by the Laukathi River that flows on the part of the northern boundary line of the Pourashava. The land elevation adjacent to the rivers is varied within 1.5 meter to 3 meter. Steep slope (about

90^{o} angle) of the side wall of the river is prominent. Alignment of khals and natural channels are in somewhere 1.0 meter to 2.5 meter high than the normal river water.

64. **Geology:** Barishal Division has been built on the plane surface area of stream deposits, delta plain deposits and flood plain deposits. The district is covered with alluvial sediments. Patuakhali District in Barishal Division is located at the Lower Ganga Delta. The Ganges delta is formed by the confluence of the Ganges (local name Padma), Brahmaputra (Jamuna), and Meghna rivers and their respective tributaries. The Ganges unites with the Jamuna (main channel of the Brahmaputra) and later joins the Meghna, finally flowing into the Bay of Bengal. The Ganges Delta and its surroundings are one of the largest alluvial plains in the world. It faces the Bay of Bengal and rivers flowing in the low land take their source from the Himalayan mountains. The deposition of sediments was vastly controlled by quaternary sea level fluctuation, climatic conditions and tectonic activities (Umitsu 1987). The Bengal Basin was filled with sediments of Tertiary and Quaternary age (Morgan and McIntire1959; Umitsu 1985, 1987, 1993). Mainly the Ganges deltaic deposits of Late Holocene to recent age cover the study area. The modern deltaic plain in the western Bengal Basin can be divided into two regions: the Upper Delta plain of meander belts of the Ganges– Bhagirathi rivers in the north; and the lower delta plain with numerous tidal creeks in the south (Das et. al. 1996). The lower deltaic plain, formed in Pleistocene–Holocene time, is characterized by the presence of an extensive clay layer of varying thickness (15–76 m) which is underlain by silt, sand, and gravel (Deshmukh and Goswami 1973). Figure 5 geological map of the region.

Figure 5: Geological Formation of Barishal Region



Source: Geological Survey of Bangladesh, 2017.

65. **Soil:** Based on the general soil map and soil texture map of Bangladesh, Patuakhali District has non-calcareous and calcareous brown and grey floodplain and acid sulphate soils with silty loam to silty clay texture. Patuakhali Pourashava has non-calcareous and calcareous brown floodplain soils with silty loam texture.

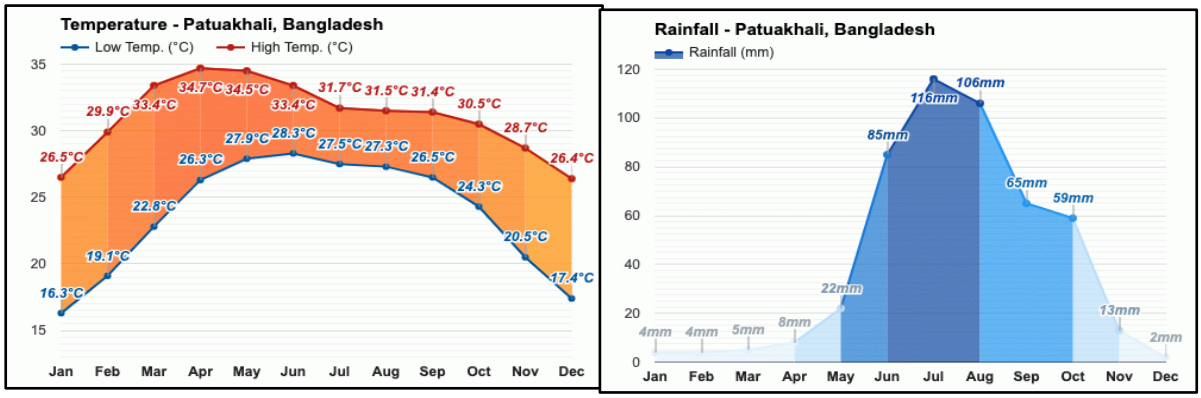
66. **Seismicity.** Twenty-six, 38 and 36 percent of Bangladesh falls within the high, moderate, and low risk zones in terms of earthquake vulnerability, respectively. The distribution of recorded earthquakes indicates a major clustering of seismicity around the Dauki Fault and scattering of other events along other major fault systems of Bangladesh. The magnitude of the earthquakes is moderate (4-6, magnitude in Richter scale) and majority of them are at shallow depth. Based on the Geological Survey of Bangladesh (GSB, undated[10]), Patuakhali falls in low intensity seismic zone (Zone-III, Basic Seismic Coefficient 0.04g).

The Bangladesh National Building Code (2010) on the other hand, divides Bangladesh into four categories of seismic zone according to intensity, i.e., very high, high, moderate and low. Patuakhali falls within seismic zone 1 (Z = 0.12).

67. **Climate:** The climate in Barishal Division is a combination of Tropical Savannah (Aw) and Tropical Monsoon (Am) according to the Koppen-Geiger climate classification (Beck et al. 2018[15]). The subproject site has a Tropical Monsoon (Am) climate.

68. **Rainfall and Temperature:** The average monthly temperature and rainfall variation at Patuakhali BMD station is shown in the below Figure 6. The graph shows that the highest and lowest values of rainfall are observed during the months of July (116 mm) and December (2 mm) respectively. The figure also shows the variations of average maximum and average minimum temperatures at the Patuakhali BMD station. The average maximum temperature values range from around 26.4°C (December) to around 34.7°C (April). Significant fluctuations in average minimum temperatures have been found, which varies from 16.3°C (January) to 28.3°C (June).

Figure 6: Temperature and Precipitation Pattern in Patuakhali (Barishal)



Source: Weather Atlas(https://www.weather-atlas.com/en/bangladesh/patuakhali-climate)

69. Patuakhali has a tropical wet and dry climate. Annual average humidity varies from maximum 84.24% to minimum 51.76%. Wind speed in Patuakhali is the highest in June and July (around 15.8 kph) and the lowest in December (around 9.1 kph). During cyclone SIDR

[15] Beck, H., Zimmermann, N., McVicar, T. et al. Present and future Köppen-Geiger climate classification maps at 1-km resolution. Sci Data 5, 180214 (2018). https://doi.org/10.1038/sdata.2018.214

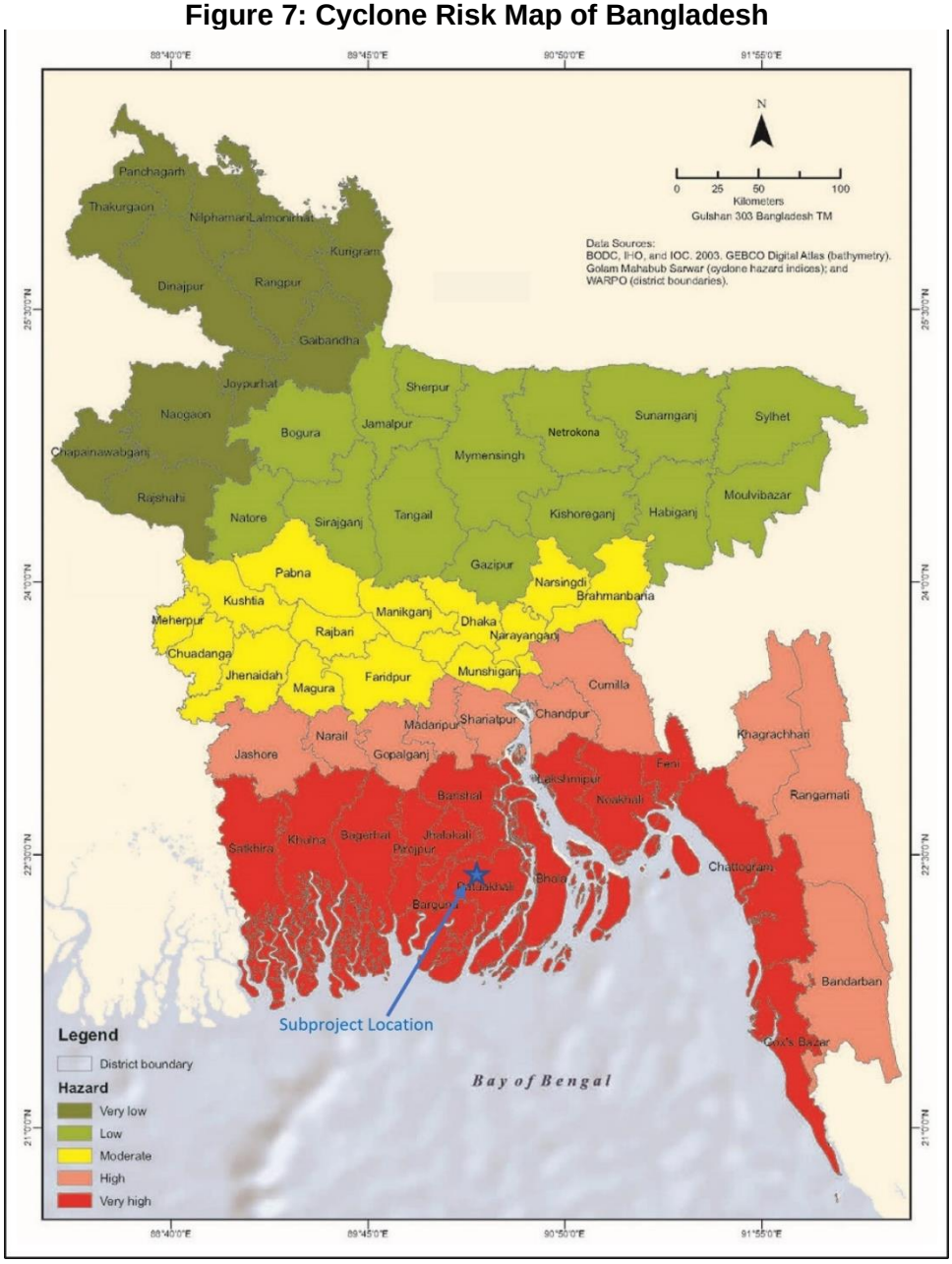
(2007) and AILA (2009), 1-minute sustained wind speeds were recorded as 260 kph and 120 kph respectively.

70. **Ground water:** Ground water quality in the Patuakhali area is influenced by salinity and iron. Patuakhali has groundwater depth of 0-5.3 meters. Water in most shallow aquifer is somewhere arsenic/salinity, and all are contaminated with iron, not suitable for drinking purposes. Water collects from river and ponds for irrigation purposes. The lower deep aquifer is found at a depth of 80 m to 100 m. Deep aquifers with fresh water in the Pourashava are exploited to meet the demand of water for inhabitants but that is small.

71. **Surface water:** The Lohalia River plays an important role in natural drainage system. The river is a tidal one with a reported tidal variation of about 2.3m. The normal direction of flow is from east to west. Its northern bank has mild slope. The southern bank is a vast flat char which is frequently flooded during high tide. During low tide, the depth of the river is not so much, with main flow passing close to the northern bank. Not much scientific literature is available on hydrology of this area. Beside this river, there are 6 canals, 609 ponds and 89 ditches as the sources of surface water. Surface water pollution is originating from the use of insecticide and chemical fertilizers in crop fields. Cattle bathing and flow of wastewater from domestic use discharge into the ponds, khals and river have also identified as reasons for surface water contamination. There is no available information on surface water quality for the nearest receiving body for Patuakhali Pourashava yet. Hence, baseline surface water quality sampling and analysis will be conducted before the start of construction activities.

72. **Natural Hazards**. Large portion of Patuakhali District is surrounded by rivers and canals and being adjacent to the Bay of Bengal, natural hazards visit the district every year. Subsequently, the inhabitants of the district suffer much from the disaster. In addition to this, climate change effect has sped up the frequency of natural hazards like, cyclone, tidal surge, excessive rainfall, rising temperature, increased salinity, landslide, erosion of riverbanks, thunderstorm, etc. Cyclones and flooding are observed in Patuakhali Pourashava (Figure 7).

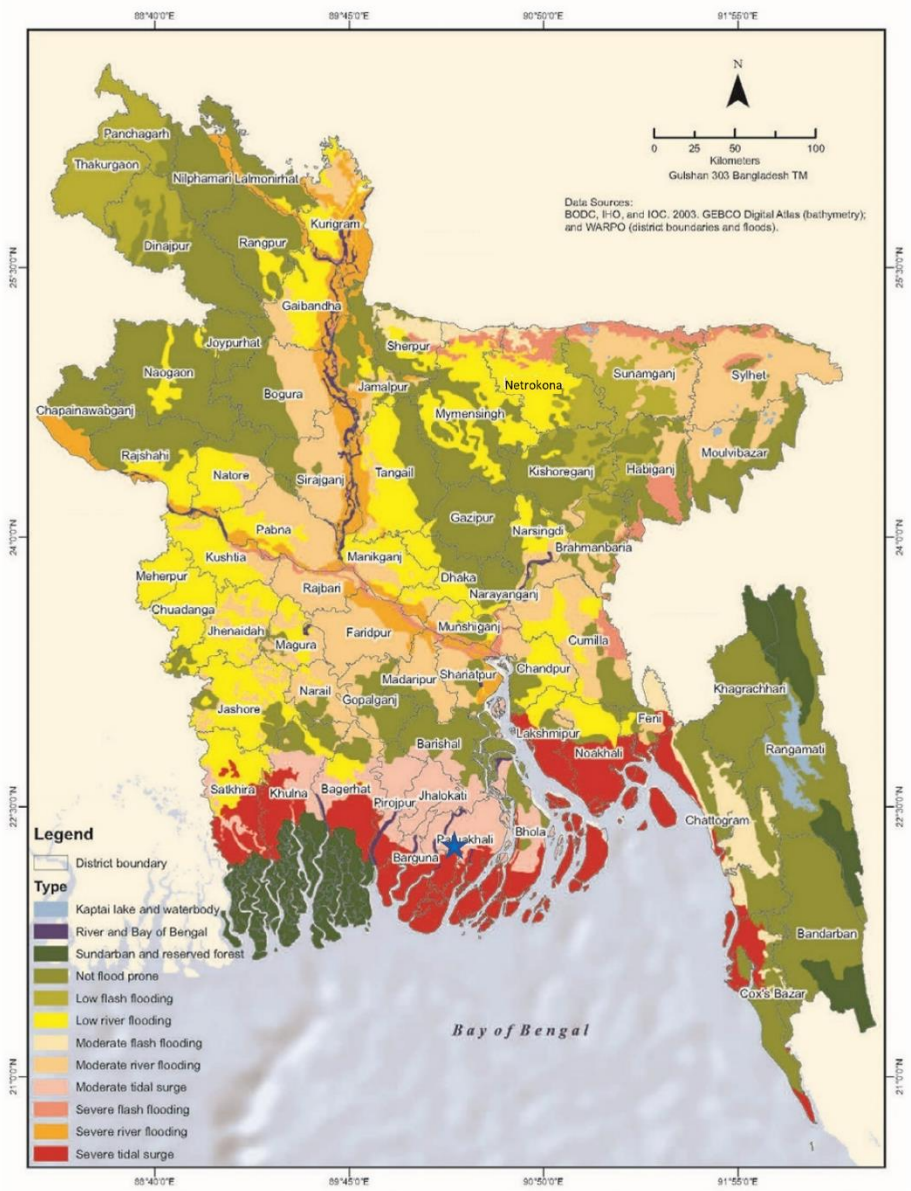
Figure 7: Cyclone Risk Map of Bangladesh



Source: Bangladesh Climate and Disaster Risk Atlas. ADB. December 2021

73. **Flood:** Flooding is a common phenomenon in Bangladesh. The major cause of flood is monsoon rainfall runoff from upstream catchments, with more than 90 percent from outside Bangladesh. Generally, flood season in Bangladesh starts from May and can continue until November. Five floods during the last fifty years were extensive and devastating and these are the floods of 1955, 1974, 1987, 1988, and 1998. Figure 8 below shows that the project area falls in the “moderate tidal surge” flood zone.

Figure 8: Flood Prone Areas of Bangladesh and Classifications



Source: Bangladesh Climate and Disaster Risk Atlas. ADB. December 2021

74. **Air Quality.** Baseline data on air quality for the subproject area is not available. There is no major source of air pollution at the proposed site. The contractor will be required to establish the baseline air quality before the start of construction.

75. **Noise Level.** Baseline data on noise for the subproject area is not available. There is no major source of noise pollution at the proposed site. Sources of noise in the subproject site include motor vehicles (motorcycles, pick-up, mini-trucks, auto-rickshaws, Nochimon/Tomtom), playing of loud-speaker, mass people gathering and people chatting. The contractor will be required to establish the baseline noise levels before the start of construction.

D. Biological Environment

76. **Terrestrial Fauna and Flora Species.** There are no forest areas within and in the immediate vicinities of Patuakhali Pourashava. Fauna species found in the subproject area are domestic animals and other species commonly found in the lowlands of Bangladesh.

77. **Fauna Species. Mammals**: Due to ruthless destruction of the Sundarban portion of the forest in the district of Patuakhali, most of the wild animals are now rarely seen in this area. Despite importance of ecological integrity and bio-diversity, the species of fauna in this region are being affected by over exploitation, deforestation, inefficient forest management, agricultural and industrial pollution etc. A proper inventory of the rich biological resources of the country should be made and the economic, social, ecological and ethical values of bio-diversity are yet to be realised and disseminated by all concerned. However, there are some vertebrate species of various classes of fauna that are common to the adjoining districts are also found in the district. The names of few species belonging to each class are given in the following paragraphs. Commonly found mammals are ud biral (Aonyx cinerea), benji (Herpestes edwardsi), Indur (Rattus rattus), nengti indur (Bandicota bengalensis), dura kathbirali (Funambulus pennanti), tickell's bat (Hesperoptenus tickelli) and chika (Suncus murinus).

78. **Birds:** The birds usually seen in the district are babui or baya weaver (Ploceus phillippinus), meutushi (Nectarinea Athene brama), kalo kokil or cuckoo (Cuculus microplerus), tia or parrot (Psillacula krameri), ghugu or dove (Streptophelia orientalis), botkol (Treron phoenicoptera), dahuk or white breasted water (Amaurornis phoenicurus), korchey bok (Ardeola grayii), pankoyri (Phalacrococan niger), etc. Reptiles and Amphibians: Among the reptilia tiktiki (Hemidactylus brooki) is the most common and best known. Other reptiles that are commonly seen are gui shap (Varanus salvator), dhora shap (Xenochrophis piscator), gharginni shap (Lycodon jara), jait shap (Naja kaouthia), etc. The amphibians are not rich in species, but very much so in numbers. Among them the most common are kotkoti bang (Rana cyanophlyctis), bhawa beng (Rana cyanophlyctis), kuno beng (Bufo melanostictus) and jhi jhi beng (Rana limnocharis).

79. **Fisheries**: The fish habitats are primarily classified under two broad categories, capture fishery and culture fishery. Internal khals as well as floodplains are considered as capture fish habitats. The culture fish habitats are of two types: Homestead fishponds and commercial fish ponds. The main fish species reported in fish farming ponds are mainly major carps and exotic carps. During field visit in November 2021 the consultant observed that culture fisheries (90%) dominate Patuakhali fish market. The rest is capture fisheries (10%). Both fresh water and marine fishes as very essential staple play a very important role in the economy of the locality. The fresh water fishes are ruhi or salmon (Labeo rohita), mrigel or trout (Cirrhinus mrigala), kalboush (Labeo calbasu), katla or carp (Catla catla), etc. Soil fish or

walking fish (Ophicephalus-steiaxtus), shingl (Heteropneustes fossilis), scorpion-fish or singi are also found in large quantity in beels and khals. Many other spieces of river and fresh water fishes are also found in the district. Of these the principal varieties are, dhain, chital (Notopterus chitala), ghona, airh (Mystus aor), bagar (Bagarius bagarius), pangas (Pangasius pangasius), boal (Wallago attu), rita (Rita rita), bain or eel fish (Mastacembelus armatus), chapila (Gudusia chapra), bhagna (Labeo boga), nandail bacha, pon, gargle (Arius gagora), kaulia, kapali, khorsols, mehsir, golsha (Mystus bleekeri), tengra (Mystus vittatus), chanda (Mene muculata), tekchanda (Gerres argyreus), kachki (Corica soborna), baila (Glossogobius giuris), bheda (Nandus nandus), batashi (Pseudoutropius atherinoides), kakila (Strogylura strogylura), phalli or flat fish (Notopterus notopterus), tatkeni (Crosscheilus latius), pabda or butter fish (Ompok pabda), chela (Chela cachius), gangchela, gajal (Channa marulius), koi or climbing fish (Anabas testudineus), bele or baila (Eleotris ambinensis), kholisha (Colisa fasciatus), punti (Barbus puntius), sharputi (Puntius sarana), taki (Channa punctatus), walking fish (Ophicephalus striaxtus), malandi, bashpata (Danio devario), tengra, kakra (Scylla serrata), meani, shrimps, and prawn are found in the district. However, some of these varieties, especially those which inhabit the marshes and tanks, are dwindling due to over catching and other reasons such as use of insecticides and pesticides for crop production, etc.

80. In addition, some exotic varieties of fish such as telapia (Oreochromis mossambicus), nilotica (Oreochromis niloticus), silver carp (Hypophthadmicthys molitrix), grass carp (Cteopharyngodon idella) are also cultivated in the district and they are also becoming very popular.

81. **Flora Species:** Trees species in various ecosystems and the aquatic floral species at project site are given below. The district has wide variety of trees, shrubs and thickets of bamboos and bananas that surround the village homesteads. The district is covered with trees common throughout Bangladesh such as mango (Mangifera indica), kanthal or jackfruit (Artocarpus heterophyllus), bel or wood apple (Aegle marmelos), narikel or coconut (Cocos nucifera), ataphal (Anona squamosa), Sharifa or sweet hop (Annona squamoss), kamranga or carambola (Averrho karambola), latkan (Baccaurea ramiflora), tal or plam (Borassus flabellifer), Kadam (Anthocephalus cadamba), pitraj or rona (Aphanamixls polystachia), supuri (Areca catechu), neem (Azadirachta indica), bamboo (Bambusa valgaris), tallabans or tella bamboo (Bambusa tulda), hijol (Barringtonia acutangula), ooriam (Bischofia javanica), simul or cotton (Bombax ceiba), belati gab or belati magostecn (Diospysos kaki), palash (Butea monosperna), papaya or pepe (Carica papaya), sonalu (Cassia fistula), Jambura or lime (Citrus decumana), mandar (Erythrina variegata), bat or banyan (Ficus benghalensis), ashatha or pipul (Ficus religiosa), dumur or fig (Ficus hispida), jarul (Legerstroemia speciosa), deshi gab or mangosteen (Diospysos peregrine), sajna (Moringa obifera), khejur or date plam (Phoenix sylvestris), debdaru or pine (Polyalathia longifolia), piyara or guava (Psidium guajava), rain tree (Samanca saman), kalojam or black berry (Syzygium cumini), jat koroi (Albizzia procera), etc. Besides the above, the following trees are peculiar to this area: ponyal (Calophylluminophyllum), ghau (Casuarina equisetifolia), chaltha or acid fruit (Dillenia indica), karamja (Pongamia pinnata), shoila (Sonneratia caseolaris), bilati amra (Spondias dulcis), kewat kanta (Pandamustectorius), paras (Thespesia populnea), jalpai or olive ((Eleaeocarpus tectorius). Moreover, a few types of Sundarban trees are still found in the district. These are gab (Diospyros precatorius), haritoki (Terminalia chebula), keora (Sonneratia apetala), baira (Zejyphus jujiba), etc. Reeds known as Hoglapata grow in the marshes and on the river banks. Golpata, a kind of palm is very important. Its stems are used for roofing houses. Its fruits are edible and molasses (gur) is made from its juice. The surface of the marshes either shows huge stretches of inundated rice or is covered by matted flowing islets of sedges and grass and with various water lilies, the most striking of which is makhna (Euryale ferox). Some species of shrubs like harjaza (Acanthus ilicefolius), nona jhaw (Tamarix dioscoria), tamrbul kata (Dalborgia spinosa), sodabaen (Avicenia alba), sundri lata (Brownlowia lanceolata),

singara (Cynometru ramiflora), khalsi (Acgiceras majus), hantab (Phoenix paludosa), etc. are also seen in the area.

82. **Agriculture:** The district is essentially an agricultural district. The main agricultural crops are rice, wheat, jute, pulses, oil seeds, vegetables, spices, sugarcane, tobacco, etc. Among rice crops Aman crops occupy the largest area followed by Aus and Boro. The fruit crops of importance are banana and coconut. The crop which is very commonly grown and is of speciality for the district is betelnut. Agricultural farming practices within most of the study area have adjusted to the agro climatic conditions prevailing in the Kharif (March-October) and the Rabi (November-February) seasons. The crop year starts from the Kharif-I season characterized by high temperature, high evaporation, low humidity and low rainfall. S. Vegetables, T. Aus (Local) and T. Aus (HYV) are grown in this season. High rainfalls, lower temperatures, high humidity, low solar radiation and high floods that recede towards the end of the season, characterize the Kharif-II season. T-Aman (Local) and T. Aman (HYV) crops are grown in this season. The Rabi season is characterized by low temperatures, high solar radiation, low evaporation, insignificant rainfalls and low humidity. A wide range of crop varieties such as W. Vegetables, Spices, Potato, Chili, Wheat, Pulses, Oilseeds and Boro (HYV) crops area grown in these seasons. Sugarcane and Orchard are perennial crops in this area. Some occasional overlapping occurs in the area. Such as Kharif-I crops (S. Vegetables, T. Aus) are harvested in Kharif-II season, Kharif-II crops (T. Aman) are harvested in the Rabi season and Rabi crops (W. Vegetables, Spices, Potato, Chilli, Wheat, Pulses, Oil seeds and Boro) are harvested in Kharif-I season.

83. **Protected Areas and Critical Habitats**. Protected areas (PAs) are “especially dedicated to the protection and maintenance of biological diversity and associated cultural resources, which are managed through legal or other effective means" (IUCN, 1994). They are "designated or regulated and managed to achieve specific conservation objectives" (Mulongoy & Chape, 2004). Three types of protected areas were defined under the Bangladesh Wildlife Preservation Act, 1973; i.e., National Park, Wildlife Sanctuary and Game Reserve. There is no PA within 10km of the site (Figure 9).

84. The Integrated Biodiversity Assessment Tool (IBAT) was used to screen the presence of protected areas or critical habitats around the subproject site (area of analysis of 10 km radius). Screening results show there is no protected area within the 10-km radius of the site, which confirms the illustration in Figure 9. Results also show that there is no key biodiversity area (KBA) within the 10-km radius of the site. From the same IBAT screening, 71 IUCN Red List species of concern are identified within the default area of analysis of 50-km radius (see Appendix 2 for the results of IBAT screening). The subproject site is already a built-up area and the probability of these species being found at the site is very low.

Figure 9: Protected Areas of Bangladesh

Source: Forest Department, 2021

85. **Demography**. As of the 2011 Bangladesh census, Patuakhali Pourashava has an area of 27 sq. km with a population of 65,000 (projected population of 79,411 for 2020).[16] There are 33,630 males and 31,370 females.

86. **Land use pattern**, Land use pattern can be an indicator to understand the poverty incidence in a given area. Statistics shows that there are 70% smallholders, 23% medium and

[16] Draft Report on Integrated Drainage Plan for Patuakhali Pourashava. December 2020 (Referenced source: Population Census – 2011 Community Series, Patuakhali, BBS 2018)

only 6%large landholders (BBS 2011). In the study area, arable land is mainly used for crop production. Generally, small and medium landholders cultivate variety of crops in these lands.

87. In the region, employed population is engaged in different occupations. According to BBS 2011, 88% of the populations are engaged in agriculture sector. Here agricultural sector includes farmer, agricultural labor, fishers, day labors etc. About 5%population is engaged in salaried service sector. It includes population who are employing for government, private sector jobs.

88. **Literacy rate and educational institutions.** Educational institutions include 2 government colleges, teachers training college 2, one (01) polytechnic institute 1, vocational institute 1, two (02) secondary government schools and 124 government primary schools (GPS), 66 non-government primary schools, 56 Islamic schools (madrasa). The rate of literacy of Patuakhali Pourashava is 59.5% (62.7% Male and 56.5% female).

89. **Household Income.** Average monthly income of 50.7% of the households is between Tk. 5,001.00 - Tk.10,000.00. The middle-income group with monthly income between Tk. 10,001.00 and Tk. 15,000.00 accounts for 22.2% of Patuakhali Pourashava households. Small business is the dominating occupation of the people followed by private service, farming, homoeopathic treatment, etc. (BBS, 2011).

90. **Health centers**. The government medical college hospital and 250 bed government sadar hospital are the two government hospitals in the Patuakhali District. Besides, 14 community clinics, 22 private medicals, hospital and clinics are available for providing treatments.

91. **Physical Cultural Resources**. The subproject component location is not located within nor is it immediate to any protected monument. Three mass graves located inside the old jail compound and one memorial monument located inside the old Town Hall of the district were identified. Considering these graves and monument are located within property compounds, impacts due to the subproject activities is not expected. However, as a precautionary measure, the detailed design will ensure that no alignment will cross or encroach these property compounds. Appropriate mitigation measures will likewise be instituted when working in alignments outside these compounds, if there is any.

92. Few historical mosques named as Kachichira Jami Mosque, Sikder Bari Jami Mosque, Shrirampur Mosque, and Amirullah Munsi Bari Jami Mosque are located inside the district. Marks of liberation war: The historical mosques are relatively far from any drainage alignment, and impacts to them is not expected. Map below shows the sites and proximity to Patuakhali town center. An inset shows the zoomed map location of the Amirullah Munsi Bari Jami Mosque which is the historical site nearest the town center but already about more than 500m from nearest alignments. All the other historical mosques are located far outside Patuakhali town Figure 10.

Figure 10: Historical Sites/Mosques in Patuakhali and Vicinity

VI. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

93. Environmental impact assessment is the systematic identification and evaluation of the potential impacts (effects) of proposed projects, plans, programs, or legislative actions relative to the physical, chemical, biological, cultural, and socioeconomic components of the total environment. ADB SPS (2009) requires the assessment of environmental impacts during the different stages of the project, including project design/pre-construction, construction, and operation phases, and the formulation of corresponding mitigation measures to avoid, minimize or offset environmental impacts.

A. Design Phase Impacts and Mitigation Measures

94. **Integration of EMP in bidding documents and contracts**. Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-implementation of EMP.

95. To ensure that EMP will be provided with sufficient budget and implemented:

(i) The PMU will incorporate the costs of implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document.

(ii) Once the Contractor is selected, the PIU with support from PMSC will inform contractors on their responsibilities in EMP implementation, in compliance with ADB and government requirements, self -monitoring and reporting procedures.

96. **Provisions for connection to service infrastructure**. Unplanned construction activity may be necessary in case of absence of service infrastructure at the site.

97. To avoid unplanned construction activity, the PMU and PIU shall confirm the location, capacity, functionality and connection readiness of water, sewerage, electricity, heating and legal landfills to avoid wastewater dumping, ad-hoc connection arrangements, or inappropriate waste disposal during the construction phase.

98. **Integration of climate change considerations in design**. The impact of climate change is significant for the drainage rehabilitation subproject. The detailed design of the drainage should consider future changes in climate patterns such as flooding due to extended monsoon seasons and increased level of precipitation, droughts, and increased global temperature, among others. More particularly for the subproject, the design of the subproject should consider:

(i) Likely changes in the climatic conditions with respect to temperature, flooding, salinity, and acidity, including drainage aspects; and

(ii) Likely impacts on surface runoff due to climate change-induced heavier and more erratic rainfall.

99. The impacts of climate change will be mitigated during the design and planning stage for the drainage construction and improvement subproject. Among these measures are the following:

(i) Due to climate change, the river water level will rise and as a result may overflow causing flooding of roads and establishments. Therefore, the appropriate base depth level of the canals for desilting and excavation should be determined;

(ii) The differences in water level between base and future time should be computed as it is needed to estimate the additional drainage embankment height required. This is in addition to the resulting depth of the canal after excavation or desilting;

(iii) The drainage canal is expected to drain a significant additional discharge due to climate change-induced higher rainfall during monsoon seasons. Therefore, widening of some sections of the drainage should be considered. However, any widening activities should also consider any social safeguard implications; and

(iv) Maximum possible efforts have to be made for minimizing cutting of trees while designing the rehabilitation and protection of the drainage canal walls and embankments.

100. **Impacts on local hydrology.** Failure to consider the local hydrology in the siting and design planning may lead to local waterlogging problems and obstruction of water flows in the vicinity.

101. To address these impacts, the design will consider the following:

(i) Detailed assessment of the micro hydrology and topography of the project site;

(ii) Design the drains according to the slope and elevation relative to the water bodies that may exist in the area; and

(iii) Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded.

B. Pre-Construction Phase Impacts and Mitigation Measures

102. **Updating of IEE**. The PMU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.

103. **Disruption of Existing Utilities**. Construction activities may disrupt existing utilities.

104. To avoid/minimize or manage the disruption of existing utilities, the following measures will be implemented:

1. Conduct investigation at site to determine all the existing utilities that will likely be disturbed during construction phase; and

2. Coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with LGED and stakeholders at the site. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the time required and at cost of the subproject.

105. **Disturbance of private and common properties and physical cultural resources.** Damage to private and common properties (such as boundary walls, ramps, fences, telephone and electric poles, roadside business structures, houses), government infrastructure (District jail, Registry Pool, Income Tax Office), residence of DC, canal and water bodies (Bapari Bari Canal, Nandokanai Canal), residential area (Kalatala Housing); educational institution (Polytechnic institute, girls school , PTI, College); commercial areas (Titas cinema hall, Press, Launch Ghat, B-Type Bazar, Banks); and mosques

106. The following mitigation measures shall be implemented to address the above impacts:

1. Conduct investigation at site to determine if any existing private or common properties/structures will be disturbed during construction phase;

2. Conduct meaningful consultation with stakeholders whose private and common properties may be affected by the construction works;

3. Ensure that all works will be confined within existing alignments, and within existing rights-of-way (ROWs).

4. avoid disturbance or damage of physical cultural resources (mosque, graveyards) and common physical resources through proper design of drainage rehabilitation works and demarcating construction area; and

5. ensure the implementation of measures according to the resettlement plan for the subproject, as necessary

107. **Material sourcing**. Erosion and sedimentation may be caused by illegal quarries in the region. Materials for the construction should not be sourced from these facilities.

108. As a measure,

6. the bid documents should include a clause on material sourcing that will require the contractor to source construction materials from legal or government-approved sources only.
7. no new quarry sites shall be used for the subproject;
8. verify suitability of all material sources and obtain approval of PMU/Divisional/Regional Office or PIU; and
9. document all sources of materials and include in the monthly reporting to the PIU.

109. **Drinking water quality.** Drinking water supply for workers will be likely sourced from tube wells. However, there is a possibility that underground sources have arsenic levels that could be detrimental to the health.

110. To avoid any health risks from the drinking water supply:

10. the bid documents should include a requirement that Contractor will ensure that drinking water supply shows compliance with the drinking water quality standards, particularly for arsenic parameter.
11. The Contractor will undertake groundwater quality sampling and analysis to ensure that water from tube wells follows the drinking water quality standards. If the groundwater quality does not comply with the standards, the contractor will source potable water from an alternative source or provide a potable onsite treatment facility with own costs and approval from PIU/PMU.

111. **Consents, Permits and Clearances**. Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result in design revisions and work stoppage.

112. All the necessary consents, permits, and clearances shall be obtained before the start of civil works. LGED will contact the School Committees for land records and other necessary papers that are required for clearance for construction. The School Committees will issue the NOCs to LGED as well as local upzilla parishad. Environmental clearance for the entire Project will be obtained by the PMU from the Department of Environment before construction. Additionally, any permits or consents required from relevant government agencies for construction activities near UNESCO World Heritage Sites or locally recognized monuments (if present) will be obtained.

113. **EMP Implementation Training.** If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GoB environmental policies.

114. The PMU, Divisional/Regional Office, PIU and contractors will be required to undergo training on EMP implementation. Methodology of capacity and training activities are discussed in Part D of Chapter IX hereof. The capacity building program will be participatory to the extent possible to make it more effective, with learning by doing, role playing, group exercises, on-the-job training, etc. Pre- and post-training assessment will be conducted to measure the effectiveness of the program.

115. **Community awareness of project activities and impacts**. Lack of community awareness on project activities may result in potential community health and safety concerns and complaints.

116. Before the start of project construction, a meaningful consultation with the affected communities will be conducted. This meaningful consultation will aim to engage community stakeholders, listen to their views, and try to come to a common understanding about the need for an improved drainage system and the sacrifices that need to be made to achieve it. To aid in consultation process, the community should be made aware of the upcoming project and project activities. Important information to be disseminated to the people are, among others, the following:

1. Overview and objectives of the proposed project;
2. Preliminary and/or final detailed design of proposed project components;
3. Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and
4. Grievance redress mechanism and contact details of the project.

C. Construction Phase Impacts and Mitigation Measures

117. **Construction Planning.** Inadequate planning could lead to non-implementation of EMP during the construction phase and result in significant environmental impacts leading to non-compliance with ADB's environmental safeguard requirements.

118. To ensure that EMP will be implemented during the construction phase, the contractor should, prior to start of construction activities:

(i) Designate an Environmental Health and Safety Officer (EHSO).
(ii) Conduct training on the rationale for and implementation of the SEMP and EMP to enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to relevant staff of contractors (including EHSOs)
(iii) The Contractor will be required to submit to PMU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP implementation. No works can commence prior to approval of SEMP. The SEMP will include the following:
    a. Construction Compound Management Plan;
    b. Construction Traffic Management Plan;
    c. Construction Health and Safety Plan (including COVID-19 H&S guidance);
    d. Materials Management Plan;
    e. Noise and Vibration Management Plan
    f. Water Quality Management Plan;
    g. Dust Management Plan;
    h. Waste Management Plan; and
    i. Emergency Incident Response Plan.

119. **Excavation Works.** Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug.

120. To mitigate, the contractor will ensure the following:

(i) All excavations shall be done to the minimum dimension as required for safety and working facility.
(ii) The excavation shall be executed in such a manner that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost.
(iii) All excavations and other work shall be carried out during nighttime at busy road section.
(iv) Road drains and channels shall be kept free from obstructions at all times.

121. **Removal of Trees.** Some trees are present along the alignments which could be affected during the construction phase.

122. While cutting of trees will be avoided as much as possible, there may be instances when cutting of trees may be necessary. In such case, the following actions are proposed to minimize the impact of tree removal:
(i) After the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked;
(ii) Trees within area required for construction will be felled after prior approval;
(iii) Replacement of the tree shall be undertaken by LGED at the replacement ratio of two trees for every tree that is cut (i.e., 2:1 ratio); Indigenous/native species will be preferred in tree planting;
(iv) Only trees that will require removal within the proposed construction areas of the sites will be cut; and
(v) For trees that will not be cut, take all precautions to protect them from any damage from construction activities.

123. **Soil erosion and sediment mobilization.** Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall.

124. During construction phase, the Contractor shall implement the measures at all times to control soil erosion that shall include, but not be limited to the following:
(i) The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable.
(ii) Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor.
(iii) The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered.
(iv) Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion.
(v) The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows.
(vi) Monitor groundwater quality that could exist close to the working areas to ensure compliance.

125. **Surface water pollution.** Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water. Untreated sewage from the pit latrines could enter surface water if not adequately designed and positioned to reflect the local hydrological and hydrogeological patterns. Periods of high rainfall could lead to the overflow of the pit and overland flow, or rapid through-flow of the effluent to surface water prior to its full digestion in the soil. Raw sewage

can potentially impact surface water quality by promoting the growth of algae and delivering pathogens may be harmful to human and ecological receptors. Solvents and vehicle maintenance fluid (oil, coolant) and diesel fuel may contaminate surface and groundwater if these are disposed of directly into the ground or washed into the streams. Human waste from construction workers may also contaminate surface water and groundwater if there are no adequate sanitary facilities.

126. To mitigate these impacts, the contractor will be required to:

(i) Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals.
(ii) The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMSC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work.
(iii) All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels.
(iv) Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer.
(v) Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low lying areas.
(vi) Avoid scheduling of excavation work during the monsoon season. Earthworks during dry season.
(vii) Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site.
(viii) Ensure that drains are not blocked with excavated soil
(ix) Stockyards at least 50 meters (m) away from watercourses.
(x) Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%.
(xi) Daily control of machinery and vehicles for leakages
(xii) No obstruction in flowing water.
(xiii) For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. A sewage management plan has to be prepared by the contractor and agreed with the PMSC.
(xiv) Monitor water quality according to the environmental monitoring plan.

127. For management and final disposal of solid wastes following mitigation, contractor will be required to apply the follow-up measures such as:

(i) collection of recyclable solid wastes and supply to scrap vendors;
(ii) ensure all the camp wastes and construction wastes are placed in the designated waste collection pits away from receiving water;
(iii) establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site; and
(iv) consultation with PIU on the proper disposal of all residual wastes.

128. **Groundwater use and contamination.** Increased demand for groundwater is anticipated during the construction phase for construction activities and personal consumption by workers. Uncontrolled extraction of water may affect availability of water to locals. In

addition, construction waste, if left unattended, will result in percolation of leachate through the soil strata reaching the groundwater table contaminating it.

129. It is necessary that arrangement for safe drinking water is made prior to start of work. Water will be supplied for consumption only after adequate analysis and requisite treatment. The workers may also be trained on the need for judicious use of freshwater resources. The contractors will use water in consideration to its value as a resource. Mitigation measures will include:

(i) Prevent pollutants from contaminating the soil and the groundwater;
(ii) All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned;
(iii) Storage of lubricants and fuel at least 50 m from water bodies;
(iv) Storage of fuel and lubricants in double hulled tanks. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%;
(v) Daily control of machinery and vehicles for leakages;
(vi) Collection of waste during construction activities;
(vii) Provide uncontaminated water for dust suppression;
(viii) Enclose the construction area to prevent unauthorized access.

130. **Drainage Congestion.** Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion. The impact of these on hydrology is expected to be more pronounced during post monsoon period with rapid movement of rainwater through existing drainage structures, which if blocked by construction waste and debris may cause flooding or waterlogging in neighboring areas.

131. The contractor shall adopt a site clearance procedure that separates topsoil and stores it under appropriate conditions for reuse as instructed by the Engineer. Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals. The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that they do not permit direct runoff into watercourses and are on land sloping at less than 1.5%. All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized.

132. **Impact on Air Quality.** There will be two main sources of air emissions, i.e., mobile sources and fixed sources during construction phase. Mobile sources are mostly associated with vehicles involved in construction activities. On the other hand, air pollution from fixed sources is mainly from generator sets, construction equipment (e.g. compressors) and excavation/ grading activities.

133. Dust and gaseous emissions will be generated by the construction machinery**.** Pollutants of primary concern include particulate matter (PM10). However, suspended dust particles are coarse and settle within a short distance of the construction area. Therefore, the impact will be direct but temporary, and will be restricted to areas in close vicinity of the construction activities only.

134. Construction work also involves breaking up, digging, transporting, and dumping large quantities of dry material. The particulate matter from these can cause health impacts, i.e. respiratory problems, irritation in eyes and reduction in visibility.

135. In the conduct of construction activities and the operation of equipment, contractors shall utilize all practical methods to control, prevent and otherwise minimize atmospheric emissions, specifically:

(i) Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre-project ambient air quality standards.
(ii) Fit all heavy equipment and machinery with air pollution control devices that are operating correctly.
(iii) Vehicles travelling to and from the construction site must adhere to speed limits to avoid producing excessive dust.
(iv) Reduce dust by spraying stockpiled soil, excavated materials, and spoils.
(v) Cover with tarpaulin vehicles transporting soil and sand.
(vi) Cover stockpiled construction materials with tarpaulin or plastic sheets.
(vii) Heavy equipment and transport vehicles shall move only in designated areas and roads.
(viii) Water spraying to access roads, camp sites and work sites to reduce dust emissions.
(ix) Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications.
(x) All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements of DOE. Copies of conformance will be submitted regularly to the PMSC.
(xi) Repair and maintain access roads, as necessary.
(xii) Monitor air quality according to the environmental monitoring plan.
(xiii) Clean wheels and undercarriage of vehicles prior to leaving construction site;
(xiv) Prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
(xv) Use vehicles that have government-issued permits and registrations; and
(xvi) Prohibit open burning of solid waste

136. **Noise.** Noise-emitting construction activities include earthworks, concrete mixing, concrete formation works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates, among others. The vulnerable groups who are susceptible to construction noise include (i) onsite workers who are the most exposed to the highest noise levels generated from different construction activities due to their proximity to the noise sources; and (ii) neighboring communities and other sensitive receptors (such as worshipers at church/mosque, students at schools and other educational institutes, patients at hospitals etc.).

137. The significance of noise impact will be higher at the immediate vicinity of the subproject site where noise-sensitive receptors are situated, such as for example schools and residential areas. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site.[17]

138. Mitigation measures to reduce the noise impacts off-site at the nearest sensitive receptors include the following:
(i) Provide prior information to the local public, including institutions such as schools and hospitals along alignments that may be affected, about the work schedule;
(ii) Use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical;

17 IFC World Bank Group. 2007. *Environmental, Health and Safety (EHS) Guidelines – General EHS Guidelines: Environmental – Noise Management*.

(iii) Restrict noisy activities to day time, except in areas near schools, places of worship, and other institutions which may be likely disturbed during day time. Consider night time works in these areas;
(iv) Avoid use of noisy equipment or doing noisy works at night time near residential areas;
(v) Limit engine idling to a maximum of one minute;
(vi) Spread out the schedule of material, spoil and waste transport;
(vii) Minimize drop heights when loading and unloading coarse aggregates; and
(viii) Avoid use of horns unless it is necessary to warn other road users or animals of a vehicle's approach.
(ix) Implement a complaints handling system;

139. On-site construction noise shall be mitigated to ensure a safe work environment by implementing an on-site occupational health and safety plan, which considers national and international requirements. The plan shall include the following measures:

(i) Ear muffs/protective hearing equipment shall be made available to all workers in noise critical areas
(ii) Training on how and when to use protective hearing equipment shall be conducted as part of the workers' induction sessions.
(iii) Place visually clear instructions in areas where noise emissions are significant.
(iv) Measure noise level according to the environmental monitoring plan.

140. **Construction wastes generation.** The construction work is likely to generate considerable quantities of waste soil and excavated solid wastes. Indiscriminate disposal of the soil and excavated solid wastes, excess construction material, concrete, packing materials, containers, lubricants and oils may affect the soil, landscape and aesthetics of local environment and the worker's and community's health and safety.

141. To mitigate the impacts, the contractor will implement the following to manage wastes:

(i) Dispose excess spoils per the Spoil Management Plan attached in Appendix 3;
(ii) Avoid stockpiling of excess excavated soils as far as possible;
(iii) Avoid disposal of any debris and waste soils in or near water bodies/rivers;
(iv) Coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;
(v) Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material.
(vi) The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators.
(vii) Contractor shall implement waste segregation on site.
(viii) Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed of in officially sanctioned local landfills.
(ix) Construction waste should also be disposed of in legal local landfills.
(x) Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase;
(xi) Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by relevant parties;
(xii) Remove all wreckage, rubbish, or temporary structures which are no longer

required.

142. In addition, and consistent with the Spoils Management Plan, all dredged or excavated silts and soil from the drainage canals or khals, including any demolished concrete from rehabilitation of existing drainage walls will be disposed to appropriate disposal site approved by the local government or Pourashava. Expectedly, dredged materials from the drainage canal will be ordinary soil and uprooted grasses or shrubs with some amount of non-biodegradable wastes that have accumulated in the drains for years. For proper handling of the spoils, the following actions will be followed by the contractor:

(i) Recover or collect the non-biodegradable waste materials from the mixture of excavated materials. This includes broken glasses and any other hazardous materials found in the dredged mixture, if any;
(ii) Handle and haul the non-biodegradable wastes and hazardous materials separately from the excavated soil;
(iii) Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints;
(iv) Haul all wastes using transport equipment such as dump trucks with proper cover (e.g. tarpaulin) to avoid accidental release along the route to the disposal site; and
(v) Utilize haulers that are authorized to handle and transport these kinds of wastes.

143. Disposal site for spoils and other dredged materials from drainage rehabilitation will be identified during the pre-construction phase. The use of the disposal site shall have to be approved by the Pourashava and/or by the DOE through a locational clearance certificate, if applicable. No disposal site shall be used without seeking prior approval or clearance from relevant local or national government agencies.

144. **Disturbance to terrestrial flora and fauna**. The subproject area is a built-up area, hence, the impacts to flora and fauna will be insignificant. For trees found at the site, the design will ensure that these trees will not be cut, or if tree cutting is necessary, mitigation measure should be strictly followed.

145. To mitigate these impacts, contractor will be required to:
(i) avoid, or minimize when avoidance is not possible, tree cutting;
(ii) for any tree cut, conduct replacement planting at a ratio of 1(cut):2 (new planting) and consistent with the social forestry program of LGED (see Appendix 5 for LGED Tree Plantation Program);
(iii) protect giant trees and locally important trees (for religious reasons), if any is identified as the site during implementation;
(iv) prevent workers or any other person from removing and damaging any other flora and fauna found in the subproject site; and
(v) prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the site.

146. **Impacts on aquatic ecology.** Some of the subproject alignments are near or adjacent to khals (canals) and ponds. The construction of the subproject may affect these ponds due to siltation and chemical spills, and improper waste disposal, and therefore may impact the quality of the water and any thriving aquatic species. As observed during the site visit, no ponds or khals are used for aquaculture within the subproject area.

147. To mitigate, contractor will be required to:
(i) provide temporary protection at sections near the river to avoid sliding of soils
(ii) store spoils away from the side of the river or any canals in the area to avoid

being washed down; and

(iii) Avoid construction works near these sites during the spawning and breeding period between June and September.

148. **Impacts to protected and areas and critical habitats.** Subproject area is located within the Pourashava which is a built-up area. No ecologically sensitive areas nearby, therefore, no impact is predicted. No mitigation measure is necessary.

149. **Impact to Traffic.** Drainage rehabilitation works will render some portions of the road impassable at periods of time. This scenario will create traffic congestion and disturbance to pedestrians and motorists in the vicinity of the affected area if not properly managed.

150. A traffic management plan (TMP) will be developed prior to construction and approved by the PIU. The TMP shall include the following: (i) installation of clear signages; (ii) barricades; (iii) lightings at night; and (iv) markers to direct traffic movement in sites, among others. A sample TMP is attached with this IEE as Appendix 4. Emergency response plan must be prepared for any traffic accident during construction.

151. **Disruption of Public Access.** Public access to establishments adjacent the drainage alignments may be disrupted during construction activities.

152. Mitigation measures to ensure safe access shall be implemented by the contractor. Among which are the following:

(i) Prior coordination with the surrounding community on operation and work schedules.
(ii) As necessary, increase workforce for speedy completion;
(iii) Inform through display board about nature, duration of construction and contact for complaints;
(iv) Schedule material deliveries on low pedestrian traffic hours;
(v) Restore damaged properties and utilities;
(vi) Erect and maintain barricades if required;
(vii) Pedestrian access will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained.
(viii) Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the traffic management plan.

153. **Impacts on physical cultural resources (PCR) and chance finds.** The subproject area is not located near nationally or internationally protected historical, cultural and archaeological sites. However, few alignments are adjacent a locally recognized mosques. Detailed design will ensure these mosques will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. The local people use these for the purposes of religious, social and cultural gathering. However, as a precautionary approach, the contractor will be required to implement the following measures in the event of a chance finds:

(i) strictly follow the protocol by coordinating immediately with PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works;
(ii) stop work immediately to allow further investigation if any finds are suspected; and
(iii) request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance finds, and comply with further instructions.

154. Common property resources/community facilities in the subproject area include mosques, graveyards, temples, cremation ground, playground, open water bodies, and Eidgahs (place for offering Eid prayers). The mitigation measures are discussed in “Disturbance of private/common properties, physical cultural resources” under the design phase.

155. **Impacts on socio-economic activities.** The impacts will result from excavation works, stockpiling, the operation of construction vehicles and equipment, and accidental damage to utilities (e.g., power supply poles, open drains, and water taps or hoses). The potential impacts include disturbance to economic activities, particularly to the businesses operating along the alignments of construction works.

156. Contractor will be required to:

(i) Implement the traffic management plan in collaboration with local authorities;
(ii) Where traffic congestion will likely occur, place traffic flagmen during working hours;
(iii) Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;
(iv) If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities;
(v) Provide convenient access to pedestrians when works occur in front of residential, commercial or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas.
(vi) Provide appropriate compensation to qualified affected people or businesses per approved resettlement plan for the subproject;
(vii) Manage stockpile;
(viii) No drainage water will be disposed elsewhere beyond the canals. If water logging occurs at any section of the drain that is scheduled for rehabilitation, pumping and bailing out of the water will be undertaken prior to any construction works. The water will be pumped to the other section/s of the canal where no works is in progress. Pumping will continue as required until the rehabilitation works are completed at the affected section;
(ix) Relocate the affected power supply poles, and
(x) Advise the concerned authority during accidental damage to utilities.

157. **Occupational health and safety risks.** Safety risks and health issues arise from storage, handling and transport of hazardous construction material. Construction workers are also at risk of accidents due to moving vehicles, and other construction related activities. Workers are also exposed to high level of pollution from dust, exhaust of vehicles and machinery and noise. Further, if workers do not keep to regulated working hours, the risk of accident events will be higher due to fatigue. Insufficient supply and improper use of personal protective equipment (PPE) and lack of safety procedures may cause injuries or fatal accidents. Spread of COVID-19 is also a risk to manage among workers. It is expected that, at peak time there will be 30-40 workers at a time on each site, which can easily trigger COVID-19 human transfers. There is also a risk of transmitting COVID-19 to the residents.

158. The contractor will be required to implement the following measures:

(i) All relevant provisions of the Bangladesh Labor Act, 2006 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase;
(ii) Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities[18] and EHS Guidelines on Waste Management Facilities. These practices include recommended measures to prevent, minimize and control pathogens from inflicting workers through training and use of appropriate PPEs, clothing and equipment when working along the drainage system, and immunization and health monitoring (e.g. hepatitis B and tetanus).
(iii) Hazardous working conditions in some places of the facility due to lack of oxygen and flammable nature of methane emissions will be detrimental to the health and safety of workers and facility. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety;
(iv) Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19). See Appendix 6 for a sample guidance note in responding to COVID19;
(v) A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital;
(vi) Other first aid medical equipment and nursing staff will be made available or arranged on-call;
(vii) The contractor will, at his own expense, conform to all disease prevention instructions as may be given by PMU/Divisional/Regional Office and/or PIU;
(viii) Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce;
(ix) The contractor shall provide at cost all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications and provide personal protective equipment (PPE) to all the laborers working at the construction site;
(x) Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards;
(xi) Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any;
(xii) Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and
(xiii) Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.

159. **Community health and safety risks.** Communities will be moderately exposed to threats due to impacts on air and water quality, ambient noise level; mobility of people, goods, and services; accesses to properties, economic activities, and social services; service disruptions, etc. Construction workers may potentially bring communicable diseases in the community, including COVID-19.

160. To mitigate these impacts, the contractor will be required to implement the following measures:

18 IFC World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning*.

(i) Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work;
(ii) Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;[19]
(iii) Follow established community health and safety protocol on emerging infectious diseases such as COVID19. See Appendix 6 for a sample guidance note in responding to COVID19;
(iv) Implement measure to prevent proliferation of vectors of diseases at work site;
(v) Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (CTCRP);
(vi) Schedule transportation activities by avoiding peak traffic periods;
(vii) Clean wheels and undercarriage of haul trucks prior to leaving construction site;
(viii) Educate drivers: limit speed not more than 30 km/h in settlements and avoid use of horn;
(ix) Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement;
(x) Provide prior information to local people, particularly the Madrasa and mosques nearby about work schedules;
(xi) Noise barriers must be installed in between the construction site and Madrasa/mosque sites to reduce the noise level;
(xii) Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and
(xiii) Ensure contractor has staff trained on emergency response.

161. **Post-construction clean-up and reinstatement.** Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction.

162. The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken:

(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required;
(ii) All excavated road/drainages shall be reinstated to original condition;
(iii) All disrupted utilities restored;
(iv) All affected structures rehabilitated/compensated;
(v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up;
(vi) All hardened surfaces within the construction camp area shall be ripped;
(vii) All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document;
(viii) The contractor must arrange the cancellation of all temporary services;

19 IFC World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning*.

(ix) Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.

D. Operation Phase Impacts and Mitigation Measures

163. Once completed, the drainage subproject will provide beneficial environmental impact to Patuakhali Pourashava and its population. Potential flooding will be avoided and improved aesthetic or landscape will be expected.

164. However, these beneficial impacts will not be sustained if no proper operation and maintenance is in place. Hence, Patuakhali Pourashava as PIU will need to undertake the following actions to ensure that the rehabilitated drainages and khals (canals) operate sustainably:

(i) Establish a program of regular visual inspection to identify problems early, before they become critical (e.g., breakage, plugging, etc.);
(ii) Ensure that all remedial actions are implemented promptly, including clearing sediment and other materials that could cause blockage, and conducting any required physical repairs to the drains to prevent leaks; and
(iii) Include in the Pourashava budget a permanent allocation for undertaking the above tasks.
(iv) Continue to encourage community participation in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible.

E. Cumulative Impacts and Mitigation Measures

165. There are no similar construction or project activities in the area that would result in cumulative environmental impacts. Direct impacts during construction phase, including, among others, increase in noise levels, fugitive dust, and common air emissions near the construction areas, are temporary in nature and will not result in cumulative adverse impacts to people and environment with the implementation of mitigation measures discussed in this IEE report.

F. Unanticipated Impacts during Construction and Operation

166. In the event of unanticipated environmental impacts not considered as significant during implementation and not considered in the IEE and EMP, the PMU shall prepare a corresponding time-bound and budgeted corrective action plan acceptable to ADB and ensure that these are implemented by the contractor/s and reported accordingly in environmental monitoring reports to ADB. If unanticipated environmental impacts deemed as significant become apparent during project implementation, the PMU will: (i) inform and seek ADB's advice; (ii) assess the significance of such unanticipated impacts; (iii) evaluate the options available to address them; and (iv) update the IEE including EMP. ADB will help the borrower mobilize the resources required to mitigate any adverse unanticipated impacts or damage.

VII. INFORMATION DISCLOSURE, CONSULTATION AND PARTICIPATION

A. Consultation and Participation

167. Meaningful consultation is an essential part of the environmental assessment process which enables the incorporation of all relevant views of affected people and other stakeholders into decision making, such as project design, mitigation measures, and the sharing of development benefits and opportunities, and implementation issues. The process also helps avoid potential conflicts with stakeholders for smooth project implementation. The findings from the public consultations are documented and considered in the development of the EMP, especially in identifying the significant impacts of the proposed Project and developing the corresponding mitigation measures.

168. Consultations may be conducted through focus group discussions, interviews, and town meetings. During these activities, implementation of COVID-19 health and safety measures as per local and national guidelines must be observed.

169. The key stakeholders to be consulted include:

(i) Project beneficiaries;
(ii) Elected representatives, community leaders and representatives of community-based organizations;
(iii) Local non-government organizations (NGOs);
(iv) Local government and relevant government agency representatives, including local authorities responsible for land acquisition, protection and conservation of forests and environment, archaeological sites, religious sites, and other relevant government departments; and
(v) Residents, shopkeepers, businesspeople, and farmers who live and work near the subproject.

B. Public Consultations Conducted

170. Consultations were conducted with key stakeholders and community members in line with ADB's requirements pertaining to environmental and social considerations. These consultations helped in identifying the felt needs, concerns and apprehensions of the communities related to the project and their priorities.

171. On 1 November 2021 and 5 November 2021, consultation meetings were conducted with the stakeholders in Patuakhali Pourashava at ward no 01 and ward no 09. Key issues discussed included the following:

(i) Community benefits realized as a result of the Drain schemes;
(ii) Resettlement and social issues and mitigation measures according to Resettlement Framework prepared and approved by ADB and government Bangladesh for this project;
(iii) Participation of local community during the construction phase;
(iv) Roles and responsibilities of different stakeholders for realizing desired outcome;
(v) Potential social and economic impacts of the proposed Drain construction/ improvement.
(vi) Awareness of the local community about the proposed Drains;
(vii) Opinion of the local people about its need;
(viii) Community support and participation;
(ix) Construction and maintenance of the Drains;
(x) Participation of local people for construction and maintenance

172. There were 126 local people (90 males and 36 females) as participants, which translates to about 30% participation by women during the consultations meetings. The consultation meetings were able to gather the views, opinions and concerns of the different stakeholders. The following are the description of the nature of views and concerns from the participants:

173. The CTCRP Consultant also discussed on the following Points of FGDs and invited the opinions of the participants.

(i) Safeguard Issues:

a. Position of land and trees and its ownership (check bayadalil, namjari record, dalil, etc);
b. Construction of Road and Road side drainage system, cyclone shelter, water supply, sanitation, and other municipal infrastructures includes: access road, bridges, solid waste management plant, bus terminal, slum improvements, boat landing/ ferry ghats, markets/growth centres etc.;
c. Community Support for constructing these schemes;
d. Benefits from these infrastructures' establishments by the community Workers Health & Safety; and
e. Disseminate information about project implementation.

(ii) Emergency & Gender Development Issues:

a. Instructions for the Contractors to employ women workers with same wage scale and safeguard facilities (gloves, apron, sanitation, tube well, workers' shed equal and separate facility for men and women at work site);
b. Orientation/Training Program for women groups/ workers/ women headed family heads to promote understanding of women about interrelationship between environment, sanitation, solid waste management, health and hygiene (facility) and its use;
c. Advance Emergency Warning System;
d. Comm. Mobilization Facilitator must monitor contractors' assignments for Gender development issues. Proper documentation as per LGED reporting format; and
e. CMF must arrange gender awareness raising meetings with the TLCCs members at project /Ward level (a minimum 2 such meetings in a week)- as per LGED guideline/manual.

174. During question-and-answer session the local people hoped that the entitled persons would not be harassed unnecessarily during compensation payment. The recommendation and suggestions of affected persons are as follows: Drain Schemes:

(i) They will be happy to have improved Drain communication;
(ii) Nobody will claim for any compensation for any type of impact if not entitled;
(iii) If necessary, they will provide undertaking;
(iv) The participants opined to be happy to have improved Drain communication with improved Drain facility in the near future by the Pourashava;
(v) Engage local people to construction works by their capacity; and
(vi) Construction works should be completed in dry season.

175. Minutes, attendance sheets and photos of public consultation, and the no objection certificate is in Appendix 7.

C. Future Consultations during Detailed Design Stage

176. Stakeholder consultations will continue during the detailed design stage and throughout the project implementation. PMU and PMSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS 2009. The summary of the IEE will be locally disclosed in an accessible place and in a form and language(s) understandable to affected people and other stakeholders before consultations to give stakeholders a chance to read it and consult experts.

D. Information Disclosure

177. Information shall be disclosed through public consultation and making available relevant documents in public locations. ADB will disclose upon receipt of acceptable reports and endorsement from the PMU. The following documents will be submitted to ADB for disclosure on its website: [20]

(i) IEE report (including subproject EMP);
(ii) Updated IEE (including EMP) and corrective action plan prepared during project implementation, if any; and
(iii) Environmental monitoring reports.

178. The EA/IA will send a written endorsement to ADB for disclosing these documents on the ADB website. The PIUs will provide relevant safeguard information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. For the benefit of the community, the summary of the IEE will be translated in Bangla and made available at: (i) office of PMU; and (ii) offices of the contractors. Hard copies of the IEE report will also be available at the PMU and accessible to citizens as a means of disclosing the document and at the same time creating wider public awareness. On demand, the person seeking information can obtain a hard copy of the complete IEE document at the cost of photocopy from the office of the Project Director, on a written request and payment for the same. Electronic version of the IEE will be placed in the official website of LGED after approval of the documents by Government and clearance from ADB. Disclosure will follow ADB's Access to Information Policy, 2018.

[20] Per ADB SPS, 2009, prior to disclosure on ADB website, ADB reviews the "borrower's/client's social and environmental assessment and plans to ensure that safeguard measures are in place to avoid, wherever possible, and minimize, mitigate, and compensate for adverse social and environmental impacts in compliance with ADB's safeguard policy principles and Safeguard Requirements 1-4." Upon its receipt of acceptable safeguard documents and endorsement by PMU, ADB discloses the same on ADB website.

VIII. GRIEVANCE REDRESS MECHANISM

179. A common GRM will be in place for social, environmental, or any other grievances related to the project; the resettlement plans (RPs), RSECPs and IEEs will follow the GRM described below, which is developed in consultation with key stakeholders. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

180. Across the *Pourashava,* awareness on grievance redress procedures will be generated through a public awareness campaign. The project implementation unit (PIU) under the guidance of Deputy Project Director PMU and Deputy Director Regional Municipal Support Unit of Divisional/Regional Office will conduct *pourashava*-wide awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements and will work with the PIU safeguards assistant to help ensure that their grievances are addressed.

181. Affected persons will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes that will be installed by project *pourashavas* or through telephone hotlines at accessible locations, by e-mail, by post, WhatsApp or by writing in complaints register that will be kept in *pourashava* offices. Appendix 8 has the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The Deputy Project Director from PMU, Divisional/Regional Offices, and PIU will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party.

182. **Grievance redress process**. In case of grievances that are immediate and urgent in the perception of the complainant, the Social Coordinator, Contractor and Social Safeguard and Environment Specialist from the project management and supervision consultants (PMSC) on-site will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact phone numbers and names of the concerned PIU safeguards assistant, contractors, PMU safeguards officer, PMSC environmental and social safeguards specialists will be posted at all construction sites at visible locations.

183. **1st Level Grievance, Pourashava Level PIU.** The contractors, PIU Safeguard and Gender Focal person can immediately resolve issues on-site or at *pourashava* level in consultation with each other and with the support of Administrative Officer of *Pourashava,* designated municipal ward councilor and will be required to do so within 7 days of receipt of a complaint/grievance. Assistance of ward level coordination committees (WLCC) will be sought if required for resolution of the issue, by any one or all of them jointly. The first level grievance redress team will comprise of the following members:

(i) Chief Executive Officer or in his absence *Pourashava* Secretary
(ii) Executive Engineer, *Pourashava* (Safeguard and Gender Focal person)
(iii) Administrative Officer, *Pourashava*
(iv) Municipal Ward Councilor (designated)
(v) EHS Supervisor/Social Coordinator, Contractor

184. The town-level grievance team shall have at least one women member. In addition, for project-related grievances, representatives of affected persons, community-based organizations (CBOs), and eminent citizens must be invited as observers in GRC meetings.

In case of any impacts on small ethnic communities (SECs), in subproject towns (example: Bagerhat), the grievance redress team must have representation of the affected SECs, the chief of the SEC group as traditional arbitrator (to ensure that traditional grievance redress systems are integrated) and/or an NGO working with SECs.

185. **2nd Level Grievance, Divisional/Regional Office, Division Level.** All grievances that cannot be redressed within 7 days at PIU level will be brought up to the Divisional/Regional Office level. Second level grievance redress team headed by the Deputy Project Director, Divisional/Regional Office supported by the Assistant Directors (environment, social safeguard and gender) and Construction Supervision and Safeguards Engineers /Asst. Supervision and Safeguards Engineers, PMSC will attempt to resolve the grievance /complaint within 7 days. At the Divisional/Regional Office level, the composition of 2nd level grievance redress team will be as follows:

(i) Deputy Director
(ii) Assistant Director (Safeguards, Livelihood and Gender)
(iii) Construction Supervision and Safeguards Engineers /Asst. Supervision and Safeguards Engineers, PMSC (Support)

186. **3rd Level Grievance, PMU Level**. All grievances that cannot be redressed within 7 days at Divisional/Regional Office level will be brought up to the PMU level. The Divisional/Regional Office safeguards team will refer any unresolved or major issues to the PMU level grievance redress team, that will be headed by the Project Director and will have Deputy Project Director, social safeguard, environment safeguards and gender Assistant Directors, and PMSC, who will resolve the complaints/grievances within 15 days. The PMU level grievance team will comprise of:

(i) Project Director, PMU
(ii) Deputy Project Director (Safeguards, Livelihoods and Gender)
(iii) Sub Assistant Engineer Safeguards
(iv) Social, Environment and Gender Specialist, PMSC (support)

187. The grievance redress process is represented in Figure 11.

188. Despite the project GRM, an aggrieved person shall have access to the country's legal system at any stage and accessing the country's legal system can run parallel to accessing the GRM and is not dependent on the negative outcome of the GRM.

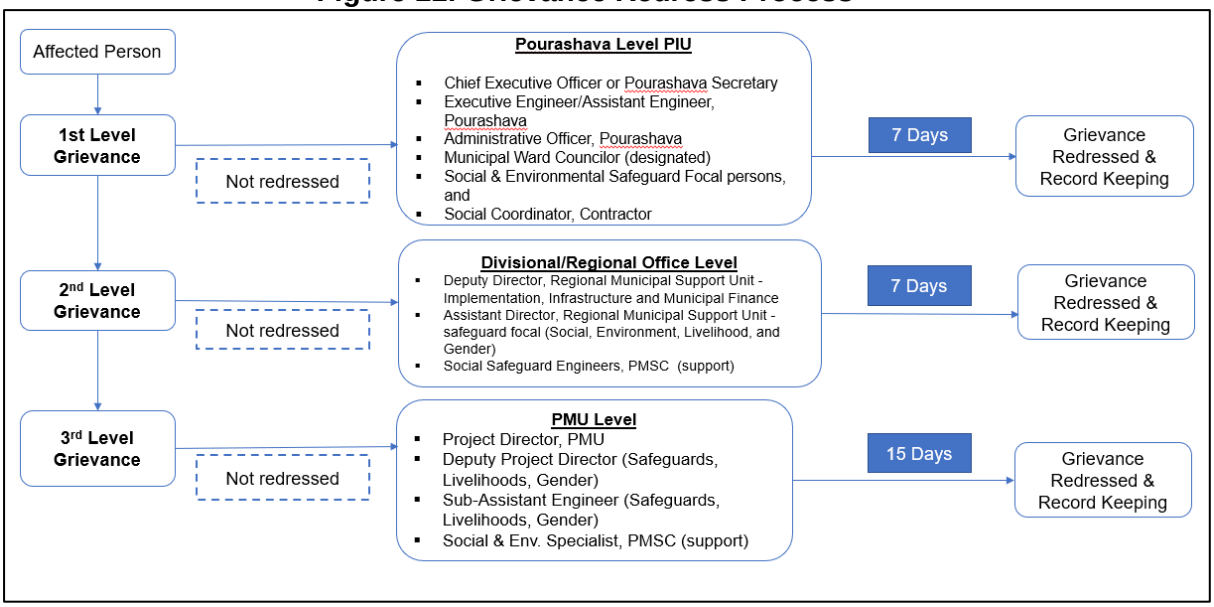
189. **ADB Accountability Mechanism**. In the event that the established GRM is not in a position to resolve the issue, the affected person can also use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Bangladesh Resident Mission (BRM). Before submitting a complaint to the Accountability Mechanism, it is necessary that an affected person makes a good faith effort to solve the problem by working with the concerned ADB operations department and/or BRM. Only after doing that, and if they are still dissatisfied, will the Accountability Mechanism consider the compliant eligible for review. The complaint can be submitted in any of the official languages of ADB's developing member countries. The ADB Accountability Mechanism information will be included in the project-relevant information to be distributed to the affected communities, as part of the project GRM.

190. **Documentation and Record keeping.** All GRC documents will be maintained by Contractor and PMU. Record of all complaints received, and action taken will be maintained at both at the field level and the PMU. This information will be available for review and verification by supervision consultants and ADB or any third party. All the grievance records will be updated regularly and easily accessible on-site.

191. **Information dissemination methods of the GRM:** GRC procedures and operational rules will be publicized widely through community meeting and pamphlets in Bengali so that the affected persons are aware of their rights and obligation, and procedures of grievance redress. Grievances received, and responses provided will be documented and reported back to the affected persons.

192. **Costs:** All costs involved in resolving the complaints (meetings, consultations, communication, and reporting/information dissemination) will be borne by the PMU.

Figure 11: Grievance Redress Process



GRC = grievance redressal committee; PIU = project implementation unit; PMSC = project management and supervision consultants; PMU = project management unit
Note: In case of project towns where impacts to SEC are assessed, the PIU-level grievance redress committee/team will have representation of the affected SECs.

IX. ENVIRONMENTAL MANAGEMENT PLAN

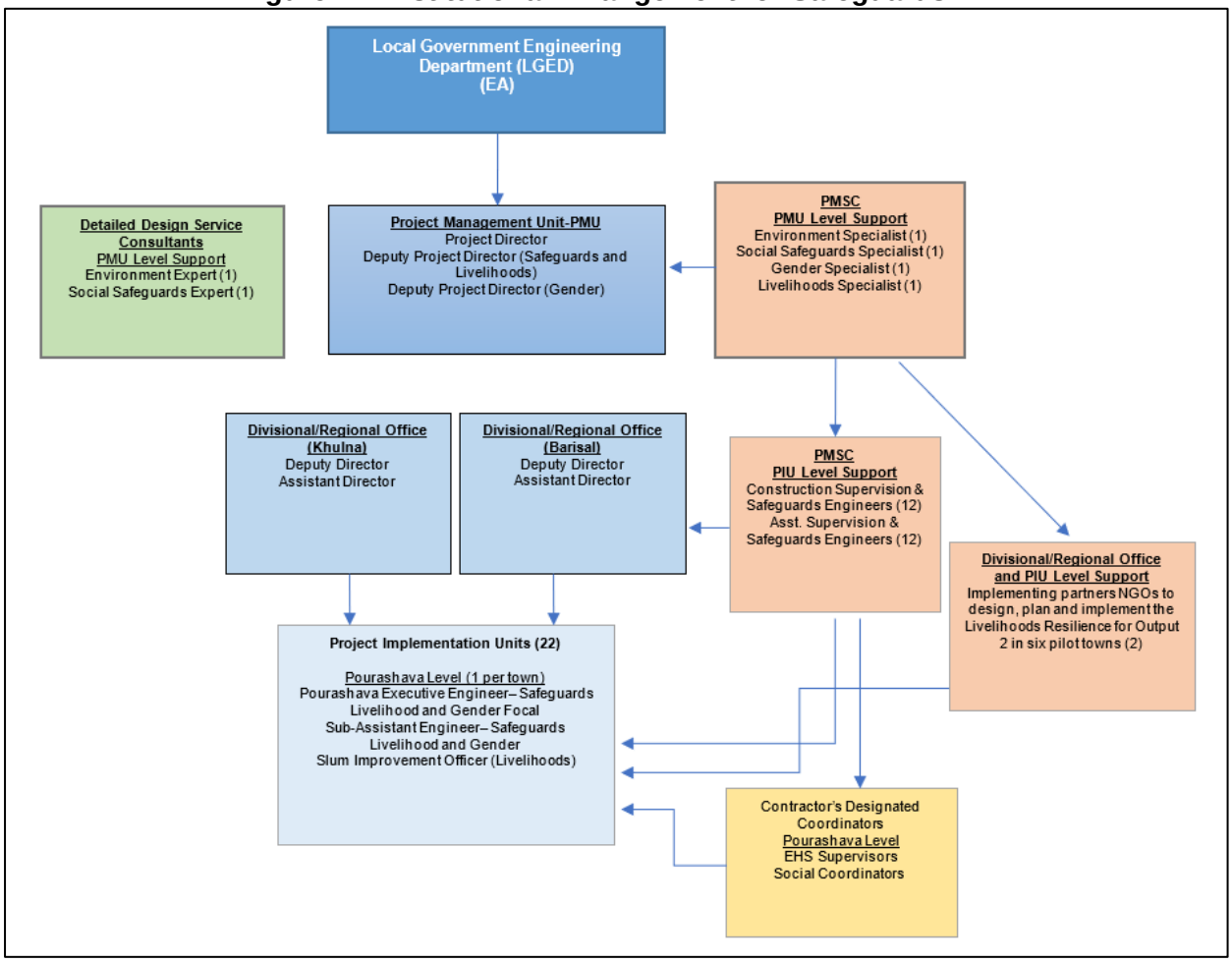
193. This environmental management plan (EMP) has been prepared in accordance with the ADB's Safeguard Policy Statement 2009. This EMP identifies the minimum requirements with regard to the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout design, construction and operation periods of the project, to avoid, minimize or offset the potential environmental impacts identified in the chapter on Anticipated Environmental Impacts and Mitigation Measures of this IEE. This chapter also discusses the institutional arrangement, roles, and responsibilities for the effective implementation of the EMP.

E. Institutional Arrangement

194. The Ministry of Local Government, Rural Development and Cooperatives, acting through its Local Government Engineering Department (LGED), will be the Executing Agency. Pourashavas or towns selected as beneficiaries of the project are the implementing agencies

195. Figure 12 below shows the institutional arrangement for safeguards of the overall project.

Figure 12: Institutional Arrangement for Safeguards



DDSC = Detailed Design Service Consultant; EHS = Environment, Health, and Safety; PIU = Project Implementation Unit; PMSC = project management supervision consultant; PMU = project management unit

196. **Project Management Unit (PMU)**. A PMU will be created within LGED to support the management and supervision of the project. The PMU will coordinate environment safeguards planning and implementation and ensure that the environmental assessment and review framework is followed during subproject implementation. The PMU will be headed by a project director (PD) of Executive Engineer rank. The PD will be supported by a Deputy Project Director (DPD) who is also a permanent staff of LGED and will serve as the environmental safeguards focal person in the PMU on concurrent capacity. The PMU will be assisted by two consultant teams, namely: Detailed Design Service Consultant (DDSC) and Project Management and Supervision Consultant (PMSC). DDSC and PMSC will each include an Environment Specialist who will support in the efficient overall implementation of environmental safeguards of the project, through tasks described in relevant paragraphs below. The PMU will work closely with the Divisional/Regional Offices and project implementation units (PIUs) at the *Pourashava* level. The PMU will have the following responsibilities with regard to environmental safeguards:

(i) Ensure subprojects comply with the national and local statutory and legal environmental requirements, ADB SPS 2009, EARF and environmental safeguards provisions of the ADB loan covenant;
(ii) Ensure subprojects conform to exclusion criteria and subproject selection guidelines as stipulated in the EARF;
(iii) Review and approve the environmental categorization of future subprojects;

(iv) Review and approve subproject IEE reports, including EMPs, and ensure that subproject IEEs and EMPs are updated based on final detailed designs and submit to ADB for review, clearance and disclosure prior to bid invitation;
(v) Ensure that robust chance find protocol is put in place and implemented properly;
(vi) Engage competent heritage experts and oversee conduct of heritage assessment study for towns where there are notified heritage areas close by (such as for example in Bagerhat); and ensure that no works/sites are located within 1 km from the boundary of any UNESCO notified heritage area or within monuments protected by Department of Archaeology, Government of Bangladesh;
(vii) Ensure that updated/final IEEs based on final detailed design are provided to the construction contractor prior to start of construction ;
(viii) Ensure that the IEEs including EMPs are updated in case of changes in detailed design that may occur during implementation phase, and submitted to ADB for review, clearance and disclosure;
(ix) Ensure that IEEs with EMPs are included in bidding documents and civil works contracts;
(x) Ensure that the requirement for contractors to prepare their respective Health and Safety (H&S) Plans including COVID-19 H&S Plans is included in bidding documents and civil works contracts;
(xi) Review and approve site-specific EMPs (SEMPs) of contractors;
(xii) Provide oversight on environmental management aspects of the project, and ensure EMPs and SEMPs are implemented by contractors;
(xiii) Establish a system to monitor environmental safeguards of the Project including monitoring the indicators set out in the monitoring plan of the IEE;
(xiv) Facilitate timely and ensure overall compliance with all national and local government rules and regulations regarding site and environmental permits/clearances/approvals as well as any other environmental requirements as relevant;
(xv) Review, monitor and evaluate effectiveness with which the EMPs, SEMPs, and Health and Safety Plans are implemented, and recommend necessary corrective actions to be taken;
(xvi) With support from PMSC, consolidate quarterly monitoring reports from the Divisional/Regional Offices and/or PIUs and submit semi-annual environmental monitoring reports (SEMRs) to ADB;
(xvii) Ensure availability of budget for safeguards activities;
(xviii) Ensure adequate awareness campaigns, information disclosure among affected communities and timely disclosure of final IEEs/EMPs and SEMRs, including corrective action plans, if any, in project website and in a form accessible to the public;
(xix) Address any grievances brought through the grievance redress mechanism (GRM) described in this IEE report in a timely manner;
(xx) Undertake regular review of safeguards-related loan covenants, and the compliance during project implementation; and
(xxi) Organize periodic capacity building and training programs on safeguards for stakeholders, PMU, Divisional/Regional Offices, PIUs and contractors.

197. **Divisional/Regional Office of LGED, Division Level.** The Divisional/Regional Office in Barishal will be responsible for overall implementation of the subprojects within the Division. The Assistant Director of the Regional Municipal Support Unit of the Divisional/Regional Office will be responsible for Social and Environmental Safeguards, Livelihoods and Gender, with support by PMSC in the implementation of social and environmental safeguard plans and gender action plan (GAP). The Divisional/Regional Office will undertake internal monitoring and supervision and record observations throughout the project period to ensure that the safeguards and mitigation measures are provided as intended.

198. The PMU and Divisional/Regional Office of LGED will jointly oversee safeguards implementation by the *pourashava*/town level PIU, coordinate public consultations, information disclosure, regulatory clearances and approvals, implementation of resettlement plans, EMP implementation, and grievance redressal.

199. The key tasks of the Divisional/Regional Office on environmental safeguards, and PIU level PMSC as support, will be as follows:

(i) Supervise PMSC to coordinate with PIU, conduct consultations with affected persons and key stakeholders, and update PMU accordingly for all subproject locations;
(ii) Ensure and support preparation and/or updating of this IEE report by DDSC and submit to PMU for review and approval and submission to ADB;
(iii) Support PIU to obtain no objection certificates and/or permits required for the subproject at the local or pourashava level, other than those certificates or permits that are to be obtained by the contractor;
(iv) Provide all necessary support to heritage expert in the conduct of heritage assessment study in subproject towns close to UNESCO heritage areas, and coordinate with DDSC to ensure that component sites are away from these UNESCO heritage areas (1.5-2 km), and in any case, no works/sites shall be located within 1 km from the boundary of any UNESCO heritage area or within monument/sites protected by Department of Archaeology, Government of Bangladesh;
(v) Supervise PIU to ensure no subproject civil works will commence until all relevant statutory requirements are obtained;
(vi) Support PMU to ensure IEE report is included in bidding documents and civil works contracts;
(vii) Guide PIU to ensure EMP of subproject is implemented effectively and efficiently;
(viii) Consolidate monthly environmental monitoring reports received from PIU (and other PIUs in the Division) and prepare quarterly environmental monitoring reports to PMU;
(ix) Guide PIU to conduct continuous public consultation and awareness with affected persons and other key stakeholders;
(x) Address any environment-related grievances brought about through the GRM promptly;
(xi) Organize an induction course for the training of contractors, preparing them on EMP implementation and monitoring, GRM and actions towards any unanticipated environmental impacts that may occur during implementation; and
(xii) Liaise with the district administration, and other division-level stakeholders, as and when required.

200. **Project Implementation Unit (PIU), *Pourashava*/Town Level.** The PIU, such as the Patuakhali PIU for this subproject, will be established and staffed with a safeguards and gender focal person (Executive Engineer/Assistant Engineer, *pourashava*). The PIU will be assisted by PMSC. and will receive support from the Divisional/Regional Office environment, social and gender Assistant Directors and region level Construction Supervision and Safeguards Engineers, PMSC. The PIU will be responsible for implementation of the IEE/resettlement plan/resettlement and small ethnic community plan (RSECP)/GAP. The Executive Engineer (safeguards, livelihoods, and gender focal person) with the support of the Construction Supervision and Safeguards Engineers, PMSC will support PMU safeguards

Deputy Project Directors and Sub Assistant Engineers in subproject implementation. The Slum Improvement Officer at the *pourashava* will be responsible for livelihood intervention tasks and responsibilities.

201. Key tasks and responsibilities of the PIU on environmental safeguards, through the PIU safeguard and gender focal person as lead and division-level PMSC as support, are as follows:

(i) Ensure compliance with government and ADB requirements on environmental safeguards;
(ii) Provide all necessary support to heritage expert in the conduct of heritage assessment study in subproject towns close to UNESCO heritage areas, and coordinate with DDSC to ensure that component sites are away from these UNESCO heritage areaw (1.5-2 km), and in any case, no works/sites shall be located within 1 km from the boundary of any UNESCO heritage area or within monument/sites protected by Department of Archaeology, Government of Bangladesh;
(iii) With support from PMSC, review and approve site-specific EMPs (SEMPs) prepared by contractor;
(iv) Conduct regular site visits, including spot checks, to ensure the EMP and/or SEMP are properly implemented;
(v) Review monthly reports from contractor;
(vi) Prepare quarterly reports on all aspects concerning environmental assessment, management, and monitoring;
(vii) Obtain approval of the quarterly reports from the Project Engineer, and submit approved reports to Divisional/Regional Office;
(viii) Address any grievances brought about through the GRM as described in the IEE report in a timely manner; and
(ix) Support all other environmental safeguards-related activities and tasks of the PMU/Divisional/Regional Office as may be needed.

202. **Detailed Design Service Consultants (DDSC).** The project will be supported by the DDSC. The DDSC will be staffed by an Environment Expert, Heritage / Archaeological Expert, and a Social Safeguard Expert. DDSC will support PMU in designing and planning of subproject components. The DDSC will screen all subprojects for climate resilience, conduct technical surveys and detailed studies, heritage assessment studies, and prepare all engineering designs, bidding and safeguard documents. In collaboration with the PMSC Environmental Safeguards and Heritage/Archaeological Experts, the tasks of the DDSC Environmental Safeguards and Heritage Experts are as follows:

(i) Screen and categorize the subproject based on the EARF;
(ii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines; and
(iii) Ensure that technical design team works closely with the Heritage Expert; select subproject sites/work area as far as away from UNESCO heritage area if any, and in any case, no works/sites shall be located within 1 km from the boundary of UNESCO heritage area or within monument/sites protected by Department of Archaeology, Government of Bangladesh;
(iv) Ensure that all recommendations made in the heritage assessment study are in integrated into finalization of subproject sites, detailed designs, and construction methodologies; and

(v) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS.

203. **Project Management Supervision Consultant (PMSC).** The PMSC will provide project management and supervision services to support the PMU. PMU will provide support to the LGED, PMU for project management, and administration, construction supervision and quality control, safeguard compliance, municipal services operation and maintenance, monitoring and evaluations, and other activities as appropriate. PMSC will have an Environment Specialist, a Social Safeguard Specialist, Heritage/Archaeological Expert, and a Gender Specialist.

204. The key responsibilities of PMSC on environmental safeguards (PMU level and PIU level), with the support of heritage expert to be assigned in subproject towns where heritage areas are likely to be affected, are to fulfil collaborative tasks with the DDSC Environment Specialist and Heritage Expert and provide expert support to PMU, Divisional/Regional Office and PIU on the following:

(i) Screen and categorize final components of the subproject based on the EARF;
(ii) Update/Finalize the initial environmental examination (IEE) report including environmental management plans (EMP) based on final detailed design of the subproject and in accordance with ADB SPS and national laws, regulations, policies and guidelines;
(iii) Engage heritage expert to review the works sites before the start of works, and confirm on site by joint verification with PIU and heritage management authority that project component sites are away from UNESCO notified heritage area, and no works are located within 1 km of the boundary and are not within the monument/sites protected by Department of Archaeology, Government of Bangladesh;
(iv) Ensure that all recommendations made in the heritage assessment study are implemented;
(v) Conduct due diligence of associated facilities and/or audit of existing facilities, if any, during the detailed design phase, as defined in ADB SPS;
(vi) Conduct of meaningful consultations and ensure issues/concerns/suggestions raised are incorporated in the design and updated/final IEE report;
(vii) Ensure relevant provisions from the updated/final IEE report and EMP are incorporated in the bid and contract documents;
(viii) Establish grievance redressal mechanism and ensure members of the grievance committee have the necessary capacity to resolve project-related issues/concerns;
(ix) Together with the social safeguards experts, conduct safeguards capacity building to ensure PMU, Divisional/Regional Office and PIU have the capacity to implement, monitor, and report on implementation of EMP, resettlement plans and indigenous peoples plans (if any); and
(x) Monitor implementation of EMP at all work sites, including all potential safeguard issues identified in the safeguard documentation mentioned above;
(xi) Monitor any unanticipated environmental risks or impacts that arise during construction, implementation or operation of the subproject that were not considered in the IEE report and EMP. Prepare corrective action plans and ensure that these are implemented by the contractor and reported accordingly in environmental monitoring reports to ADB; and
(xii) Undertake all other tasks to ensure the subproject complies with ADB SPS and national environmental laws, rules, and regulations.

205. **Civil Works Contract and Contractor.** The IEE with EMP will form part of bidding and contract documents and verified by PMU. The Contractor will be required to designate an environment, health and safety officer (or equivalent) to ensure implementation of EMP during civil works. Contractor is to carry out all environmental mitigation and monitoring measures outlined in their contract and the IEE. The Contractor will be required to submit to PIU, for review and approval, a SEMP including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program per EMP; and (iv) budget for SEMP and EMP implementation. No works can commence until SEMP is approved by PIU.

206. Specifically, the Contractor will have the following responsibilities, among others that will be included in the bid and contract documents:

(i) Ensure that the infrastructure development works are carried out in an environmentally friendly manner, minimizing environmental impacts while ensuring the health and safety of all its workers and the minimizing disturbance to the surrounding environment and communities;
(ii) Consideration of ADB SPS, national regulations and the EMP during bid preparation and cost estimation;
(iii) Hire or designate a full time Environment, Health and Safety Officer (or equivalent) responsible for compliance to ADB SPS requirements, national regulations and the EMP. The officer/staff must have a clear terms of reference and responsibilities to ensure that all environmental and social concerns are properly managed;
(iv) Ensure regular reporting to the PIU on work progress and alert management on any potential issues or delays;
(v) Strictly follow National COVID 19 protocols and other COVID-19 related instructions issued by the government, and immediately report to the PIU upon detection of COVID positive cases at the subproject site;
(vi) Obtain the necessary permits and clearances, if any is required for the contractor, to implement the subproject;
(vii) Ensure that all worker recruitment and OHS requirements are complied;
(viii) Take necessary corrective action to rectify any non-conformance, including actions related to grievances;
(ix) Institute an emergency plan for natural calamities/disasters and accidents at the site; and
(x) Follow chance finds procedures to discovery of any physical cultural artifact.
(xi) Comply with the requirements of heritage assessment study, and follow chance finds procedures to discovery of any physical cultural artifact

207. A copy of the EMP/approved SEMP will be kept on-site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP/SEMP constitutes a failure in compliance and will require corrective actions.

208. PMU will ensure that bidding and contract documents include specific provisions requiring contractors to comply with: (i) all applicable labor laws and core labor standards on (a) prohibition of child labor as defined in national legislation for construction and maintenance activities; (b) equal pay for equal work of equal value regardless of gender, ethnicity, or caste; and (c) elimination of forced labor; and with (ii) the requirement to disseminate information on sexually transmitted diseases, including HIV/AIDS, to employees and local communities surrounding the proposed project sites.

F. Environmental Management Plan (EMP)

209. The EMP is necessary on the grounds that it will manage the environment by offsetting the negative impacts with possible mitigation measures and enhancing the positive impacts within the allocated fund from the project. Thus, the main objectives of the EMP for the drainage rehabilitation subproject are:

(i) Define the responsibilities of the project proponents in accordance with the three project phases (design, construction and operation);
(ii) Facilitate the implementation of the mitigation measures by providing the technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures;
(iii) Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
(iv) Identify training requirements at various levels and provide a plan for the implementation of training sessions;
(v) Identify the resources required to implement the EMP and outline corresponding financing arrangements; and Providing a cost estimate for all proposed EMP actions

210. The Environmental Management Plan (EMP) matrix is presented in Table 14. This summarizes the potential environmental impacts, mitigation measures, responsible entity for implementation and monitoring, and cost of implementation.

Table 14: Environmental Management Plan Matrix

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Design Phase				
Integration of EMP in bidding documents and contracts	Lack of awareness by contractors on ADB SPS requirements may result in insufficient budget and non-implementation of EMP	• Implementing OHS and the EMP as well as specific provisions requiring contractors to comply with all other conditions required by ADB into the bidding and contract document. • Once the Contractor is selected, the Divisional/Regional Office/PIU with support from PMSC will inform contractors of their responsibilities in EMP implementation, in compliance with ADB and government requirements, self -monitoring and reporting procedures.	PMU, PMSC	EA
Provisions for connection to service infrastructure	Potential for unplanned construction activity due to absence of service infrastructure	• Confirm location, capacity, functionality and connection readiness of water, sewerage, electricity, heating and legal landfills to avoid wastewater dumping, ad-hoc connection arrangements, or inappropriate waste disposal during the construction phase.	PIU, DDC	PMU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Integration of climate change considerations in design	Extreme weather events such as heavy rainfalls and tidal surges leading to flooding in the area	The impacts of climate change will be mitigated upfront during the design and planning stage for the drainage construction and improvement subproject. Among these measures are the following: • Due to climate change, the river water level will rise and as a result may overflow causing flooding of roads and establishments. Therefore, the appropriate base depth level of the canals for desilting and excavation should be determined; • The differences in water level between base and future time should be computed as it is needed to estimate the additional drainage embankment height required. This is in addition to the resulting depth of the canal after excavation or desilting; • The drainage canal is expected to drain a significant additional discharge due to climate change-induced higher rainfall during monsoon seasons. Therefore, widening of some sections of the drainage should be considered. However, any widening activities should also consider any social safeguard implications; and • Maximum possible efforts have to be made for minimizing cutting of trees while designing the rehabilitation and protection of the drainage canal walls and embankments.	PIU, DDC	PMU, Divisional/Regional Office, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Impacts on local hydrology	Local waterlogging problems and obstruction of natural water flows in the vicinity	• Detailed assessment of the microhydrology and topography of the subproject site; • Design the roads according to the slope and elevation relative to the water bodies that may exist in the area; and • Provide the appropriate design of drains for road stretches that do not have existing drainage or where persistent flooding has been recorded	PIU, DDC	PMU, Divisional/Regional Office, PMSC
Pre-Construction Phase				
Updating of IEE	IEE and EMP out of date due to changing conditions or design	The PMU shall update the IEE in case of change in design/based on the final detailed design and submit the same for review and clearance of ADB.	PMU, PMSC	EA
Disruption of Existing Utilities	Disruption of infrastructure and services	• Conduct investigation at site to determine all the existing utilities that will likely be disturbed during construction phase; and • Coordinate with agencies responsible for the maintenance of the utilities and formulate a plan to minimize disruption of services during construction phase. The plan must be formulated in coordination with LGED and stakeholders at the site such as the managements of Madrasa and mosque. Where required, the responsible agency shall be requested by PIU to carry out the necessary works at the	PIU, DDC	PMU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		time required and at cost of the subproject. • Avoid conventional raised plinth design that blocks water runoff, rather design should prioritize structure built on raised columns that can allow water to pass through; and • Design needs to consider additional drainage facilities and water storage.		
Disturbance of private and common properties and physical cultural resources	Damage to private and common properties (such as boundary walls, ramps, fences, telephone and electric poles, roadside business structures, houses), government infrastructure (District jail, Registry Pool, Income Tax Office), residence of DC, canal and water bodies (Bapari Bari Canal, Nandokanai Canal), residential area (Kalatala Housing); educational institution (Polytechnic institute, girls school , PTI, College); commercial areas (Titas cinema hall, Press, Launch	• Conduct investigation at site to determine if any existing private or common properties/structures will be disturbed during construction phase; • Conduct meaningful consultation with stakeholders whose private and common properties may be affected by the construction works • Ensure that all works will be confined within existing road and side drains alignments, and within existing rights-of-way (ROWs). • Avoid disturbance or damage of physical cultural resources through proper design of road alignments and demarcating construction area; and • Ensure the implementation of measures according to the resettlement plan for the subproject, as necessary	PIU, DDC	PMU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	Ghat, B-Type Bazar, Banks); and mosques			
Material sourcing	Sourcing of aggregates from illegal quarries	• The bid documents should include a clause on material sourcing that will require the contractor to source construction materials from legal or government-approved sources only. • No new quarry sites shall be used for the subproject; • Verify suitability of all material sources and obtain approval of PMU/Divisional/Regional Office or PIU; and • Document all sources of materials and include in the monthly reporting to the PIU.	PMU, RMU, PIU	EA, ADB
Drinking water quality	Groundwater may have arsenic levels that could be detrimental to the health	• The bid documents should include a requirement that Contractor will ensure that tube wells are installed or drilled to appropriate depths wherein water quality shows compliance with the drinking water quality standards, particularly for arsenic parameter. • The Contractor will undertake groundwater quality sampling and analysis to ensure that water from these tube wells are in compliance with the drinking water quality standards (see Table 9 of this IEE report for the complete set of drinking water quality standards). • If the groundwater quality is not suitable and does not comply with drinking water	PMU, DCC DCCS, Contractor	EA PMU/Divisional/Regional Office, PIU

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		standards, the contractor will source potable water from alternative source or provide potable onsite treatment facility with own costs and approval from PIU/PMU.		
Consents, Permits and Clearances	Failure to obtain necessary consents, permits, and clearances can result in design revisions and/or stoppage of the Works.	• All necessary local clearances and no objection certificates will be obtained prior to award of contract. • LGED will contact the Upazila Parishad for clearance and NOC for construction. • Environmental clearance will be obtained prior to award of contract. • Additionally, any permits or consents required from relevant government agencies for construction activities near UNESCO World Heritage Sites or locally recognized monuments (if present) will be obtained.	PMU, PIU, PMSC	EA, ADB
EMP Implementation Training	If the contractors and construction supervision engineers are not aware about the requirements of this EMP, the project may not proceed and comply with ADB and GoB environmental policies.	• The PMU, Divisional/Regional Office, PIU and contractors will be required to undergo training on EMP implementation.	PMU, Divisional/Regional Office, PIU, PSMC	EA, ADB
Community awareness of project activities and impacts.	Lack of community awareness on project activities may result in potential community	Before the start of project construction, the community should be made aware of the upcoming project and project activities.	Divisional/Regional Office, PIU, Contractor	PMU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	health and safety concerns and complaints.	Important information to be disseminated to the people are, among others, the following: • Overview and objectives of the proposed project; • Preliminary and/or final detailed design of proposed project components; • Potential environmental and social impacts (positive and negative) of the project, and the proposed mitigation measures for the perceived negative impacts; and • Grievance redress mechanism and contact details of the project.		
Construction Planning	Inadequate planning could lead to nonimplementation of EMP during the construction phase and result in significant environmental impacts leading to noncompliance with ADB's environmental safeguard requirements.	• Designate an Environmental Health and Safety Officer (EHSO). • Conduct training on the rationale for and implementation of the SEMP and EMP to enhance general understanding and clarify responsibilities regarding implementation, including monitoring and reporting, must also be provided to relevant staff of contractors (including EHSOs) The Contractor will be required to submit to PMU, for review and approval, a SEMP including (a) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes, (b) specific mitigation measures following the approved EMP; (c) monitoring program as per EMP; and (d) budget for SEMP	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		implementation. No works can commence prior to approval of SEMP. The SEMP will include the following: (i) Construction Compound Management Plan; (ii) Construction Traffic Management Plan; (iii) Construction Health and Safety Plan (including COVID-19 H&S guidance); (iv) Materials Management Plan; (v) Noise and Vibration Management Plan (vi) Water Quality Management Plan; (vii)Dust Management Plan; (viii)Waste Management Plan; and (ix) Emergency Incident Response Plan.		
Construction Phase Impacts and Mitigation Measures				
Excavation Works	Excavations may affect local drainage patterns if surface and groundwater collect in voids as they are being dug.	• All excavations shall be done to the minimum dimension as required for safety and working facility. • The excavation shall be executed in such manner, that the contractor does not damage or interfere with existing services or structures. If damage or interference is so caused, the contractor shall make arrangements with the supply and/or building owner to execute the repairs at the contractor's own cost. • All excavations and other work shall be carried out during nighttime at busy road section. • Road drains and channels shall be kept free from obstructions at all times.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Removal of Trees	Trees have been identified within the vicinity of subproject alignments, which might be affected during the construction phase.	• After the finalization of the designs and layout of the project components, the trees within proposed construction areas will be marked; • Trees within area required for construction will be felled after prior approval; • Replacement of the tree shall be undertaken by LGED at the replacement ratio of two trees for every tree that is cut (i.e., 2:1 ratio); Indigenous/native species will be preferred in tree planting; • Only trees that will require removal within the proposed construction areas of the sites will be cut; and • For trees that will not be cut, take all precautions to protect them from any damage from construction activities.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC
Soil erosion and sediment mobilization	Excavation during construction will generate loose soil which can be carried through surface run-off during a rainfall.	• The Contractor shall plan his works to minimize surface excavation works during the rainy season where practicable. • Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecast, and actions to be taken during or after rainstorms shall be developed by the Contractor. • The earthwork sites where exposed land surface is vulnerable to runoff shall be consolidated and/or covered.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		Channels, earth bunds, netting, tarpaulin and or sandbag barriers shall be used on site to manage surface water runoff and minimize erosion. • The overall slope of the works areas and construction yards shall be kept to a minimum to reduce the erosive potential of surface water flows. • Monitor groundwater quality that could exist close to the working areas to ensure compliance.		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Surface water pollution	Silt-laden run-off from stockpiled materials, solid wastes and domestic wastewater from the construction camp, and leaks from chemical storage areas and machineries may contaminate or result in water pollution if disposed or discharged to nearby receiving bodies of water	• Provision of temporary sedimentation canal and/or silt traps along construction areas, particularly alignments that are adjacent to receiving bodies of water or canals. • The measures to address soil erosion at the proposed facilities will consist of measures as per design, or as directed by the PMSC to control soil erosion, sedimentation, and water pollution. All temporary sedimentation, pollution control works, and maintenance thereof will be deemed incidental to the earthwork or other items of work. • All temporary discharge points shall be located, designed and constructed in a manner that will minimize erosion in the receiving channels. • Ensure proper compaction of refilled soil and there shall not be any loose soil particles on the top; the material shall be refilled in layers and compacted properly layer by layer. • Use surplus soil for beneficial purposes such as in any other construction activities, or to raise the level of low lying areas; • Avoid scheduling of excavation work during the monsoon season. Earthworks during dry season; • Confine construction area including the material storage (sand and aggregate) so that runoff will not enter the site; • Ensure that drains are not blocked with excavated soil; • Stockyards at least 50 meters (m) away from watercourses;	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%; • Daily control of machinery and vehicles for leakages; • No obstruction in flowing water; • For effluents from workplace, camps, and offices, provide treatment arrangements such as retention ponds and septic tanks which should be incorporated in the facility designs. A sewage management plan has to be prepared by the contractor and agreed with the PMSC; • Monitor water quality according to the environmental monitoring plan; • Collection of recyclable solid wastes and supply to scrap vendors; • Ensure all the camp wastes and construction wastes are placed in the designated waste collection pits away from receiving water; • Establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, mobile, burnt oils, etc. at the construction site; and • Consultation with PIU on the proper		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		disposal of all residual wastes.		
Groundwater use and contamination	Increased demand for groundwater is anticipated during the construction phase for construction activities and personal consumption by workers. Even a small project can require 100 m3/day of water. Uncontrolled extraction of water may affect availability of water to locals. In addition, construction waste, if left unattended, will result in percolation of leachate through the soil strata reaching the groundwater table contaminating it.	It is necessary that arrangement for safe drinking water is made prior to start of work. Water will be supplied for consumption only after adequate analysis and requisite treatment. The workers may also be trained on the need for judicious use of freshwater resources. The contractors will use water in consideration to its value as a resource. Mitigation measures will include: • Prevent pollutants from contaminating the soil and the groundwater; • All tube wells, test holes, monitoring wells that are no longer in use or needed shall be properly decommissioned; • Storage of lubricants and fuel at least 50 m from water bodies; • Storage of fuel and lubricants in double hulled tanks. Fuel and other petroleum products stored at storage areas away from water drainage and protected by impermeable lining and bunded 110%; • Daily control of machinery and vehicles for leakages; • Collection of waste during construction activities; • (Provide uncontaminated water for dust suppression; • Enclose the construction area to prevent unauthorized access.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Drainage Congestion	Construction material getting into surface run off or uncontrolled disposal may cause drainage congestion, flooding or waterlogging in neighboring areas.	The contractor shall adopt a site clearance procedure that separates topsoil and stores it under appropriate conditions for reuse as instructed by the Engineer. Wastes and construction debris will not be disposed in a manner that these would end up in drainage canals. The on-site storage of excessive quantities of unwanted spoil and aggregate materials should be avoided. Where storage is necessary, the Contractor shall ensure heaps and stockpiles are located at sites that they do not permit direct runoff into watercourses and are on land sloping at less than 1.5%. All heaps shall be of a size and stability that will ensure the risk of mass movement during period of heavy rainfall is minimized	Contractor	PMU, Divisional/Regional Office, PIU, PMSC
Impact on Air Quality	Construction activities including transport and storage of raw materials will likely create dust and emissions that could deteriorate ambient air quality in the area.	• Take every precaution to reduce the levels of dust at construction sites, and not exceeding the pre-project ambient air quality standards. • Fit all heavy equipment and machinery with air pollution control devices that are operating correctly. • Vehicles travelling to and from the construction site must adhere to speed limits to avoid producing excessive dust; • Reduce dust by spraying stockpiled soil, excavated materials, and spoils; • Cover with tarpaulin vehicles transporting soil and sand;	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Cover stockpiled construction materials with tarpaulin or plastic sheets; • Heavy equipment and transport vehicles shall move only in designated areas and roads; • Water spraying to access roads, camp sites and work sites to reduce dust emissions; • Machines and vehicles must be regularly examined and maintained to comply with requirements of technical specifications; • All vehicles, equipment, and machinery used for construction will be regularly maintained to ensure that pollution emission levels comply with the relevant requirements of DOE. Copies of conformance will be submitted regularly to the PMSC; • Repair and maintain access roads, as necessary; • Monitor air quality according to the environmental monitoring plan; • Clean wheels and undercarriage of vehicles prior to leaving construction site; • Prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Use vehicles that have government-issued permits and registrations; and • Prohibit open burning of solid waste.		
Noise	Noise generation may disturb nearby sensitive receptors (e.g school, etc.)	• Provide prior information to the local public, including institutions such as schools and hospitals along alignments that may be affected, about the work schedule; • Use equipment that emits the least noise, well maintained and with efficient mufflers. Install silencers if necessary and practical; • Restrict noisy activities to day time, except in areas near schools, places of worship, and other institutions which may be likely disturbed during day time. Consider night time works in these areas; • Avoid use of noisy equipment or doing noisy works at night time near residential areas; • Limit engine idling to a maximum of one minute; • Spread out the schedule of material, spoil and waste transport; • Minimize drop heights when loading and unloading coarse aggregates; and • Avoid use of horns unless it is necessary to warn other road users or animals of a vehicle's approach. On-site construction noise shall be mitigated to ensure a safe work	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		environment by implementing an on-site occupational health and safety plan, which considers national and international requirements. The plan shall include the following measures: • Ear muffs/protective hearing equipment shall be made available to all workers in noise critical areas • Training on how and when to use protective hearing equipment shall be conducted as part of the workers' induction sessions. • Place visually clear instructions in areas where noise emissions are significant. • Measure noise level according to the environmental monitoring plan.		
Construction wastes generation	Inadequate management of construction wastes will result in negative impact on the soil, aesthetic beauty of area and workers' and community's health and safety.	• Dispose excess spoils per the Spoil Management Plan attached in Appendix 3; • Avoid stockpiling of excess excavated soils as far as possible; • Avoid disposal of any debris and waste soils in or near water bodies/rivers; • Coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; • Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		landowners and developers seeking fill material. • The contractors should take every opportunity to reduce the amounts of waste generated and collect recyclable material for processing by local operators. • Contractor shall implement waste segregation on site. • Receptacles for solid waste should be provided for the use of workers, and their contents should be disposed of in officially sanctioned local landfills. • Construction waste should also be disposed of in legal local landfills. • Clean construction waste such as excess soil or rubble should be used in landscaping on site or given to landowners and developers seeking fill material. • Waste auditing. The contractor will record the quantity in tons and types of waste and materials leaving site during the construction phase; • Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by relevant parties; • Remove all wreckage, rubbish, or temporary structures which are no longer required.		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		For proper handling of the spoils, the following actions will be followed by the contractor: • Recover or collect the non-biodegradable waste materials from the mixture of excavated materials. This includes broken glasses and any other hazardous materials found in the dredged mixture, if any; • Handle and haul the non-biodegradable wastes and hazardous materials separately from the excavated soil; • Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints; • Haul all wastes using transport equipment such as dump trucks with proper cover (e.g. tarpaulin) to avoid accidental release along the route to the disposal site; and • Utilize haulers that are authorized to handle and transport these kinds of wastes.		
Disturbance to terrestrial flora and fauna	The subproject area is not within any forest, hence, the impacts to flora and fauna will be minimal to insignificant. Trees within the vicinity may be cut.	• Avoid, or minimize when avoidance is not possible, tree cutting; • For any tree cut, conduct replacement planting at a ratio of 1(cut):2 (new planting) and consistent with the social forestry program of LGED (see Appendix 5 for LGED Tree Plantation Program); indigenous species will be preferred for tree planting	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Protect giant trees and locally important trees (for religious reasons), if any is identified as the site during implementation; • Prevent workers or any other person from removing and damaging any other flora and fauna found in the subproject site; and • Prohibit employees and workers from poaching animals and cutting of trees for firewood in the vicinity of the site.		
Impacts on aquatic ecology	The construction of the subproject may affect nearby khals (Nandokanai Canal) and ponds and the aquatic species thriving therein due to siltation and pollutant spills.	• Provide temporary protection at sections near the river to avoid sliding of soils; • Store spoils away from the side of the Nandokanai Canal in the area to avoid being washed down; and • Avoid construction works near these sites during the spawning and breeding period between June and September.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC
Impact to Traffic	Rehabilitation works will render some portions of the road impassable at periods of time. This scenario will create traffic congestion and disturbance to pedestrians and motorists in the vicinity of the affected area if not properly managed.	A traffic management plan (TMP) will be developed prior to construction and approved by the PIU. The TMP shall include the following: • installation of clear signages; • barricades; • lightings at night; and • markers to direct traffic movement in sites, among others. Emergency response plan must be prepared for any traffic accident during construction.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Disruption of Public Access.	Public access along the road/drainage alignments may be disrupted during construction activities.	• Prior coordination with the surrounding community on operation and work schedules. • As necessary, increase workforce for speedy completion; • Inform through display board about nature, duration of construction and contact for complaints; • Schedule material deliveries on low pedestrian traffic hours; • Restore damaged properties and utilities; • Erect and maintain barricades if required; • Pedestrian access to school and mosque will be maintained with the use of walking boards. Wheelchair and disabled access shall be maintained. • Surfaced roads shall be subject to road cleaning and unsurfaced roads to dust suppression, the methodology and frequency of which shall be included in the traffic management plan.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Impacts on physical cultural resources (PCR) and chance finds.	The subproject area is not located near nationally or internationally protected historical, cultural and archaeological sites. However, few alignments are adjacent a locally recognized mosques. Detailed design will ensure these mosques will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. Excavation activities might encounter chance finds.	• Strictly follow the protocol by coordinating immediately with PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works; • Stop work immediately to allow further investigation if any finds are suspected; and • Request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance finds, and comply with further instructions.	Contractor	PMU, Divisional/Regional Office, PIU, PMSC
Impacts on socio-economic activities.	Disturbance to economic activities may result from excavation works, stockpiling, the operation of construction vehicles and equipment, and accidental damage to utilities (e.g., power supply poles, open	• Implement the traffic management plan in collaboration with local authorities; • Where traffic congestion will likely occur, place traffic flagmen during working hours; • Avoid full road closures by applying the construction method on section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
	drains, and water taps or hoses)	• If full road closure is not possible, especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities; • Provide convenient access to pedestrians when works occur in front of residential, commercial, or institutional establishments. Examples are planks with handrails that should be provided to cross excavated areas. • Provide appropriate compensation to qualified affected people or businesses per approved resettlement plan for the subproject; • Manage stockpile; • No drainage water will be disposed elsewhere beyond the canals. If water logging occurs at any section of the drain that is scheduled for rehabilitation, pumping and bailing out of the water will be undertaken prior to any construction works. The water will be pumped to the other section/s of the canal where no works is in progress. Pumping will continue as required until the rehabilitation works are completed at the affected section; • Relocate the affected power supply poles, and • Advise the concerned authority during accidental damage to utilities.		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
Occupational health and safety risks.	Construction activities could create health and safety risks to construction workers	• All relevant provisions of the Bangladesh Labor Act, 2006 and relevant WHO guidelines will be adhered to, concerning the provision of adequate measures to avoid contracting and/or spreading diseases during construction phase; • Follow international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities and EHS Guidelines on Waste Management Facilities. These practices include recommended measures to prevent, minimize and control pathogens from inflicting workers through training and use of appropriate PPEs, clothing and equipment when working along the drainage system, and immunization and health monitoring (e.g. hepatitis B and tetanus); • Follow established occupational health and safety protocol on emerging infectious diseases such as the corona virus disease (COVID19). See Appendix 6 for a sample guidance note in responding to COVID19; • Hazardous working conditions in some places of the facility due to lack of oxygen and flammable nature of methane emissions will be detrimental to the health and safety of workers and	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		facility. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety • A readily available first aid unit, including an adequate supply of sterilized dressing material and appliances, will be provided as per the factory rules. Suitable transport will be provided to facilitate the transfer of injured or ill persons to the nearest hospital; • Other first aid medical equipment and nursing staff will be made available or arranged on-call; • The contractor will, at his own expense, conform to all disease prevention instructions as may be given by PMU/Divisional/Regional Office and/or PIU; • Provide regular health check-ups, sanitation and hygiene, health care, and control of epidemic diseases to the workforce; • The contractor shall provide at cost all labor and materials and construct/install and maintain site safety, hard barricading, flexible green net, signboards, temporary day/light traffic diversions throughout the construction activities according to the specifications		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		and provide personal protective equipment (PPE) to all the laborers working at the construction site; • Launch awareness programs concerning human trafficking and the possibility of spread of sexually transmitted diseases (STDs) and HIV/AIDS using brochures, posters, and signboards; • Make available first aid kits, ambulance facilities, and fire extinguishers in camp sites, if any; • Compensation for the loss of life (a zero tolerance to loss of life policy should be developed and implemented) or for any type of injuries; and • Provide insurance to the workers. Health and safety training for all site personnel is very important and must be mandatory.		
Community health and safety risks.	Construction activities could create health and safety risks to community people.	• Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work; • Follow International best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS)	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		Guidelines on Construction and Decommissioning Activities; • Follow established community health and safety protocol on emerging infectious diseases such as COVID19. See Appendix 6 for a sample guidance note in responding to COVID19; • Implement measure to prevent proliferation of vectors of diseases at work site; • Maintain a complaint logbook in worker's camp and take action promptly of complaints. Follow the established GRM of the overall project (CTCRP); • Schedule transportation activities by avoiding peak traffic periods; • Clean wheels and undercarriage of haul trucks prior to leaving construction site; • Educate drivers: limit speed not more than 30 km/h in settlements and avoid use of horn; • Earmark parking place for construction equipment and vehicles when idling; no parking shall be allowed on the roads, that may disturb the traffic movement; • Provide prior information to local people, particularly the Madrasa and mosques nearby about work schedules; • Noise barriers must be installed in between the construction site and Madrasa/mosque sites to reduce the noise level;		

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• Provide adequate space and lighting, temporary fences, reflectorized barriers and signages at the work site; and • Ensure contractor has staff trained on emergency response.		
Post-construction clean-up and reinstatement	Construction debris, spoils, and excess construction materials may pose hazards to properties, community and environment if left unattended after construction.	The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition. The following generic measures should be taken: • Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; • All excavated roads/drainages shall be reinstated to original condition; • All disrupted utilities restored; • All affected structures rehabilitated/compensated; • The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up; • All hardened surfaces within the construction camp area shall be ripped;	Contractor	PMU, Divisional/Regional Office, PIU, PMSC

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		• All imported materials removed, and the area shall be top soiled and regressed using guidelines set out in the re-vegetation specification that forms part of this document; • The contractor must arrange the cancellation of all temporary services; • • Request PIU to report in writing that worksites and camps have been vacated and restored to pre-project conditions before		
Operation and management phase				
Operation and maintenance of drain	Once completed, the drainage subproject will provide beneficial environmental impact to Patuakhali Pourashava and its population. Potential flooding will be avoided, and improved aesthetic or landscape will be expected. However, these beneficial impacts will not be sustained if no proper operation and maintenance is in place.	• Establish a program of regular visual inspection to identify problems early, before they become critical (e.g. breakage, plugging, etc.); • Ensure that all remedial actions are implemented promptly, including clearing sediment and other materials that could cause blockage, and conducting any required physical repairs to the drains to prevent leaks; and • Include in the Pourashava budget a permanent allocation for undertaking the above tasks. • Continue to encourage community participation in ensuring drainage canals are clog-free through information and behavior change campaigns and incentives, if possible. • Hazardous working conditions in some places of the facility due to lack of	Drainage Management	LGED

Parameter	Environmental Impacts	Mitigation Measures	Institutional Responsibility	
			Implementation	Monitoring/Supervision
		oxygen and flammable nature of methane emissions will be detrimental to the health and safety of workers and facility. Put in place standard operating procedures with appropriate equipment, and workers are provided with necessary training and personnel protection equipment to safeguard health and safety		

G. Environmental Monitoring Program

211. Monitoring of mitigation measures during construction is the responsibility of the Patuakhali PIU and PMU, supported by the PMSC Environmental Specialist, while monitoring of mitigation measures during operation phase is the responsibility of the Patuakhali Pourashava and LGED. Table 15 shows the proposed Environmental Monitoring Program for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

Table 15: Environmental Monitoring Program

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Pre construction					
Secure Environmental Clearance Certificate (ECC) from Department of Environment	PMU office	PMU, PMSC	Copy of approved ECC	Before construction activities	PMU, PMSC
IEEs and EMPs are included in bid and contract documents	PMU office	PMU, PMSC	Copies of bid and contract documents	Before approval tender document	PMU, Divisional/Regional Office, RMSC
Site-specific EMP (SEMP) submitted by Contractor for approval by PIU/PMU/Divisional/Regional Office	PIU office	Contractor, PIU	Copy of approved SEMP	Before commence construction activities	PMU, Divisional/Regional Office, PMSC
Spoil management plan (SMP) submitted by Contractor for approval by PIU/PMU/Divisional/Regional Office	PIU Office	Contractor, PIU	Copy of approved SMP:	Before commence construction activities	PMU, Divisional/Regional Office,PMSC
Traffic management plan (TMP) submitted by Contractor for approval by PIU/PMU/Divisional/Regional Office	PIU Office	Contractor	Copy of approved TMP	Before commence construction activities	PMU, Divisional/Regional Office, PMSC
Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before commence construction activities	PMU, PMSC
Conduct of baseline ambient air quality and noise level monitoring	Subproject site	Contractor	Site visits and observations, Contractor records,	Before commence construction activities	PMU, Divisional/Regional Office, PIU, PMSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
			Results of laboratory analysis (if necessary)		
Conduct of baseline surface water quality monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analysis (if necessary)	Before commence construction activities	PMU, Divisional/Regional Office, PIU, PMSC
Develop archaeological protocol to protect chance finds	PIU Office	Contractor	Copy of approved Chance find Protocol	Before commence construction activities	PMU, Divisional/Regional Office,PMSC
Construction					
Implementation of SEMP; including implementation of community and occupational health and safety measures.	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PMU, Divisional/Regional Office, PIU, PMSC
Implementation of SMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMSC
Implementation of TMP	Subproject site	Contractor	Site visits, Contractor records,	Weekly or as needed	PIU, PMSC
Tree Removal and Replacement	Subproject site and planting site	Contractor	Site visits, Contractor records,	Monthly or as needed	PMU, Divisional/Regional Office, PIU, PMSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
Conduct of ambient air quality and noise level monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analysis (if necessary)	At least semi-annual or as needed	PMU, Divisional/Regional Office, PIU, PMSC
Conduct of surface water quality monitoring	Subproject site	Contractor	Site visits and observations, Contractor records, Results of laboratory analysis (if necessary)	At least semi-annual or as needed	PMU, Divisional/Regional Office, PIU, PMSC
Apply archaeological protocol to protect chance finds	Subproject site	Contractor, PMU, PIU, PMSC	Contractor records,	Once until protocol is approved	PMU, Divisional/Regional Office, PIU, PMSC
Provide EHS training for all personnel	Subproject site	Contractor	Site visits, Contractor records, interviews to workers	Monthly	PIU, PMSC
Keep accident reports and records	Subproject site	Contractor	Site visits, Contractor records, interviews to workers and	Monthly	PIU, PMSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Methods	Monitoring Frequency	Monitoring Responsibility
			community people		
Employ workforce from communities near sites	Subproject site	Contractor	Contractor records	Monthly	PIU, PMSC
Implementation of EHS measures at construction camps	Construction camp site	Contractor	Site visits; Interviews to workers at camp	Monthly	PIU, PMSC
Operation and Maintenance					
Drainage repair and maintenance	Subproject site	Patuakhali Pourashava	Site observation	Monthly	LGED
Prevent run-off/deposit of foreign materials into drains and clean drain periodically; dispose of materials removed from drains	Subproject site	Patuakhali Pourashava	Site observation	Monthly	LGED

H. Capacity Development Training

212. The PMSC Environment Specialist and Social Safeguard Specialist will be responsible for training the PMU, Divisional/Regional Office, PIU and contractors. Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

I. Environmental Safeguards

(i) sensitization on ADB's safeguard policy on environment;
(ii) introduction to environment and environmental considerations in urban infrastructures;
(iii) review of IEEs and integration into the project detailed design;
(iv) improved coordination within nodal departments; and
(v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

II. Social Safeguards

(i) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
(ii) introduction to social safeguards assessment and document requirements;
(iii) Consultation and participations requirements;
(iv) Project GRM and ADB's Accountability Mechanism; and
(v) monitoring and reporting system.

213. **Methodology**. Capacity building activities will be achieved through combination of practical methodologies available such as lecture and workshop training by experts, on-the-job training and mentoring, and continuing team meetings and exercises. The PMSC Environment Specialist will spearhead the designing of specific programs appropriate for the target participants or stakeholders, including the execution of these programs during the different implementation phases of the CTCRP, which includes the subproject. Pre-training and post-training assessment will be an integral part of the overall program to measure its effectiveness, and identify any other needed interventions to improve effectiveness, if necessary.

214. As fundamental component for the capacity building program, basic lectures and seminar training sessions will be provided by the PMSC Environment Specialist to strengthen the awareness of project stakeholders on the requirements of ADB SPS and government environmental laws, rules and regulations. Modules will be prepared and customized based on the skills set and needs of the different stakeholders. The entire training will cover basic principles of environmental assessment and management mitigation plans and programs, implementation techniques, monitoring methods and tools. A proposed lecture and seminar training program along with the frequency of sessions is presented in the following table.

Table 16: Sample Lecture and Seminar Training Program for Environmental Management

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/workshop for contractors and supervisory staff	Experience and best practice sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and Government of Bangladesh and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Bangladesh	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	Module 1: Orientation ADB Safeguards Policy Statement Government of Bangladesh Environmental Laws and Regulations Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts	Roles and responsibilities of officials/contractors/consultants towards protection of the environment Environmental issues during construction Implementation of EMP Monitoring of EMP implementation Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 Day	1 Day	1 Day on a regular period to be determined by PMU and PMSC
Participants	PMU, Divisional/Regional Office AND PIU staff (technical and environmental) involved in the project implementation	PMU, Divisional/Regional Office, PIU, Contractor	PMU, Divisional/Regional Office, PIU, Contractor

I. Environmental Management and Monitoring Plan Implementation Cost (Indicative)

215. Most of environmental mitigation and enhancement measures are integrated into the design and cost are included as part of the civil works contract. Some items need to be incorporated in the Bill of Quantities (BOQ) of this subproject including the environmental monitoring costs. The environmental costs presented in table below are tentative provisions based on experience of undertaking similar works under different LGED projects. For the details of environmental costs under civil works contract, individual contract package bid document may be consulted. Contractors will bear the direct costs of all mitigation measures during construction, which will be included in the tender and contract documents; this includes features built into facility designs to prevent environmental impacts from arising. The PIU (Patuakhali Pourashava) will bear the costs related to mitigation measures during operation. Costs related to environmental supervision during construction will be borne by the PIU, the PMU (for the activities of the environmental consultants) and by the contractors (for monitoring work carried out by the EHS Officer/s). During the operation phase, monitoring costs will be borne by the Pourashava and/or the PIU.

Table 17: Tentative Environmental Management Plan Budget for Bill of Quantities

(The following items and costs need to be updated, including cost for potential tree replacement activities after any final survey. The final costs need to be incorporated in the BOQ and/or Provisional Sum sections of the contract of this subproject):

Impact Mitigation and Monitoring Activities	Unit	Quantity	Frequency	Rate	Total (Tk.)
Mitigation Measures (Scheme Code : 57895-22-10041) Package Number : CTCRP/PATU/21-22/DR/01					
(i) Campsite establishment. (ii) Waste treatment and disposal. (iii) Spillage and spoil management. (iv) Water leakage management	LS	1.0	1.0	50,000.00	50,000.00
(i) Dust suppression. (ii) Site safety plan implementation (iii) Misc.	LS	1.0	1.0	50,000.00	50,000.00
Covid-19 Prevention Response: Providing and maintaining temporary isolation facilities for Suspected works infected with COVID in case of emergency.	LS	1.0	1.0	120,000.00	120,000.00
Covid-19 Prevention Response: Installation of cautionary sign in term of health & safety signs and preventive messages against Covid-19 with appropriate explanatory diagrams and pictures as per Engineer-in-charge.	LS	1.0	1.0	14,000.00	14,000.00
Covid-19 Prevention Response: Providing PPEs considering covid-19 like hand gloves and Sufficient face mask for one person as per Engineer- in - charge.	LS	1.0	1.0	60,000.00	60,000.00
Covid-19 Prevention Response: Providing and maintaining a Portable hand wash station including wash basin, plastic water tank, plastic tab (Bibcock), hand wash liquid soap/ soap etc. as per Engineer-in-charge. One washing station will be used by ten persons. Contractor will responsible to fill water tank & to supply sufficient hand wash liquid soap/soap.	LS	1.0	1.0	20,000.00	20,000.00
Covid-19 Prevention Response:	LS	1.0	1.0	10,000.00	10,000.00

Impact Mitigation and Monitoring Activities	Unit	Quantity	Frequency	Rate	Total (Tk.)
Disinfection facilities with Backpack Sprayer, 4-Gallon 4-inchwide mouth opening with removable strainer, translucent tank for easy filling and cleaning; compatible with bleach solutions and fungicides; Up to 100 psi pressure; Comfort-grip poly shutoff and reinforced hose, adjustable cone and fan nozzles included; Padded shoulder straps to accommodate a full backpack for hours and maintaining with disinfectant throughout the areas of construction during the construction period as per Engineer-in--charge.					
Environmental monitoring: Air quality monitoring/sampling (PM10, PM2.5 and CO) during construction	Each	12	Sampling: 3 locations x 4 times in project duration[a]	25,000.00	300,000.00
Environmental monitoring: Water quality monitoring/sampling during construction.	Each	12	Sampling: 3 locations x 4 times in project duration[b]	10,000.00	120,000.00
Environmental monitoring: Noise level measurement	Each	12	Sampling: 3 locations x 4 times in project duration[a]	5,000.00	60,000.00
Environmental monitoring: Soil Sampling (organic matter, Nitrogen, Phosphate, Oil and Grease, Heavy Metals)	Each	4	Sampling: 1 location x 4 times in project duration[c]	15,000.00	60,000.00
Other environmental mitigation measures not included above, including measures and monitoring for unanticipated impacts during construction phase.	LS	1	1	494,042.00	494,042.00
Sub Total	**One Million Three Hundred Fifty Eight Thousand Forty Two Taka**				**1,358,042.00**
Mitigation Measures (Scheme Code : 57895-22-10042) Package Number : CTCRP/PATU/21-22/DR/02					
(i) Campsite establishment. (ii) Waste treatment and disposal. (iii) Spillage and spoil management. (iv) Water leakage management	LS	1.0	1.0	50,000.00	50,000.00
(i) Dust suppression. (ii) Site safety plan implementation	LS	1.0	1.0	50,000.00	50,000.00

Impact Mitigation and Monitoring Activities	Unit	Quantity	Frequency	Rate	Total (Tk.)
(iii) Misc.					
Covid-19 Prevention Response: Providing and maintaining temporary isolation facilities for Suspected works infected with covid in case of emergency.	LS	1.0	1.0	120,000.00	120,000.00
Covid-19 Prevention Response: Installation of cautionary sign in term of health & safety signs and preventive messages against Covid-19 with appropriate explanatory diagrams and pictures as per Engineer-in-charge.	LS	1.0	1.0	14,000.00	14,000.00
Covid-19 Prevention Response: Providing PPEs considering covid-19 like hand gloves and Sufficient face mask for one person as per Engineer- in – charge.	LS	1.0	1.0	60,000.00	60,000.00
Covid-19 Prevention Response: Providing and maintaining a Portable hand wash station including wash basin, plastic water tank, plastic tab (Bibcock), hand wash liquid soap/ soap etc. as per Engineering charge. One washing station will be used by ten persons. Contractor will responsible to fill water tank & to supply sufficient hand wash liquid soap/soap.	LS	1.0	1.0	20,000.00	20,000.00
Covid-19 Prevention Response: Disinfection facilities with Backpack Sprayer, 4-Gallon 4-inchwide mouth opening with removable strainer, translucent tank for easy filling and cleaning ; compatible with bleach solutions and fungicides; Up to 100 psi pressure; Comfort-grip poly shutoff and reinforced hose, adjustable cone and fan nozzles included; Padded shoulder straps to accommodate a full backpack for hours and maintaining with disinfectant throughout the areas of construction during the construction period as per Engineer-in-change	LS	1.0	1.0	10,000.00	10,000.00

Impact Mitigation and Monitoring Activities	Unit	Quantity	Frequency	Rate	Total (Tk.)
Environmental monitoring: Air quality monitoring/sampling (PM10, PM2.5 and CO) during construction	Each	12	Sampling: 3 locations x 4 times in project duration[a]	25,000.00	300,000.00
Environmental monitoring: Water quality monitoring/sampling during construction.	Each	12	Sampling: 3 locations x 4 times in project duration[b]	10,000.00	120,000.00
Environmental monitoring: Noise level measurement	Each	12	Sampling: 3 locations x 4 times in project duration[a]	5,000.00	60,000.00
Environmental monitoring: Soil Sampling (organic matter, Nitrogen, Phosphate, Oil and Grease, Heavy Metals)	Each	4	Sampling: 1 location x 4 times in project duration[c]	15,000.00	60,000.00
Other environmental mitigation measures not included above, including measures and monitoring for unanticipated impacts during construction phase.	LS	1	1	494,042.00	494,042.00
Sub Total	**One Million Three Hundred Fifty Eight Thousand Forty Two Taka**				**1,358,042**
Mitigation Measures (Scheme Code : 57895-22-10043) Package Number : CTCRP/PATU/21-22/DR/03					
(iii) Campsite establishment. (ii) Waste treatment and disposal. (iv) Spillage and spoil management. (iv) Water leakage management	LS	1.0	1.0	50,000.00	50,000.00
(v) Dust suppression. (ii) Site safety plan implementation (iii) Misc.	LS	1.0	1.0	50,000.00	50,000.00
Covid-19 Prevention Response: Providing and maintaining temporary isolation facilities for Suspected works infected with covid in case of emergency.	LS	1.0	1.0	120,000.00	120,000.00
Covid-19 Prevention Response: Installation of cautionary sign in term of health & safety signs and preventive messages against Covid-19 with appropriate explanatory diagrams and pictures as per Engineer-in-charge.	LS	1.0	1.0	14,000.00	14,000.00

Impact Mitigation and Monitoring Activities	Unit	Quantity	Frequency	Rate	Total (Tk.)
Covid-19 Prevention Response: Providing PPEs considering covid-19 like hand gloves and Sufficient face mask for one person as per Engineer- in – charge.	LS	1.0	1.0	60,000.00	60,000.00
Covid-19 Prevention Response: Providing and maintaining a Portable hand wash station including wash basin, plastic water tank, plastic tab (Bibcock), hand wash liquid soap/ soap etc. as per Engineering charge. One washing station will be used by ten persons. Contractor will responsible to fill water tank & to supply sufficient hand wash liquid soap/soap.	LS	1.0	1.0	20,000.00	20,000.00
Covid-19 Prevention Response: Disinfection facilities with Backpack Sprayer, 4-Gallon 4-inchwide mouth opening with removable strainer, translucent tank for easy filling and cleaning ; compatible with bleach solutions and fungicides; Up to 100 psi pressure; Comfort-grip poly shutoff and reinforced hose, adjustable cone and fan nozzles included; Padded shoulder straps to accommodate a full backpack for hours and maintaining with disinfectant throughout the areas of construction during the construction period as per Engineer-in-change	LS	1.0	1.0	10,000.00	10,000.00
Environmental monitoring: Air quality monitoring/sampling (PM10, PM2.5 and CO) during construction	Each	12	Sampling: 3 locations x 4 times in project duration[a]	25,000.00	300,000.00
Environmental monitoring: Water quality monitoring/sampling during construction.	Each	12	Sampling: 3 locations x 4 times in project duration[b]	10,000.00	120,000.00
Environmental monitoring: Noise level measurement	Each	12	Sampling: 3 locations x 4 times in project duration[a]	5,000.00	60,000.00
Environmental monitoring: Soil/sludge Sampling (organic matter, Nitrogen, Phosphate, Oil and Grease)	Each	4	Sampling: 1 location x 4 times in project duration[c]	15,000.00	60,000.00

Impact Mitigation and Monitoring Activities	Unit	Quantity	Frequency	Rate	Total (Tk.)
Other environmental mitigation measures not included above, including measures and monitoring for unanticipated impacts during construction phase.[a]	LS	1	1	494,042.00	494,042.00
Sub Total	**One Million Three Hundred Fifty Eight Thousand Forty Two Taka**				**1,358,042.00**
Tree Replacement	**Each**	**To be determined**	**To be demined**		
Total					**4,074,126.00**

[a] Number of sampling activity is indicative. Air quality sampling or noise level monitoring may not be necessary when construction activities do not generate air pollutants or high noise level that are detrimental to the environment, nearby residents, or the workers. Ambient air quality and noise level measurements will be done at the construction sites and other critical areas/points where sensitive receptors exist. Locations of sampling points for linear works shift as construction activities progress. Exact sampling locations will be selected during the works.

[b] Surface water quality sampling will only be conducted when surface water is deemed affected by the construction works. Therefore, the no. of sampling activity is indicative. Sampling will be done on the downstream of an affected water body.

[c] Soil quality monitoring may only be done once during a reporting period. It is expected that soil quality in the various drains of the Pourashava may be identical considering the common domestic source of drainage water. If there are drains serving as catchment of industrial effluents, sampling should be prioritized along these drains.

X. MONITORING AND REPORTING

216. PMU will monitor the overall progress of EMP implementation of the entire CTCRP through the different subproject jurisdictions, including the drainage construction and improvement in Patuakhali Pourashava. The PMU, Divisional/Regional Office and PIU will undertake their respective roles in site inspections and document review to verify compliance with the EMP and SEMP, and progress toward the final outcome. The contractor will conduct day-to-day implementation of the SEMP.

217. The contractor will submit monthly reports to the PIU/Divisional/Regional Office. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS Officer (or equivalent) on a daily basis. A sample daily monitoring sheet which can be used by the contractor is in Appendix 9. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction site.

218. The PIU/Divisional/Regional Office will submit quarterly environmental monitoring reports to PMU, which will include summary of monthly monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU and/or Divisional/Regional Office. In the conduct of these independent inspection activities, PIU and/or Divisional/Regional Office will be supported by PMSC in this regard. A sample inspection checklist is in Appendix 10. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction site.

219. PMU shall consolidate quarterly reports from the PIUs including PIU in Patuakhali, and results of its independent monitoring or inspection activities. PMU shall accomplish semi-annual environmental monitoring report (SEMRs) starting from the effectivity date up to the end of construction phase, which shall be submitted to ADB for review and disclosure on ADB website. The template for the SEMR is attached as Appendix 11. The PMU shall prepare and submit annual environmental monitoring report during the operation phase until project completion. Submission of these reports to ADB will be within thirty (30) days from the end date of reporting period.

XI. CONCLUSION AND RECOMMENDATION

220. The Patuakhali drainage construction and improvement subproject will result in significant environmental benefits because of improved drainage facilities in Patuakhali Pourashava.

221. Potential environmental impacts were assessed based on secondary data, stakeholder consultations, and field visits at the subproject sites. The subproject sites are in a built-up area, and there are no sensitive ecological area (protected area or critical habitats) within at least 10-km radius of the subproject location. Seventy-one IUCN Red List species of concern were identified within the 50-km radius default area of analysis; however, the probability of these species being found at the site is very low.

222. Impacts were assessed based on the location and project activities during the pre-construction, construction, and operation phases. The subproject component will involve straightforward construction and is unlikely to cause significant adverse impact. Usual construction-related impacts such as noise, dust generation, silt generation, construction waste generation, and occupational and community health and safety risks including the spread of COVID-19, among others, will be localized and temporary and can be readily mitigated through the measures indicated in the EMP. Detailed design will ensure that private and common properties, and any local physical cultural resources will not be significantly impacted by the subproject through either re-alignment or institution of appropriate measures. All works will be confined in existing drain alignments, and within existing rights-of-way (ROWs). Potential adverse impacts that are associated with the operation phase can be mitigated upfront through incorporation of environmental requirements in the detailed engineering design, including climate change adaptation measures.

223. Public consultation was conducted as part of the environmental assessment process. The stakeholders expressed support for the drainage construction and improvement in the subproject site. Results of the consultation were documented and considered in the formulation of the environmental management plan. Public consultation will continue throughout the project implementation.

224. Based on the results of the IEE, no further environmental assessment such as EIA is required and the classification of Category B per ADB SPS is confirmed. However, per the Environmental Conservation Rules of Bangladesh (ECR, 1997), the project is categorized as “Orange-B” category. Hence, preparation of an initial environmental examination (IEE) and environmental management plan (EMP) based on DOE approved terms of reference is mandatory. Approval of the IEE and EMP and issuance of the Environmental Compliance Certificate (ECC) must be obtained from the DOE prior to award of civil works contracts.

225. This IEE has been prepared based on preliminary designs of the subproject. If the design is revised or modified, the PMU, with support from PMSC, shall update this draft IEE based on final detailed design and submit to ADB for review and disclosure. No work can commence until the final IEE is approved by ADB and provided to the Contractor, and the SEMP is approved by the PIU or Divisional/Regional Office.

Appendix 1: Rapid Environmental Assessment (REA) Checklist

Instructions:

1. The project team completes this checklist to support the environmental classification of a project. It is to be attached to the environmental categorization form and submitted to the Environment and Safeguards Division (SDES) for endorsement by the Director, SDES and for approval by the Chief Compliance Officer.
2. This checklist focuses on environmental issues and concerns. To ensure that social dimensions are adequately considered, refer also to ADB's (a) checklists on involuntary resettlement and on tribes, minor races, ethnic sects and communities;[21] (b) poverty reduction handbook; (c) staff guide to consultation and participation; and (d) gender checklists.
3. Answer the questions assuming the "without mitigation" case. The purpose is to identify potential impacts. Use the "remarks" section to discuss any anticipated mitigation measures.

Country/Project Title: Coastal Towns Climate Resilience Project (CTCRP)

Sector Division: CTCRP/construction/Improvement of Drains in Patuakhali Pourashava

Screening Questions	Yes	No	Remarks
A. Subproject Siting Is the subproject area			
1. Densely populated	✓		The proposed drainage alignments to be rehabilitated are located within the pourashava area which is densely populated.
2. Heavy with development activities?		✓	There are no heavy development activities in the area.
3. Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site		✓	Based on desk review of locations and field verifications by PMU, there is no environmentally sensitive cultural heritage site within or near any of the subproject locations/alignments..
• Protected Area		✓	Based on desk review of locations and field verifications by PMU, there is no protected area encompassing or near any of the subproject locations/alignments.
• Wetland		✓	Based on desk review of locations and field verifications by PMU, there is no protected wetland near any of the subproject locations/alignments.
• Mangrove		✓	Based on desk review of locations and field verifications by PMU, there is no mangrove near any of the subproject locations/alignments.

[21] Groups or population identified as Indigenous Peoples within the context of ADB's Safeguard Policy Statement will be referred to in this document as *tribes, minor races, ethnic sects and communities* (following the request of the Government of Bangladesh).

Screening Questions	Yes	No	Remarks
• Estuarine		✓	Based on desk review of locations and field verifications by PMU, there is no estuarine near any of the subproject locations/alignments.
• Buffer zone of protected area		✓	Based on desk review of locations and field verifications by PMU, there is no buffer zone of protected encompassing or near any of the subproject locations/alignments.
• Special area for protecting biodiversity		✓	Based on desk review of locations and field verifications by PMU, there is no special area for protecting biodiversity encompassing or near any of the subproject locations/alignments.
• Bay		✓	Based on desk review of locations and field verifications by PMU, there is no bay near any of the subproject locations/alignments.
B. Potential Environmental Impacts Will the Subproject cause			
4. impacts on the sustainability of associated sanitation and solid waste disposal systems and their interactions with other urban services.	✓		The construction phase of the subproject may have impacts on local sanitation and waste disposal system due to potential creation/production of wastes from the work sites and workers camps. However, these impacts will be mitigated with relevant measures as described in the EMPs. During operation phase, the impact of the subproject is expected to be positive in view of improved drainage system in the areas.
5. deterioration of surrounding environmental conditions due to rapid urban population growth, commercial and industrial activity, and increased waste generation to the point that both manmade and natural systems are overloaded and the capacities to manage these systems are overwhelmed?	✓		The construction phase of the subproject will add to generation of wastes in the town, and therefore will also add burden to the existing services, such as sanitation, sewerage, and waste disposal. However, these impacts will be mitigated with relevant measures in the EMP. During operation phase, it is expected that the subproject will provide positive impacts to the area with the efficient flow of water in canals, improved aesthetics, reduced vectors of diseases, etc.
6. degradation of land and ecosystems (e.g. loss of wetlands and wild lands, coastal zones, watersheds and forests)?		✓	Not applicable. The subproject sites are far from these types of ecosystems.
7. dislocation or involuntary resettlement of people?		✓	Per resettlement plan, this impact will be assessed during the detailed measurement survey that is yet to be undertaken by the social safeguards team.
8. disproportionate impacts on the poor, women and children, Indigenous Peoples, or other vulnerable group?		✓	Not anticipated. The subproject is a pro-poor and gender-inclusive undertaking as it aims to provide better drainage system for the communities, including those less privileged (low-income) population of the town.

Screening Questions	Yes	No	Remarks
9. degradation of cultural property, and loss of cultural heritage and tourism revenues?		✓	Not anticipated. During construction phase, all potential impacts are considered site-specific and with short term duration. These will be mitigated through measures indicated in the EMPs. During operation phase (or when the subproject is completed), the impact will be positive with the improvement of drainage system and aesthetic in the town.
10. occupation of low-lying lands, floodplains, and steep hillsides by squatters and low-income groups, and their exposure to increased health hazards and risks due to polluting industries?		✓	Not applicable. The nature of the subproject is only on improving drainage system of the town and along areas with existing ROWs. The subproject does not involve industrial activities.
11. water resource problems (e.g. depletion/degradation of available water supply, deterioration for surface and ground water quality, and pollution of receiving waters?	✓		Construction of new and rehabilitation of existing drainages will potentially increase siltation of Laukathi river which is the ultimate receiving body of water of all drainages in the subproject area. However, this impact will be mitigated through implementation of measures in the EMP.
12. air pollution due to urban emissions?	✓		This is anticipated during construction phase. The sources of air pollution will be from excavation of dry soils in drainage canals, trucks transporting materials to the sites, transporting dredged soil and waste to disposal site, and machinery use. However, this impact will be mitigated through implementation of measures in the EMP.
13. risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during subproject construction and operation?	✓		Construction activities and exposure to various occupational hazards at the sites will pose risks to workers. However, this can be mitigated through the implementation of the EMP, particularly occupational health and safety measures both at work sites and construction camp sites.
14. road blocking and temporary flooding due to land excavation during rainy season?		✓	Not anticipated. The work sites will be the existing drainage canals or locations with existing rights-of-way (ROWs). These are wide enough to accommodate all construction works, heavy equipment and raw materials. No temporary flooding is expected because works will be undertaken mostly during dry season.
15. noise and dust from construction activities?	✓		Construction activities will result to noise and dust generation, although temporary and limited to the subproject site. However, this can be mitigated through the implementation of the EMP.
16. traffic disturbances due to construction material transport and wastes?		✓	Not anticipated. The nature of works in the construction and rehabilitation of drainages will not be intensive on the use of transport vehicles. Nevertheless, all necessary transporting of construction materials and wastes will be undertaken during non-busy hours of the day.
17. temporary silt runoff due to construction?	✓		This is anticipated if excavation works are undertaken during the rainy season. However, measures to avoid or minimize runoff are included in the EMP, such as for example, avoiding or minimizing heavy excavation works during monsoon season.

Screening Questions	Yes	No	Remarks
18. hazards to public health due to ambient, household and occupational pollution, thermal inversion, and smog formation?		✓	Not applicable.
19. water depletion and/or degradation?		✓	Not anticipated. The nature of works does not require tremendous amount of water, now will it degrade water supply sources.
20. overpaying of ground water, leading to land subsidence, lowered ground water table, and salinization?		✓	Not applicable. The nature of works does not involve underground water extraction.
21. contamination of surface and ground waters due to improper waste disposal?	✓		Disposal of dredged soil and materials could potentially contaminate surface or ground water depending on the disposal site. However, this impact will be mitigated with measures in the EMP, such as the pre-identification of approved disposal site for dredged materials.
22. pollution of receiving waters resulting in amenity losses, fisheries and marine resource depletion, and health problems?	✓		Construction of new and rehabilitation of existing drainages will potentially increase siltation of Laukathi river which is the ultimate receiving body of water of all drainages in the subproject area. However, this impact will be mitigated through implementation of measures in the EMP.
23. large population influx during subproject construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Not anticipated. Labor requirements will be sourced locally. The drainages are existing infrastructures that will only be rehabilitated, and no population influx due to the operation of these infrastructures is expected.
24. social conflicts if workers from other regions or countries are hired?		✓	Not anticipated. Labor requirements will be sourced locally. The drainages are existing infrastructures that will only be rehabilitated, and no population influx due to the operation of these infrastructures is expected.
25. risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during operation and construction?	✓		Construction activities will include transport and use materials that could pose risks to community health and safety. However, this can be mitigated through the implementation of related measures in the EMP. These measures include implementation of the IFC EHS guidelines on construction and decommissioning related to community health and safety.
26. community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the subproject are accessible to members of the affected community or where their failure could result in injury to the community throughout subproject construction, operation, and decommissioning?	✓		Construction activities will pose risks to community health and safety. However, this can be mitigated through the implementation of related measures in the EMP. These measures include implementation of the IFC EHS guidelines on construction and decommissioning related to community and occupational health and safety.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: BAN: Emergency Assistance Project – Additional Financing

Sector:

Subsector:

Division/Department:

Screening Questions		Score	Remarks[22]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather-related events such as floods, droughts, storms, landslides?	0	
	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	1	Project needs to consider extreme rainfall events
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	1	Flooding frequency may aggravate under current Climate Change scenario
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design lifetime?	0	

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high-risk project.

Result of Initial Screening (Low, Medium, High): Medium

Other comments:_____
_____

Prepared by: PMU

[22] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Appendix 2: Result of Integration Biodiversity Assessment Tool Screening

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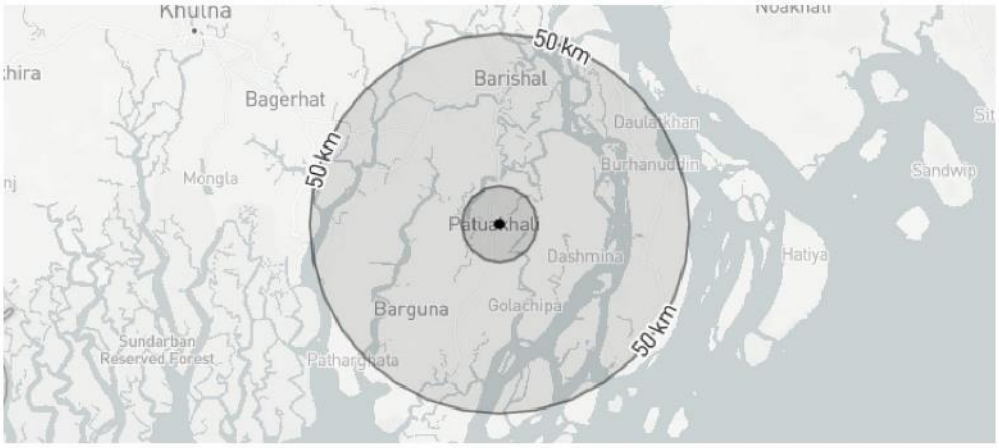
Integrated Biodiversity Assessment Tool
World Bank Group Biodiversity Risk Screen

BAN-CTCRP - PATUAKHALI DRAINS SUBPROJECT

- **Country:** Bangladesh
- **Location:** [22.4, 90.3]
- **IUCN Red List Biomes:** Marine, Freshwater, Terrestrial
- **Created by:** Miguel Diangan

Overlaps with:

Protected Areas	1 km: 0	10 km: 0	50 km: 0	0
World Heritage (WH)	1 km: 0	10 km: 0	50 km: 0	0
Key Biodiversity Areas	1 km: 0	10 km: 0	50 km: 1	1
Alliance for Zero Extinction (AZE)	1 km: 0	10 km: 0	50 km: 0	0
IUCN Red List				71
Critical Habitat				Likely



Displaying project location and buffers: 1 km, 10 km, 50 km

WORLD BANK GROUP

This report is based on IFC Performance Standard 6 (PS6) but applies to World Bank Environmental and Social Standard 6 (ESS6)

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About this report

The recommendations stated alongside any Protected Areas and Key Biodiversity Areas identified in this report are determined by the following:

Protected Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies a designation that includes either 'natural' or 'mixed world heritage site'.
- 'Assess for Critical Habitat' is stated if the report identifies a Strict Nature Reserve, Wilderness Area or National Park as coded by IUCN protected area categories Ia, Ib and II.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of protected area.

Key Biodiversity Areas:

- 'Highest risk. Seek expert help' is stated if the report identifies an Alliance for Zero Extinction site.
- 'Assess for Critical Habitat' is stated if the report identifies Critically Endangered or Endangered species OR species with restricted ranges OR congregatory species as coded in the IUCN Red List of Threatened Species.
- 'Assess for biodiversity risk' is stated if the report identifies any other type of Key Biodiversity Area.

IBAT provides initial screening for Critical Habitat values. Performance Standard 6 (PS6) defines these values for Critical Habitat (PS6: para. 16) and legally protected and internationally recognized areas (PS6: para. 20). PS6 will be triggered when IFC client activities are located in modified habitats containing "significant biodiversity value," natural habitats, Critical Habitats, legally protected areas, or areas that are internationally recognized for biodiversity. References to PS6 and Guidance Note 6 (GN6) are provided to guide further assessment and detailed definitions where necessary. Please see https://www.ifc.org/ps6 for full details on PS6 and GN6.

This report identifies restricted range species according to the KBA Standard definition (hyperlink KBA Standard https://portals.iucn.org/library/sites/library/files/documents/2016-048.pdf):

Species having a global range size less than or equal to the 25th percentile of range-size distribution in a taxonomic group within which all species have been mapped globally, up to a maximum of 50,000 km2. If all species in a taxonomic group have not been mapped globally, or if the 25th percentile of range-size distribution for a taxonomic group falls below 10,000 km2, restricted range should be defined as having a global range size less than or equal to 10,000 km2. For coastal, riverine and other species with linear distributions that do not exceed 200 km width at any point, restricted range is defined as having a global range less than or 15 equal to 500 km linear geographic span (i.e. the distance between occupied locations furthest apart).

Note, sites supporting restricted range species can qualify as KBAs under criterion B2. These are sites that hold a significant proportion of the global population size of multiple restricted-range species, and so contribute significantly to the global persistence of biodiversity at the genetic and species level.

The report screens for known risks within a standard 50km buffer of the coordinates used for analysis. This buffer is not intended to indicate the area of impact. The report can be used to:

- Scope risks to include within an assessment of risks and impacts

- Identify gaps within an existing assessment of risks and impacts
- Prioritize between sites in a portfolio for further assessment of risks and impacts
- Inform a preliminary determination of Critical Habitat
- Assess the need for engaging a biodiversity specialist
- Identify additional conservation experts or organizations to inform further assessment or planning

WARNING: IBAT aims to provide the most up-to-date and accurate information available at the time of analysis. There is however a possibility of incomplete, incorrect or out-of-date information. All findings in this report must be supported by further desktop review, consultation with experts and/or on-the-ground field assessment as described in PS6 and GN6. Please consult IBAT for any additional disclaimers or recommendations applicable to the information used to generate this report.

Please note, sensitive species data are currently not included in IBAT reports in line with the Sensitive Data Access Restrictions Policy for the IUCN Red List. This relates to sensitive Threatened species and KBAs triggered by sensitive species.

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Priority Species

Habitat of significant importance to priority species will trigger Critical Habitat status (See PS6: para 16). IBAT provides a preliminary list of priority species that could occur within the 50km buffer. This list is drawn from the IUCN Red List of Threatened Species (IUCN RL). This list should be used to guide any further assessment, with the aim of confirming knownor likely occurrence of these species within the project area. It is also possible that further assessment may confirm occurrence of additional priority species not listed here. It is strongly encouraged that any new species information collected by the project be shared with species experts and/or IUCN wherever possible in order to improve IUCN datasets.

IUCN Red List of Threatened Species - CR & EN

The following species are potentially found within 50km of the area of interest.
For the full IUCN Red List please refer to the associated csv in the report folder.

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Eretmochelys imbricata	Hawksbill Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine
Batagur kachuga	Red-crowned Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Batagur dhongoka	Three-striped Roofed Turtle	REPTILIA	CR	Decreasing	Terrestrial, Freshwater
Carcharhinus longimanus	Oceanic Whitetip Shark	CHONDRICHTHYES	CR	Decreasing	Marine
Sphyrna lewini	Scalloped Hammerhead	CHONDRICHTHYES	CR	Decreasing	Marine
Sphyrna mokarran	Great Hammerhead	CHONDRICHTHYES	CR	Decreasing	Marine
Pristis zijsron	Green Sawfish	CHONDRICHTHYES	CR	Decreasing	Marine
Rhina ancylostoma	Bowmouth Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Rhynchobatus australiae	Bottlenose Wedgefish	CHONDRICHTHYES	CR	Decreasing	Marine
Rhynchobatus laevis	Smoothnose Wedgefish	CHONDRICHTHYES	CR	Decreasing	Marine
Glaucostegus granulatus	Sharpnose Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine
Glaucostegus obtusus	Widenose Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine
Glaucostegus thouin	Clubnose Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine
Rhinobatos annandalei	Bengal Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine
Rhinobatos lionotus	Smoothback Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine
Sonneratia griffithii		MAGNOLIOPSIDA	CR	Decreasing	Terrestrial, Marine
Pristis pristis	Largetooth Sawfish	CHONDRICHTHYES	CR	Decreasing	Marine, Freshwater
Calidris pygmaea	Spoon-billed Sandpiper	AVES	CR	Decreasing	Terrestrial, Marine, Freshwater
Gyps bengalensis	White-rumped Vulture	AVES	CR	Decreasing	Terrestrial
Batagur baska	Northern River Terrapin	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Glaucostegus typus	Giant Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Maculabatis bineeshi	Shorttail Whipray	CHONDRICHTHYES	CR	Decreasing	Marine
Pelochelys cantorii	Asian Giant Softshell Turtle	REPTILIA	CR	Decreasing	Terrestrial, Marine, Freshwater
Glyphis gangeticus	Ganges Shark	CHONDRICHTHYES	CR	Decreasing	Marine, Freshwater
Balaenoptera musculus	Blue Whale	MAMMALIA	EN	Increasing	Marine
Geoclemys hamiltonii	Spotted Pond Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Hardella thurjii	Crowned River Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Morenia petersi	Indian Eyed Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Orcaella brevirostris	Irrawaddy Dolphin	MAMMALIA	EN	Decreasing	Marine, Freshwater
Rhincodon typus	Whale Shark	CHONDRICHTHYES	EN	Decreasing	Marine
Varanus flavescens	Yellow Monitor	REPTILIA	EN	Decreasing	Terrestrial
Isurus oxyrinchus	Shortfin Mako	CHONDRICHTHYES	EN	Decreasing	Marine
Carcharhinus amblyrhynchos	Grey Reef Shark	CHONDRICHTHYES	EN	Decreasing	Marine
Anoxypristis cuspidata	Narrow Sawfish	CHONDRICHTHYES	EN	Decreasing	Marine

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Nilssonia gangetica	Indian Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Nilssonia hurum	Indian Peacock Softshell Turtle	REPTILIA	EN	Decreasing	Terrestrial, Freshwater
Platanista gangetica	South Asian River Dolphin	MAMMALIA	EN	Unknown	Freshwater
Eusphyra blochii	Winghead Shark	CHONDRICHTHYES	EN	Decreasing	Marine
Mobula eregoodoo	Longhorned Pygmy Devil Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Negaprion acutidens	Sharptooth Lemon Shark	CHONDRICHTHYES	EN	Decreasing	Marine
Stegostoma tigrinum	Zebra Shark	CHONDRICHTHYES	EN	Decreasing	Marine
Aetomylaeus maculatus	Mottled Eagle Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Rhinoptera javanica	Javanese Cownose Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Mobula tarapacana	Sicklefin Devilray	CHONDRICHTHYES	EN	Decreasing	Marine
Mobula thurstoni	Bentfin Devilray	CHONDRICHTHYES	EN	Decreasing	Marine
Isurus paucus	Longfin Mako	CHONDRICHTHYES	EN	Decreasing	Marine
Acropora rudis		ANTHOZOA	EN	Decreasing	Marine
Pateobatis uarnacoides	Whitenose Whipray	CHONDRICHTHYES	EN	Decreasing	Marine

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Maculabatis gerrardi	Whitespotted Whipray	CHONDRICHTHYES	EN	Decreasing	Marine
Alopias pelagicus	Pelagic Thresher	CHONDRICHTHYES	EN	Decreasing	Marine
Himantura undulata	Honeycomb Whipray	CHONDRICHTHYES	EN	Decreasing	Marine
Heritiera fomes		MAGNOLIOPSIDA	EN	Decreasing	Terrestrial, Marine, Freshwater
Holothuria scabra	Golden Sandfish	HOLOTHUROIDEA	EN	Decreasing	Marine
Holothuria lessoni	Golden Sandfish	HOLOTHUROIDEA	EN	Decreasing	Marine
Thelenota ananas	Prickly Redfish	HOLOTHUROIDEA	EN	Decreasing	Marine
Urogymnus polylepis	Giant Freshwater Whipray	CHONDRICHTHYES	EN	Decreasing	Marine, Freshwater
Rhinoptera jayakari	Oman Cownose Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Mobula birostris	Giant Manta Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Tringa guttifer	Spotted Greenshank	AVES	EN	Decreasing	Terrestrial, Marine, Freshwater
Calidris tenuirostris	Great Knot	AVES	EN	Decreasing	Terrestrial, Marine
Rynchops albicollis	Indian Skimmer	AVES	EN	Decreasing	Terrestrial, Freshwater

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Haliaeetus leucoryphus	Pallas's Fish-eagle	AVES	EN	Decreasing	Terrestrial, Freshwater
Aquila nipalensis	Steppe Eagle	AVES	EN	Decreasing	Terrestrial
Leptoptilos dubius	Greater Adjutant	AVES	EN	Decreasing	Terrestrial, Freshwater
Telatrygon crozieri	Indian Sharpnose Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Pateobatis bleekeri	Bleeker's Whipray	CHONDRICHTHYES	EN	Decreasing	Marine
Pastinachus gracilicaudus	Narrow Cowtail Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Mobula mobular	Spinetail Devil Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Aetobatus flagellum	Longhead Eagle Ray	CHONDRICHTHYES	EN	Decreasing	Marine
Lamiopsis temminckii	Broadfin Shark	CHONDRICHTHYES	EN	Decreasing	Marine
Himantura uarnak	Coach Whipray	CHONDRICHTHYES	EN	Decreasing	Marine

Restricted Range Species

Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Rhinobatos lionotus	Smoothback Guitarfish	CHONDRICHTHYES	CR	Decreasing	Marine

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Species Name	Common Name	Taxonomic Group	IUCN Category	Population Trend	Biome
Salvinia natans	Floating Fern	POLYPODIOPSIDA	LC OR LR/LC	Decreasing	Freshwater
Ophisternon bengalense	Bengal Mud Eel	ACTINOPTERYGII	LC OR LR/LC	Stable	Marine, Freshwater
Bengala elanga	Bengala Barb	ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Xenentodon cancila		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Oreichthys cosuatis		ACTINOPTERYGII	LC OR LR/LC	Unknown	Freshwater
Oryzias dancena	Indian Ricefish	ACTINOPTERYGII	LC OR LR/LC	Stable	Marine, Freshwater
Pseudosphromenus cupanus	Spiketail Paradise Fish	ACTINOPTERYGII	LC OR LR/LC	Stable	Freshwater
Oryzias carnaticus	Spotted Ricefish	ACTINOPTERYGII	LC OR LR/LC	Unknown	Marine, Freshwater
Macrobrachium scabriculum		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rude		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Macrobrachium rosenbergii	Giant River Prawn	MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Leptocarpus fluminicola		MALACOSTRACA	LC OR LR/LC	Unknown	Freshwater
Fregetta tropica	Black-bellied Storm-petrel	AVES	LC OR LR/LC	Decreasing	Terrestrial, Marine

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Biodiversity features which are likely to trigger Critical Habitat

Protected Areas

There are no protected areas to show for this report.

Key Biodiversity Areas

The following key biodiversity areas are found within 1 km and 10 km and 50 km of the area of interest.
For further details please refer to the associated csv file in the report folder.

Area name	Distance	IBA	AZE	Recommendation
Ganges-Brahmaputra-Meghna delta	50 km	Yes	No	Assess for critical habitat

Species with potential to occur

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
REPTILIA	90	20	5	6	9	3	64	3
CHONDRICHTHYES	86	70	16	27	27	10	5	1
MAGNOLIOPSIDA	76	2	1	1	0	3	66	5
AVES	301	15	2	6	7	16	270	0
MAMMALIA	66	10	0	3	7	5	51	0
ANTHOZOA	8	2	0	1	1	2	3	1
HOLOTHUROIDEA	30	5	0	3	2	0	14	11
ACTINOPTERYGII	533	7	0	0	7	9	477	40

Area Taxonomic group	Total assessed species	Total (CR, EN & VU)	CR	EN	VU	NT	LC	DD
LILIOPSIDA	58	1	0	0	1	1	54	2
MALACOSTRACA	28	0	0	0	0	1	22	5
AMPHIBIA	20	0	0	0	0	0	20	0
INSECTA	85	0	0	0	0	0	83	2
HYDROZOA	2	0	0	0	0	0	2	0
GASTROPODA	124	0	0	0	0	0	114	10
POLYPODIOPSIDA	5	0	0	0	0	0	5	0
BIVALVIA	40	0	0	0	0	0	36	4
ARACHNIDA	2	0	0	0	0	0	2	0

Recommended citation

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Recommended Experts and Organizations

For projects located in Critical Habitat, clients must ensure that external experts with regional expertise are involved in further assessment (GN6: GN22). Clients are encouraged to develop partnerships with recognized and credible conservation organizations and/or academic institutes, especially with respect to potential developments in natural or Critical Habitat (GN6: GN23). Where Critical Habitats are triggered by priority species, species specialists must be involved. IBAT provides data originally collected by a large network of national partners, while species information is sourced via the IUCN Red List and affiliated Species Specialist Groups. These experts and organizations are listed below. **Please note that this is not intended as a comprehensive list of organizations and experts. These organizations and experts are under no obligation to support any further assessment and do so entirely at their discretion and under their terms. Any views expressed or recommendations made by these stakeholders should not be attributed to the IFC or IBAT for IFC partners.**

Birdlife Partners

URL: https://www.birdlife.org/worldwide/partnership/birdlife-partners

Directory for Species Survival Commission (SSC) Specialist Groups and Red List Authorities

URL: https://www.iucn.org/commissions/ssc-groups

Appendix 3: Spoil Management Plan

A. Spoil Types

Spoil is defined as any earthen material that is surplus to requirements or unsuitable for reuse in fill and embankments (such as unsuitable rock and soil material) or material that is contaminated. This plan has been prepared to facilitate the beneficial reuse of all material, ensuring that none is disposed off-site, except if unsuitable for reuse.

Fill is defined as earthen material excavated from one location along the corridor (for example, for a detention basin or cut excavations) and relocated elsewhere as compacted fill. Cut and fill material will generally not be stockpiled, but will be removed from the excavation site and transported directly to the construction face for immediate reuse as compacted fill. Unsuitable excavated material will primarily be transported to identified locations within the road corridor for reuse or, if space is not available, will be stored temporarily off-site for reuse later.

Select material is defined as earthen material of comparatively higher quality, necessary for engineered backfill and incorporation in upper earthworks layers as part of the overall pavement design. Typically, on the HEA project this will include high strength sandstone and low/medium strength claystone, siltstones and sandstones. Wherever possible, select material will be sourced on site, and stockpiled as necessary until incorporated in the works. However, preliminary investigations suggest that a considerable proportion of the select material required for the project will need to be sourced from off site.

Unsuitable (non-contaminated) material on the construction project is generally composed of silty, sandy, gravely and organic clays; sandy silts; clayey, silty and gravely sands and carbonaceous rock. This material will be reused on the project in the following ways:

1. widen embankments where possible;
2. land contouring;
3. landscaping mounds;
4. landscape treatments; and
5. noise mounds (if required).

Topsoil will be stripped and recovered for reuse in landscaping and revegetation. On average, the top 100mm of topsoil will be collected for future use.

B. Spoil strategy

The following provides an overview of the spoil management strategy for achieving the key spoil management objectives:

1. Minimize the amount of spoil generated: This requirement will be achieved by ensuring that the design minimizes the volume of spoil generated from excavation (a key driver for this is the need to minimize our construction footprint in order to reduce clearing). It should be noted that the minimization of spoil generation is a standard process in developing designs and planning construction activities as there are significant financial savings in minimizing spoil generation and management.

2. Classify the spoil generated using recognized guidelines and its geotechnical characteristics: There is no Waste Classification Guidelines to follow in Bangladesh. The geotechnical characteristics of spoil therefore are important to consider as it will determine the potential engineering uses of spoil.

3. Maximize the beneficial reuse of spoil on site based on its classification (both contamination category and geotechnical characteristics): Some of the spoil generated is expected to be able to be reused on site and will be suitable as general fill across the site. Some spoil may be unsuitable; however, this may be used for inclusion in capped landscaping mounds or features. Some spoil material, mainly due to its geotechnical characteristics will not be suitable for reuse.

4. Maximize the beneficial reuse of spoil off site based on its classification (both contamination category and geotechnical characteristics): Whilst it is the general intention to try and re-use all

material on-site some of the spoil generated may be able to be reused off site on other projects. Further investigation into the needs of the numerous nearby mine sites will continue in this regard. Some spoil material due to its geotechnical characteristics will not be suitable for reuse.

5. Dispose of spoil off site based on its contamination classification: Spoil unable to be reused on site or off site would be disposed of at a facility that has the appropriate development approval and Environment Protection License to receive and store the relevant waste classification of the spoil.

6. Manage the excavation, storage, transport reuse and disposal of spoil to minimize impacts and meet other environmental requirements: This includes implementing mitigation measures to manage potential impacts on traffic and soil and water, dust generation and contamination of spoil (e.g. onsite - dust control, erosion and sedimentation controls, monitoring and validation for contamination and Potential Acid Sulphate Soils, offsite – tracking and monitor spoil/fill movements and quality (contamination), haulage routes, impacts on public safety and roads and public amenity, noise impacts and required compliance requirements (i.e. approvals and consents/licenses).

C. Spoils generating activities

Spoil generated by construction will primarily come from excavation works. The spoil is expected to vary in content with silty, sandy, gravely and organic clays; sandy silts; clayey, silty and gravely sands and carbonaceous rock.
The activities associated with the generation and management of spoil and fill materials are:

1. Clearing of vegetation;
2. Selection of material;
3. Clearing of topsoil;
4. Excavation of earthen material;
5. Blasting of earthen material (if required);
6. Transport of earthen material;
7. Storage/stockpiling of spoil, topsoil and mulch; and
8. Reuse of spoil, topsoil and mulch.

Appendix 4: Generic Traffic Management Plan (TMP)

A. Principles

One of the prime objectives of the Contractor's **TMP** is to ensure the safety of all the road users along the work zone, and to address the following issues:

1. the safety of pedestrians, bicyclists, and motorists travelling through the construction zone;
2. protection of work crews from hazards associated with moving traffic;
3. mitigation of the adverse impact on road capacity and delays to the road users;
4. maintenance of access to adjoining properties; and
5. Addressing issues that may delay the project.

B. Operating Policies for TMP

The following principles will help promote safe and efficient movement for all road users (motorists, bicyclists, and pedestrians, including persons with disabilities) through and around work zones while reasonably protecting workers and equipment.

1. Make traffic safety and temporary traffic control an integral and high-priority element of every project from planning through design, construction, and maintenance.
2. Inhibit traffic movement as little as possible.
3. Provide clear and positive guidance to drivers, bicyclists, and pedestrians as they approach and travel through the temporary traffic control zone.
4. Inspect traffic control elements routinely, both day and night, and make modifications when necessary.
5. Pay increased attention to roadside safety in the vicinity of temporary traffic control zones.
6. Train all persons that select, place, and maintain temporary traffic control devices.
7. Keep the public well informed.
8. Make appropriate accommodation for abutting property owners, residents, businesses, emergency services, railroads, commercial vehicles, and transit operations.

Figure A1 to Figure A6 illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the Impact Due to Street Closure

Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

1. Approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;

2. consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
3. Determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;
4. Determining if additional traffic control or temporary improvements are needed along the detour route;
5. Considering how access will be provided to the worksite;
6. Contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
7. Developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

If full road-closure of certain roads within the area is not possible, due to inadequate capacity of the detour arrangements, the full closure can be restricted to weekends with the construction commencing on Thursday night and ending on Sunday morning prior to the morning peak period. The traffic management guidelines are as follows:

1. Review construction schedule and methods;
2. Identify initial traffic recirculation and control policy;
3. Identify routes for traffic diversions;
4. Analyze adverse impact & mitigation at the detours;
5. Begin community consultation for consensus;
6. Finalize or determine alternate detours;
7. Identify temporary parking (on and off -street);
8. Discuss with CMC, owner, community for use;
9. Coordinate with the Traffic Police to enforce traffic and diversions;
10. Install traffic control devices (traffic cones, signs, lightings, etc);
11. Conduct campaigns, publicity, and notify public about street closure; and
12. Develop a mechanism to address public grievances regarding disruptors of traffic, utilities, etc.

D. Public Awareness and Notifications

As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time

when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.
The PIU will also conduct an awareness campaign to educate the public about the following issues:

1. Traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
2. defensive driving behavior along the work zones; and
3. Reduced speeds enforced at the work zones and traffic diversions.

It may be necessary to conduct the awareness programs/campaigns on road safety during construction. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PIU, and the contractor's site office. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the following purpose:

1. Explain why the brochure was prepared, along with a brief description of the project;
2. Advise the public to expect the unexpected;
3. Educate the public about the various traffic control devices and safety measures adopted at the work zones;
4. Educate the public about the safe road user behavior to emulate at the work zones;
5. Tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
6. Indicate the office hours of relevant offices.

E. Install Traffic Control Devices at the Work Zones and Traffic Diversion Routes

The purpose of installing traffic control devices at the work zones is to delineate these areas to warn, inform, and direct the road users about a hazard ahead, and to protect them as well as the workers. As proper delineation is a key to achieve the above objective, it is important to install good traffic signs at the work zones. The following traffic control devices are used in work zones:

1. Signs
2. Pavement Markings
3. Channelizing Devices
4. Arrow Panels
5. Warning Lights

Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry

considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).
Figure A1to Figure A6illustrate typical set-ups for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics. The Contractor would need to consider such Traffic Management situations for these typical arrangements and others that may occur during road construction works. The Contractor would need to coordinate closely with the road management and road police authorities and submit their Traffic Management proposals, with not less than a month’s prior notice, to the PIU for obtaining prior approval, before any closure of roads are considered.

1. Work on Shoulder or Parking Area;
2. Work with Land Closure: Low Traffic;
3. Work on Lane Closure With Yield Sign on Two Lane: Low Volume;
4. Work on Lane Closure With Single Flag Operator on Two Lane : Low Volume;
5. Lane Closure: Two Flag Operators on Two Lane Road; and
6. Street Closure with Detour.

The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.
Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

In addition to the delineation devices, all the construction workers should wear fluorescent safety vests and helmets in order to be visible to the motorists at all times. There should be provision for lighting beacons and illumination for night constructions.

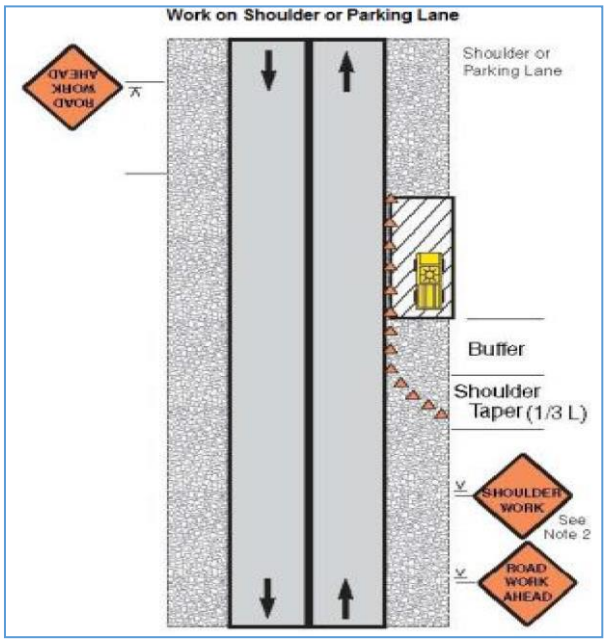


Figure A1 Work with shoulder or Parking area

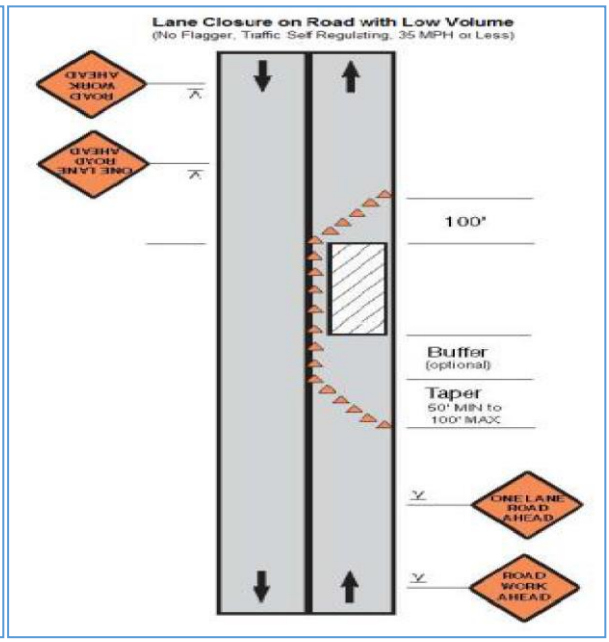


Figure A2Work with land closure: low traffic

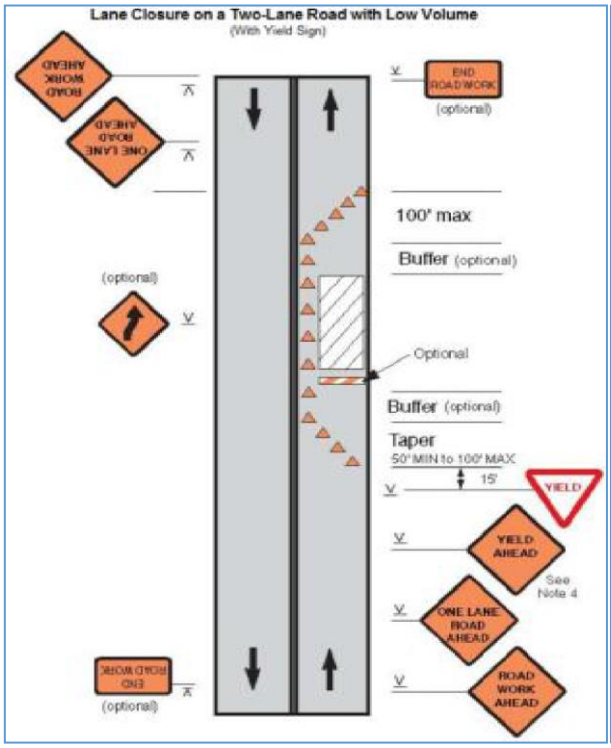


Figure A3 Work on Lane Closure with Yield Sign on Two Lane: Low

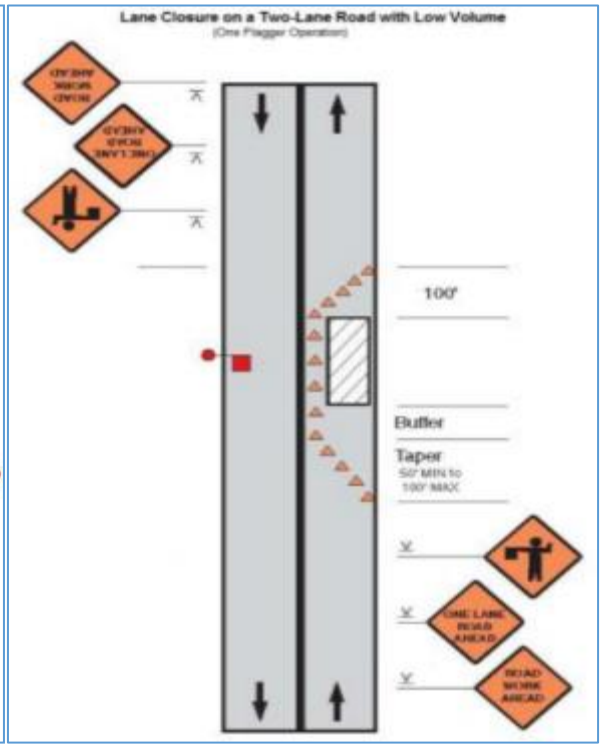


Figure A4 Work on Lane Closure With Single Flag Operator on Two

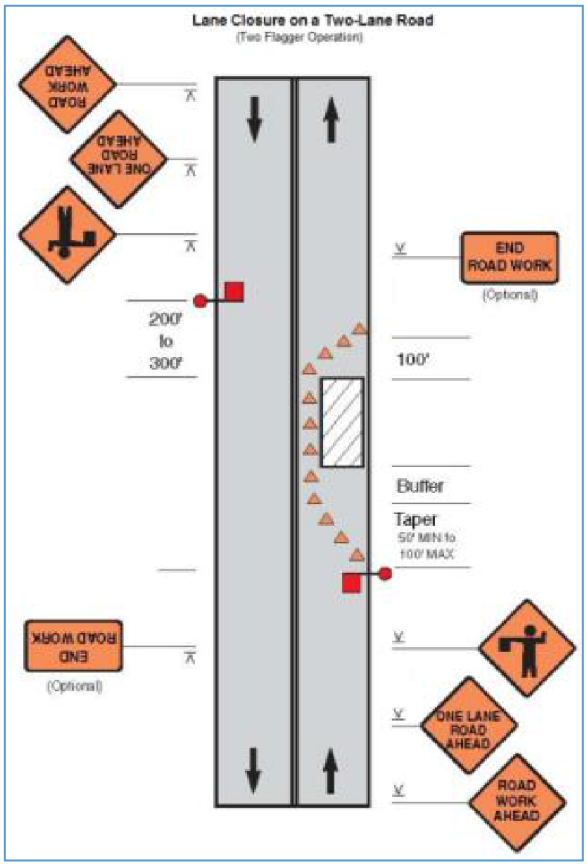


Figure A5 Lane Closure: Two Flag Operators on Two Lane Road

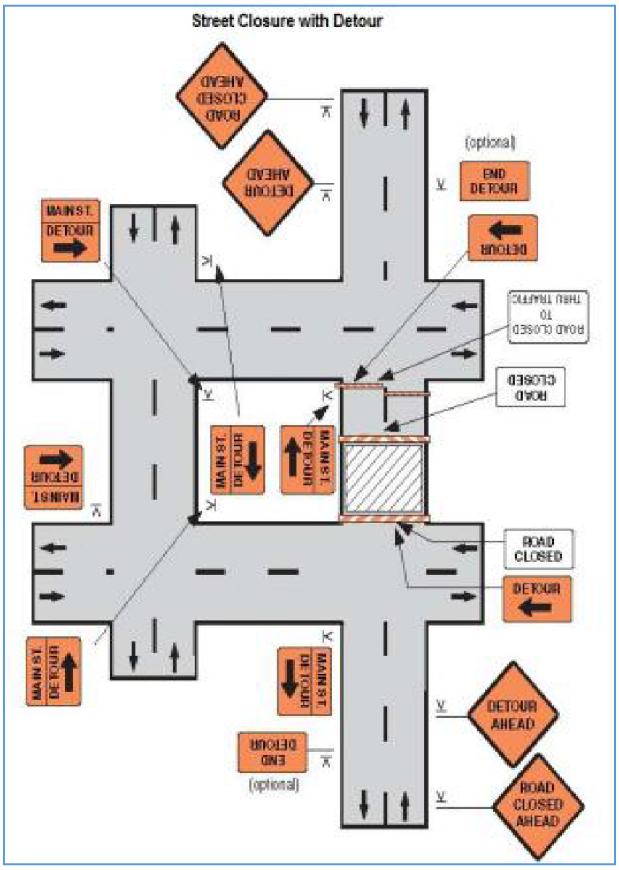
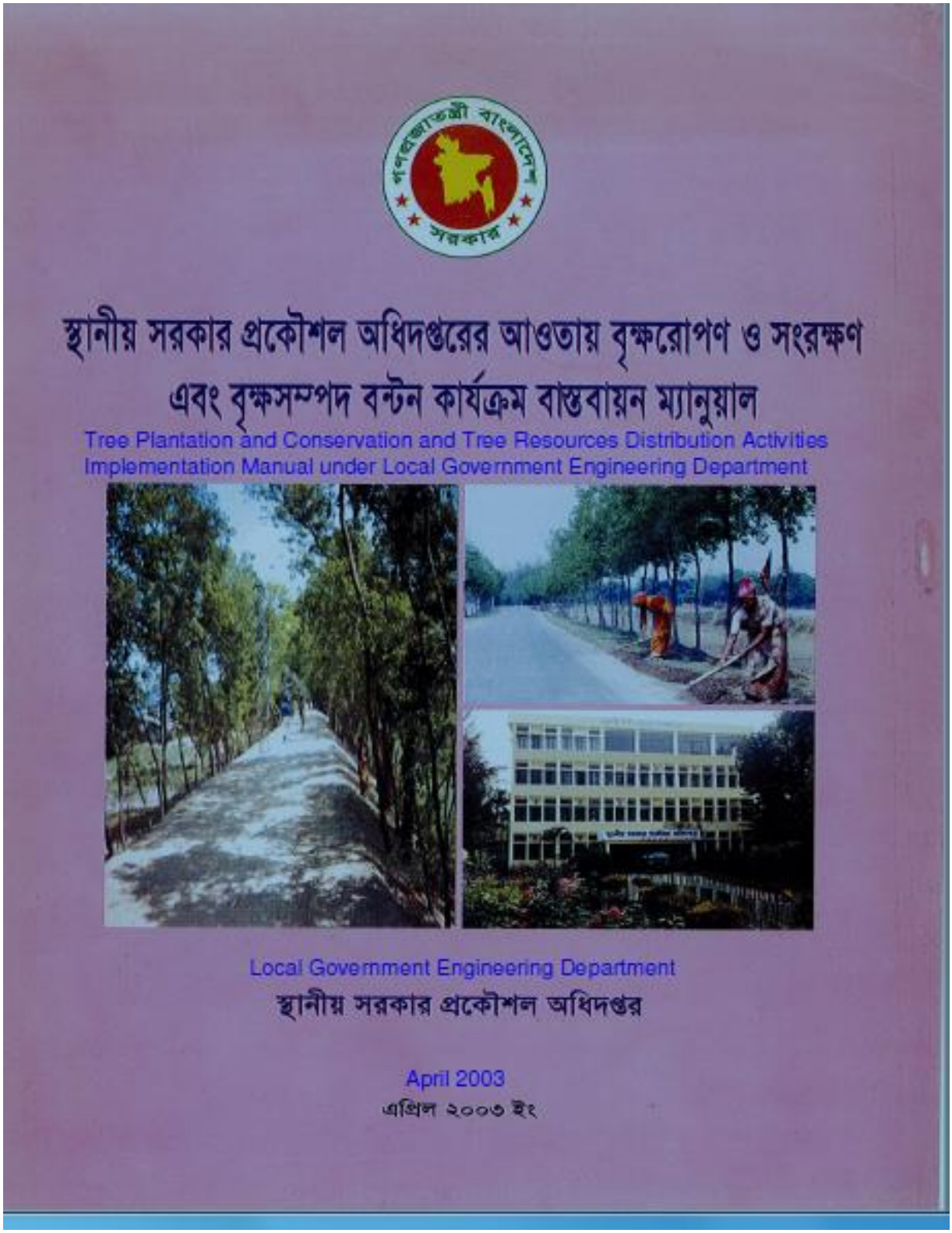


Figure A6Street Closure with Detour

Appendix 5: Local Government Engineering Division tree Plantation Program Manual (COVER PAGE AND TABLE OF CONTENTS)



Note: Copy of the full manual is available upon request at the LGED or PMU Office.

Tree Plantation and Conservation and Tree Resources Distribution Activities Implementation Manual under Local Government Engineering Department

Table of Contents

Annexures

A) Road

Road/Annex – 1:	Tree Species Selection, Tree Plantation and Caution in
Road/Annex – 2:	Method of Tree Sapling Plantation
Road/Annex – 3:	Points Value for Priority Ranking
Road/Annex – 4:	Technical Report
Road/Annex – 5:	Format for Cost Estimate
Road/Annex – 6:	Appointment Letter of Women Worker
Road/Annex – 6a:	Appointment Letter of Supervisor
Road/Annex – 7:	Women Worker's acceptance Letter for Working Tools for Road Maintenance, Tree Plantation and Conservation Scheme
Road/Annex – 8:	Regular Road Maintenance and Tree Care Monitoring Register
Road/Annex – 8a:	Work Code and Description
Road/Annex – 8b:	Daily Activity Report of Regular Maintenance Work done by Women Worker
Road/Annex – 9:	Monthly Monitoring of Regular Road Maintenance and Tree Care
Road/Annex – 10:	Monthly Monitoring Summary Report
Road/Annex – 11:	Tree Resources Distribution Agreement

B) Embankment

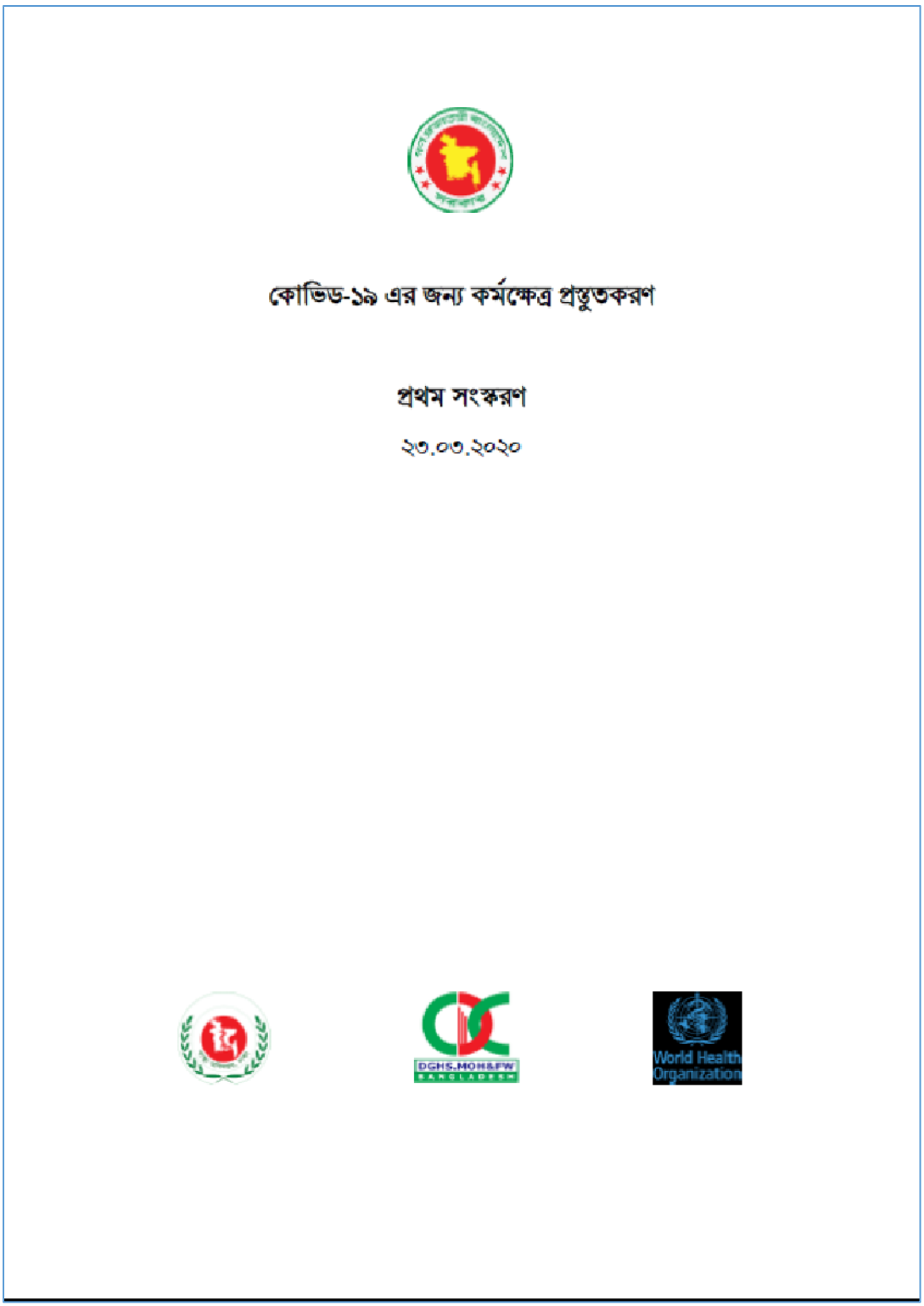
Embankment/Annex- 1:	Proposal of Plantation at Embankment Slope and Canal Bank
Embankment/Annex- 2:	Schedule 1
Embankment/Annex- 3:	Executable at a Non-Judicial Stamp of Value of Taka 150.00
Embankment/Annex- 4:	Contractor's Responsibility and Condition of Recruitment
Embankment/Annex- 5:	Sample – Method of Tree Plantation at Embankment Slope
Embankment/Annex- 6:	Template of Monthly Proress Report

Tree plantation and management plan

Steps	Management initiatives	Records	Reporting	Responsibility
Preparation of the Plantation Area	The open areas near the subproject site will be identified and selected. During the selection of the block plantation sites, the availability of the water in nearby areas will be taken into consideration as the survival of the tree saplings depends on the availability of water or watering facilities.	Demark tree plantation area, record of drawing for proposed tree plantation	Contractor	**Prime Responsibility:** Contractor **Supervising responsibility:** CSE/PIU/PMSC
Preparation of Pits and Sapling Transplantation	The location of each plantation pit will be marked according to the design and distance of the plantation. The size of the plantation pit varies depending upon the species of the plants, height of the saplings. Selection of native fruit bearing plants will be chosen for plantation. Trees will be planted on the alternate rows in a straight line for the prevention of the horizontal dispersion of the pollutants. Hence the pit will be dig accordingly. During the time of placing the tree saplings the roots will be freed from plastic or any type of cover which is normally use for the transplantation of the tree saplings from the seed bed to the tree plantation pits. This exercise will help the root hairs to reach the soil.	Demark tree plantation area, record of drawing for proposed tree plantation	Do	Do
Spacing	For the survivability of the tree species planted spacing between the saplings should be maintained. Spacing which are usually used for teak planting are 2 x 2 m^2, 3 x 1m^2, 3 x 3 m^2, 4 x 2 m^2 and 4 x 4 m^2, depending on site condition. For the construction site, wider spacing for native fruit bearing plants are suggested for large canopy and ample sunlight.	Record of Tree plantation	Do	Do
Time of Plantation	As per the normal practices followed under the silvicultural guidelines plantation of the tree sapling to be done only after the first shower during the rainy season. The best time for plantation is after 15 days from the day of first shower during rainy season.	Do	Do	Do
Protection of Tree saplings	Circular tree guard should be placed after the plantation of the saplings for the protection of these young plants from the ravages of cattle, sheep and goat and other animals. If tree saplings died or damage occur after placing the circular tree guard, timely replacements of damaged plant and thereafter care is important.	Do	Do	Do
Selection of Tree Species	The contractor will choose the local and Vulnerable, endemic species.	Do	Do	Do

Maintenance (include thinning) : Weeding	Low pruning at 6 months**;** **Thinning:** Thinning will start after the stand is 3-4 years old and repeated every 4 years until the stand is 15years old. Between 15-25 years old, thinning should be conducted every 5 years and after 25 years old, thinning will be done after every 10 years. When the canopy closes, at about 6years, 30-40% of the stems will be thinned to selectively remove suppressed, diseased and badly formed trees.	Record of Survivability rate	Do	Do

Appendix 6: Bangladesh Government guideline in response to COVID-19 in worksites



কোভিড-১৯ এর জন্য কর্মক্ষেত্র প্রস্তুতকরণ

প্রথম সংস্করণ

২৩.০৩.২০২০

DGHS.MOH&FW BANGLADESH

World Health Organization

কোভিড-১৯ এর জন্য কর্মক্ষেত্র প্রস্তুতকরণ

২০২০ সালের জানুয়ারি মাসে বিশ্ব স্বাস্থ্য সংস্থা (WHO) একটি নতুন ধরণের করোনা ভাইরাস জনিত রোগের প্রাদুর্ভাব ঘোষণা করে, যার সূচনা হয় চীনের হুবেই প্রদেশে। বিশ্ব স্বাস্থ্য সংস্থা (WHO) এর বিবৃতি অনুযায়ী করোনা ভাইরাস রোগটি (কোভিড-১৯) বিশ্বের অন্যান্য দেশে ছড়িয়ে পড়ার একটি উচ্চ ঝুঁকি রয়েছে।

বিশ্ব স্বাস্থ্য সংস্থা (WHO) এবং জনস্বাস্থ্য কর্তৃপক্ষ বিশ্বব্যাপী কোভিড-১৯ এর প্রাদুর্ভাব নিয়ন্ত্রণের জন্য কাজ করছে। তবে দীর্ঘমেয়াদী সাফল্য এখন পর্যন্ত অর্জিত হয়নি। এই রোগের বিস্তার রোধ করতে হলে ব্যবসায়ী, চাকুরীজীবীসহ সমাজের সর্বস্তরের মানুষকে অবশ্যই কার্যকরি ভূমিকা পালন করতে হবে।

কোভিড-১৯ যেভাবে ছড়ায়

কোভিড-১৯ আক্রান্ত রোগীর হাঁচি, কাঁশির মাধ্যমে রোগটি সংক্রমিত হয়ে থাকে। হাঁচি, কাঁশির মাধ্যমে রোগটির জীবাণু নিকটবর্তী বস্তুর পৃষ্ঠতল - যেমন ডেস্ক, টেবিল বা টেলিফোন/ মোবাইল ইত্যাদির উপর পড়ে যা সহজেই মানুষের হাতের সংস্পর্শে আসে, পরবর্তীতে এই জীবাণু যুক্ত হাত দ্বারা চোখ, নাক বা মুখ স্পর্শ করার মাধ্যমে তারা আক্রান্ত হতে পারে । আবার যারা কোভিড-১৯ আক্রান্ত ব্যক্তির এক মিটারের মধ্যে অবস্থান করে, তারাও হাঁচি-কাশি হতে ছিটকে আসা ক্ষুদ্র কনার সাথে মিশ্রিত জীবাণু দ্বারা আক্রান্ত হতে পারে। কোভিড-১৯ এ সংক্রমিত হলে বেশিরভাগ ব্যক্তি হালকা/সাধারণ লক্ষণগুলি অনুভব করে এবং নিজ থেকেই সুস্থ হয়ে যায়। কিছু রোগীর ক্ষেত্রে গুরুতর অসুস্থতা লক্ষ্য করা যায় এবং হাসপাতালে নেওয়ার প্রয়োজন হতে পারে। সাধারণত ৪০ বা তদোর্ধ্ব বয়সী রোগী, রোগ প্রতিরোধ ক্ষমতা কম এমন ব্যক্তির (যেমন- ক্যান্সার, ডায়াবেটিস, হৃদরোগ এবং ফুসফুসের রোগে আক্রান্ত ব্যক্তি) ক্ষেত্রে ঝুঁকির মাত্রা বেশী।

আমরা এখানে যা জানব-

১. কর্মক্ষেত্রে কোভিড-১৯ এর বিস্তার রোধ করার সহজ উপায়।

২. সভা, সমাবেশ এবং জনসমাগমে কোভিড-১৯ এর ঝুঁকিগুলি এড়িয়ে চলার উপায়।

৩. কর্তৃপক্ষ ও কর্মীগণের ভ্রমণকালীন সময়ে সাবধানতা।

৪. কোভিড-১৯ ছড়িয়ে পড়লে কর্মক্ষেত্র প্রস্তুতকরণ।

১. কর্মক্ষেত্রে কোভিড-১৯ এর বিস্তার রোধ করার সহজ উপায়

যে সকল কর্মক্ষেত্রে কোভিড-১৯ এর সংক্রমণ ছড়িয়ে পড়েনি সেখানকার দায়িত্বপ্রাপ্ত কর্মকর্তাগণ তাদের নিজ কর্মক্ষেত্রে নিম্নোক্ত বিষয়গুলো নিশ্চিত করবেন-

- কর্মস্থল পরিষ্কার-পরিচ্ছন্ন এবং স্বাস্থ্যকর কিনা তা নিশ্চিতকরণঃ
  জীবাণুনাশক দিয়ে ডেস্ক ও টেবিলের পৃষ্ঠতল এবং নিত্য ব্যবহার্য বস্তু (যেমন- টেলিফোন, কীবোর্ড) নিয়মিত মুছতে হবে। কারন পৃষ্ঠতলে থাকা জীবাণু দ্বারা সহজে সংক্রমনের সম্ভাবনা থাকে।
- কর্মচারী, ঠিকাদার এবং গ্রাহকদের নিয়মিত এবং যথাযথভাবে হাত ধোয়ার অভ্যাস করানোঃ
  সাবান-পানি দিয়ে হাত ধোয়া, কেননা সাবান দিয়ে হাত পরিষ্কার করলে ভাইরাস ধ্বংস হয় এবং কোভিড-১৯ এর বিস্তারে বাধা সৃষ্টি হয়।

- কর্মক্ষেত্রের প্রবেশপথে বা আশেপাশে সহজে দৃষ্টিগোচর হয় এমন স্থানে হ্যান্ড স্যানিটাইজার রাখার ব্যবস্থা করা।
- সঠিকভাবে হাত ধোয়ার নির্দেশনা সম্বলিত পোস্টার দৃষ্টিগোচর স্থানে প্রদর্শন করা এবং স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষের সাহায্য নিন।
- হাত ধোয়ার ব্যাপারে উৎসাহিত করার জন্য পেশাদার জনস্বাস্থ্য কর্মকর্তার দিকনির্দেশনা, বিভিন্ন সভায় প্রদত্ত সচেতনতামূলক বার্তা এবং ইন্টারনেটে ব্যবহৃত গ্রহনযোগ্য এবং বিশ্বাসযোগ্য তথ্যাদি ব্যবহার করা।
- কর্মী, ঠিকাদার এবং গ্রাহকদের সাবান ও পানি দিয়ে হাত ধোয়ার ব্যবাস্থা নিশ্চিত করা।
- কর্মক্ষেত্রে শ্বাস-প্রশ্বাস জনিত স্বাস্থ্যবিধি প্রচার করা-
  - ✓ শ্বাস প্রশ্বাসজনিত পরিচ্ছন্নতার ব্যাপারে পোস্টার প্রদর্শন। কেননা, শ্বাস প্রশ্বাসের পরিচ্ছন্নতা কোভিড-১৯ সংক্রমণ রোধ করে।
  - ✓ শ্বাস প্রশ্বাসজনিত পরিচ্ছন্নতায় উৎসাহিত করার জন্য কর্মক্ষেত্রে পেশাদার জনস্বাস্থ্য কর্মকর্তার দিকনির্দেশনা, বিভিন্ন সভায় প্রদত্ত সচেতনতামূলক বার্তা এবং ইন্টারনেটে ব্যবহৃত গ্রহনযোগ্য এবং বিশ্বাসযোগ্য তথ্যাদি ব্যবহার করা।
  - ✓ কর্মস্থলে কর্মচারীদের বিশেষ করে যাদের সর্দি বা কাশি আছে তাদের জন্য ফেস মাস্ক/কাগজের টিস্যু/রুমাল সহজলভ্য করা ও তাদের ব্যবহৃত ফেস মাস্ক/কাগজের টিস্যু/রুমালের যথাযথ ব্যবস্থাপনা এবং ধ্বংস করা নিশ্চিত করা।
- জরুরী পেশাদারী কাজে ভ্রমণে যাওয়ার আগে কর্মচারী এবং ঠিকাদারদের "ভ্রমণ সম্পর্কিত জাতীয় নির্দেশনা" জেনে নেওয়ার পরামর্শ দেয়া।
- কর্মচারী, ঠিকাদার এবং সেবা গ্রহণকারীদের এই মর্মে অবহিত করা যে, যদি কোনভাবে কোভিড-১৯ তাদের নিজ নিজ এলাকায় ছড়িয়ে পড়তে শুরু করে (হালকা কাশি বা স্বল্প জ্বর ৯৯ ডিগ্রি ফারেনহাইট বা তার সামান্য বেশি হয়) তাহলে তাদেরকে বাড়িতেই থাকতে হবে বা বাড়িতে থেকেই কাজ করতে হবে। এসময় চিকিৎসকের পরামর্শ অনুযায়ী সাধারণ ঔষধ যেমন প্যারাসিটামল, আইবুপ্রোফেন বা অ্যাসপিরিন ইত্যাদি ঔষধগুলি গ্রহণ করা যেতে পারে।
- যদি কারো কোভিড-১৯ এর খুব সাধারণ লক্ষণও দেখা দেয় তাহলে তাকে অবশ্যই সার্বক্ষণিক ঘরের মধ্যে থাকতে হবে। একথা দৃঢ়ভাবে প্রচার করতে হবে।
- কর্মস্থলে উপরোক্ত বার্তা সম্বলিত পোস্টার প্রদর্শন করুন এবং অন্যান্য মাধ্যমে যেমন স্থানীয় যোগাযোগের চ্যানেলগুলিতে (ক্যাবল অপারেটর/কমিউনিটি রেডিও) প্রচার করুন।
- স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষ কর্তৃক অনুমোদিত এবং প্রস্তুতকৃত বার্তা প্রচারের সামগ্রীসমূহের ব্যবহার নিশ্চিত করুন।
- সংবেদনশীল এই সময়ে, কর্মীদের অসুস্থতাজনিত ছুটির অনুমোদন নিশ্চিত করতে হবে।

উপরে উল্লেখিত ব্যবস্থা গ্রহনের মাধ্যমে কোভিড-১৯ এর বিস্তার রোধ করা সম্ভব।

২. সভা, সমাবেশ ও জনসমাগমে কোভিড-১৯ এর সম্ভাব্য ঝুঁকিগুলি এড়িয়ে চলার উপায়

সভা এবং সমাবেশ আয়োজকদের কোভিড-১৯ এর সম্ভাব্য ঝুঁকি নিয়ে ভাবতে হবে কারণ-

- সভায় বা সমাবেশে উপস্থিত অনেকেই অজান্তে এই ভাইরাস বহন করতে পারে যার ফলে অন্যরা তাদের সংস্পর্শে এসে কোভিড-১৯ এ সংক্রমিত হতে পারে।
- অধিকাংশ মানুষের জন্য কোভিড-১৯ মারাত্মক না হলেও অনেকের জন্য এটা মারাত্মক ও জীবনঘাতী হতে পারে। প্রতি ৫ জনের ১ জন কোভিড-১৯ আক্রান্ত রোগীর হাসপাতালে চিকিৎসা প্রয়োজন।

কোভিড-১৯ ঝুঁকি প্রতিরোধ বা হ্রাস করার জন্য বিবেচিত মূল বিষয়গুলি নিম্নরূপঃ

ক) সভা বা অনুষ্ঠানের পূর্বে-

- কোন সভা করার পূর্বে সভা স্থানের যথাযথ কর্তৃপক্ষের পরামর্শ মোতাবেক ব্যবস্থা গ্রহণ করা।
- সভা বা অনুষ্ঠানে সংক্রমণ প্রতিরোধের জন্য একটি প্রস্তুতি পরিকল্পনা গ্রহণ করা।
- সকলের উপস্থিতেতে সভা বা অনুষ্ঠান আয়োজনের প্রয়োজন কিনা তা বিবেচনা করা। টেলিকনফারেন্স বা ইন্টারনেটের মাধ্যমে অনলাইনে সভা আয়োজন করা সম্ভব কিনা তা যাচাই করে দেখা।
- সভা বা অনুষ্ঠানটি ছোট পরিসরে করা যেতে পারে কি না সেটি বিবেচনা করা যাতে লোক সমাগম কম হয়।
- জনস্বাস্থ্য এবং স্বাস্থ্যসেবা কর্তৃপক্ষের সাথে আগেই যোগাযোগ করা এবং তাদের সকল রকম তথ্য দিয়ে সহযোগিতা করা। তাদের পরামর্শ ও সুপারিশ মেনে চলতে হবে।
- সভায় কোভিড-১৯ এর সংক্রমণ প্রতিরোধের যথাযথ ব্যবস্থাপনার নিমিত্তে সকলের জন্যে টিস্যু, সাবান এবং হ্যান্ড স্যানিটাইজারসহ সকল প্রয়োজনীয় সামগ্রীর পর্যাপ্ত সরবরাহ নিশ্চিত করা। প্রয়োজনে উপকরণগুলোর প্রি-অর্ডার করা।
- শ্বাসতন্ত্রের সমস্যার উপসর্গ কারো মাঝে দেখা দিলে তার জন্য মেডিক্যাল/সার্জিক্যাল মাস্ক সরবরাহের ব্যবস্থা রাখতে হবে।
- যেখানে কোভিড-১৯ ভাইরাস বিস্তার লাভ করছে সেখানে সক্রিয় পর্যবেক্ষণ নিশ্চিত করতে হবে। সভায় অংশগ্রহণকারীদের আগাম পরামর্শ দিতে হবে যে, যদি তাদের কারো মধ্যে কোভিড-১৯ সংক্রমনের এর কোন লক্ষণ দেখা যায় বা কেউ যদি অসুস্থতা বোধ করেন তাহলে সভায় তাদের উপস্থিত হওয়া কাম্য নয়।
- সভা/ অনুষ্ঠানের আয়োজক অবশ্যই অংশগ্রহণকারী, খাবার পরিবাশনকারী এবং দর্শকদের মোবাইল/ টেলিফোন নম্বর, ই-মেইল ও তাদের বাসস্থানের বিস্তারিত ঠিকানা সংগ্রহ করবেন। যদি কোন অংশগ্রহণকারী সন্দেহজনক সংক্রামক ব্যাধিতে আক্রান্ত হয়ে থাকেন তাহলে তার সকল তথ্য স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষকে সরবরাহ করতে হবে এবং তথ্য প্রদান নিশ্চিত করবেন। **কোন অংশগ্রহণকারী তার কোন তথ্য স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষকে প্রদানে অস্বীকৃতি জানালে তিনি ঐ অনুষ্ঠান বা সভায় অংশগ্রহণ করতে পারবে না।**
- সভায় অংশগ্রহণকারী কারো মধ্যে কোভিড-১৯ সংক্রান্ত যে কোন ধরনের উপসর্গ (শুকনো কাশি, জ্বর, অসুস্থতা) দেখা দিলে নিম্নোক্ত ব্যবস্থা গ্রহণ করতে হবে-
    - অসুস্থ বোধ করছে বা লক্ষণ রয়েছে এমন ব্যক্তিকে জনসমাগম হতে বিচ্ছিন্ন করে নিরাপদে রাখার জন্য একটি কক্ষ বা অঞ্চল চিহ্নিত করতে হবে।
    - সেখান থেকে অসুস্থ ব্যক্তিকে কিভাবে নিরাপদে স্বাস্থকেন্দ্রে/হাসপাতালে স্থানান্তরিত করা যায় তার পরিকল্পনা থাকতে হবে।
    - যদি সভায় বা অনুষ্ঠানে অংশগ্রহণকারী কোন সদস্য, কর্মী বা পরিসেবা প্রদানকারীর কোভিড-১৯ টেস্টের ফল পজিটিভ হয় সেক্ষেত্রে কি করণীয় তা পূর্বেই ঠিক করে রাখতে হবে।

- কর্মক্ষেত্রের স্বাস্থ্যসেবা প্রদানকারী অথবা জনস্বাস্থ্য কর্তৃপক্ষ অথবা স্বাস্থ্য বিভাগকে গৃহীত সকল পরিকল্পনাগুলো সম্পর্কে পূর্বেই অবহিত করতে হবে।

খ) সভা বা অনুষ্ঠান চলাকালীন সময়ে -

- আয়োজিত সভা বা অনুষ্ঠানে অংশগ্রহণকারীদেরকে মৌখিক বা লিখিত ভাবে কোভিড-১৯ সংক্রান্ত সকল তথ্য প্রদান করতে হবে। অনুষ্ঠানের নিরাপত্তার স্বার্থে আয়োজক কর্তৃক গৃহীত পদক্ষেপ সম্পর্কে অংশগ্রহনকারীদের অবহিত করতে হবে।
- স্পর্শহীন সম্বোধনের উপায়গুলি প্রচার ও অনুশীলন করতে হবে এবং অন্যের সংস্পর্শ যথাসম্ভব পরিহার করতে হবে।
- সভায় অংশগ্রহণকারীদের নিয়মিত হাত ধোয়া বা হ্যান্ড রাব বা অ্যালকোহল সমৃদ্ধ হ্যান্ড-স্যানিটাইজার ব্যবহারে উৎসাহিত করতে হবে।
- অংশগ্রহণকারীরা যেন হাঁচি বা কাঁশি দেয়ার সময় টিস্যু ব্যবহার করে অথবা কনুইয়ের ভাঁজে হাঁচি-কাশি দেয় সে বিষয়ে বারবার অবহিত করতে হবে এবং পরবর্তীতে সেই টিস্যু বা কাপড় যেন ঢাকনা যুক্ত পাত্রে ফেলে দিতে পারে সেই ব্যবস্থা করতে হবে।
- জরুরি অবস্থায় যোগাযোগের জন্য অংশগ্রহণকারীদের একটি ঠিকানা অথবা হটলাইন নম্বর সরবরাহ করতে হবে যাতে তারা পরামর্শের জন্য যোগাযোগ করতে পারে বা কোন তথ্য দিতে পারে।
- অনুষ্ঠানের ভেন্যুটিতে সহজে দৃশ্যমান হয় এমন একাধিক জায়গায় অ্যালকোহল সমৃদ্ধ স্যানিটাইজার বা হ্যান্ড রাব রাখার ব্যবস্থা করতে হবে।
- আসনগুলো এমনভাবে সাজাতে হবে যাতে অংশগ্রহণকারীরা পরস্পরের থেকে কমপক্ষে এক মিটার দূরে অবস্থান করতে পারে।
- পর্যাপ্ত বাতাস চলাচলের সুব্যবস্থা নিশ্চিত করার জন্য যখনই সম্ভব ভেন্যুর জানালা এবং দরজা খুলে রাখতে হবে।
- যদি কেউ অসুস্থতা অনুভব করে তবে পূর্বপরিকল্পিত প্রস্তুতি অনুসরণ করুন বা জরুরি নাম্বারে যোগাযোগ করুন।
- সভাস্থলের আঞ্চলিক পরিস্থিতি বা অংশগ্রহণকারীদের সাম্প্রতিক ভ্রমণের উপর নির্ভর করে অসুস্থতাবোধ করা ব্যক্তিকে একটি সম্পূর্ণ বিচ্ছিন্ন কক্ষে রাখতে হবে। তাকে একটি মাস্ক সরবরাহ করুন যাতে বাড়ি ফিরার পথের অন্য কাউকে সংক্রমিত না করে। অন্যথায় পূর্বনির্ধারিত সনাক্তকরণ কেন্দ্রে নিয়ে যান।
- সকল অংশগ্রহনকারীকে তাদের সহযোগিতার জন্য ধন্যবাদ জ্ঞাপন করতে হবে।

গ) সভা বা অনুষ্ঠান পরবর্তী করনীয় -

- কমপক্ষে এক মাসের জন্য সমস্ত অংশগ্রহণকারীদের নাম এবং যোগাযোগের ঠিকানা সংগ্রহে রাখুন। যাতে অনুষ্ঠান পরবর্তীতে অসুস্থ হয়ে পড়া যে কোন অংশগ্রহনকারীকে জনস্বাস্থ্য কর্তৃপক্ষ সহজেই খুঁজে বের করতে পারে।
- যদি সভা বা অনুষ্ঠানে কোন সন্দেহভাজন কোভিড-১৯ রোগীকে পাওয়া যায় তবে তাকে আলাদা করতে হবে। অন্যান্য অংশগ্রহণকারীদের এ বিষয়ে জানাতে হবে এবং তাদেরকে পরবর্তী ১৪ দিন পর্যন্ত কোন ধরনের লক্ষণ দেখা যায় কিনা তা প্রতিদিন পর্যবেক্ষণ করার ও দিনে দু'বার করে দেহের তাপমাত্রা পরিমাপের পরামর্শ দিতে হবে।

- যদি তাদের কারো হালকা কাশি বা জ্বর (যেমন ৩৭.৩ ডিগ্রি সেন্টিগ্রেড/ ৯৯.২ ডিগ্রী ফারেনহাইট বা তার বেশি) হয় তবে তাদেরকে বাড়িতে থাকা এবং পরিবার হতে সাময়িকভাবে বিচ্ছিন্ন থাকার পরামশকরতে হবে । এর অর্থ হল পরিবারের সদস্যসহ অন্যান্য ব্যক্তিবর্গের সাথে ঘনিষ্ঠ যোগাযোগ (কমপক্ষে ১ মিটার দূরত্ব) এড়িয়ে চলতে হবে।
- স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষকে সভায় অংশগ্রহনকারীদের সাম্প্রতিক ভ্রমণ এবং উপসর্গের বিশদ তথ্য প্রদান করতে হবে।
- সকল অংশগ্রহনকারীকে তাদের সহযোগিতার জন্য ধন্যবাদ জ্ঞাপন করতে হবে।

৩. কর্তৃপক্ষ ও কর্মীগণের ভ্রমণকালীন সময়ে সাবধানতাঃ

ক) ভ্রমণের আগে-

- কোভিড-১৯ সংক্রমিত এলাকার সর্বশেষ পরিস্থিত সম্পর্কে সংশ্লিষ্ট সংস্থার কর্মকর্তা এবং কর্মচারীদের অবশ্যই জেনে নিতে হবে।
- সর্বশেষ তথ্যের ভিত্তিতে সংস্থার কর্মকর্তা-কর্মচারীদের আসন্ন ভ্রমণ পরিকল্পনা সম্পর্কিত সুযোগ সুবিধা এবং ঝুঁকিগুলো মূল্যায়ন করতে হবে।
- কোভিড-১৯ ছড়িয়ে পড়া এলাকায় অসুস্থ এবং ঝুঁকিতে থাকা কর্মচারীদের প্রেরণ করা যথাসম্ভব এড়িয়ে চলতে হবে।
- কোভিড-১৯ আক্রান্ত এলাকায় ভ্রমণের পূর্বে সংশ্লিষ্ট কর্মচারীদেরকে কোভিড-১৯ সম্পর্কে বিজ্ঞ এবং উপযুক্ত কোন ব্যাক্তি (যেমন- সংস্থার স্বাস্থ্যসেবা প্রদানকারী, স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষ) দ্বারা ঐ স্থানের সুযোগ সুবিধা সম্পর্কে অবহিত করতে হবে।
- ভ্রমণ করতে যাওয়া কর্মচারীদের হ্যান্ড রাব / হ্যান্ড স্যানিটাইজার এর ছোট বোতল (১০০ মিলি এর নীচে) সরবরাহ করতে হবে যাতে তারা নিয়মিত হাত পরিষ্কার রাখতে পারে।

খ) ভ্রমণের সময়:

- বারবার হাত ধোয়ার বিষয়ে উৎসাহিত করতে হবে এবং হাঁচি-কাশি আছে এমন লোকদের কাছ থেকে কমপক্ষে এক মিটার/তিন ফুটের অধিক দূরে থাকতে সংশ্লিষ্ট কর্মকর্তা-কর্মচারীদের নির্দেশ দিতে হবে।
- ভ্রমণের সময় কর্মচারীদের কেউ অসুস্থ বোধ করলে তার জন্য করনীয় এবং কার সাথে যোগাযোগ করবেন তা জানিয়ে দিতে হবে।
- কর্মকর্তা-কর্মচারীরা যেখানে ভ্রমণ করবেন সেখানকার স্থানীয় কর্তৃপক্ষের নির্দেশাবলী যেন সঠিকভাবে মেনে চলে সেটা নিশ্চিত করতে হবে যেমন- যদি স্থানীয় কর্তৃপক্ষ তাকে কোন জায়গায় যেতে নিষেধ করেন তাহলে সেখানে না যাওয়া। কর্মকর্তা-কর্মচারীদের স্থানীয় ভ্রমণ, চলাচল বা বড় সমাবেশ সম্পর্কিত বিধিনিষেধ মেনে চলতে হবে।

গ) ভ্রমণ থেকে ফিরে আসলে:

- কোভিড-১৯ ছড়িয়ে পড়া এলাকা থেকে ফিরে আসা কর্মচারীদের কোভিড-১৯ এর উপসর্গ পর্যবেক্ষণের জন্য ১৪ দিনের নজরদারিতে (কোয়ারেন্টাইনে) রাখতে হবে। তাদের শরীরের তাপমাত্রা দিনে দুবার করে মাপতে হবে। এসময় তারা বাড়িতেই অবস্থান করবে।

- যদি তাদের হালকা কাশি বা সামান্য জ্বর হয়ে থাকে (যেমন- তাপমাত্রা ৯৯.২ ডিগ্রি ফারেনহাইট বা তার বেশি) তবে তাদের বাড়িতে থাকা পরিবারের সদস্যসহ অন্যান্য লোক হতে বিচ্ছিন্ন হতে হবে। এর অর্থ পরিবারসহ অন্যান্য লোকের সংস্পর্শ এড়িয়ে চলতে হবে (কমপক্ষে এক মিটার দূরত্ব বজায় রাখতে হবে)
- টেলিফোনের মাধ্যমে স্বাস্থ্যসেবা প্রদানকারী বা স্থানীয় জনস্বাস্থ্য বিভাগকে তাদের সাম্প্রতিক ভ্রমণ এবং রোগের লক্ষণগুলি সম্পর্কে বিশদ তথ্য প্রদান করতে হবে।

৪. কোভিড-১৯ ছড়িয়ে পড়লে কর্মক্ষেত্র প্রস্তুতকরণঃ

কর্মক্ষেত্রে কোন কোভিড-১৯ এ আক্রান্ত সন্দেহভাজন ব্যক্তি অসুস্থ হয়ে পড়লে কি করণীয় তার একটি পরিকল্পনা তৈরি করতে হবে।

- কর্মস্থলে-
  - ✓ অসুস্থ ব্যক্তিকে এমন কোন স্থানে রাখতে হবে যেখানে তারা অন্যদের থেকে বিচ্ছিন্ন (Isolated) থাকবে। সেই সাথে অসুস্থ ব্যক্তির সাথে যথাসম্ভব কম সংখ্যক মানুষ যেন যোগাযোগ করে নিশ্চিত করতে হবে এবং স্থানীয় স্বাস্থ্যসেবা প্রদানকারী কর্তৃপক্ষের সাথে যোগাযোগ করতে হবে।
  - ✓ কর্মস্থলে অন্যান্য ঝুঁকিপূর্ণ ব্যক্তিদের কীভাবে চিহ্নিত করা যায় তা বিবেচনা করতে হবে। লক্ষ্য রাখতে হবে যেন কেউ নিগ্রহ বা বৈষম্যের শিকার না হয়। সম্প্রতি কোভিড-১৯ আক্রান্ত অঞ্চল ভ্রমণ করেছেন এমন কর্মীদের মধ্যে যারা অন্যান্য গুরুতর অসুস্থ হওয়ার ঝুঁকিতে রয়েছে (যেমন-ডায়াবেটিস, হৃদরোগ, ফুসফুসের রোগ এবং বেশি বয়স) তাদেরকে উচ্চঝুঁকিপূর্ণ হিসেবে অগ্রাধিকার দিতে হবে।
  - ✓ কোভিড-১৯ প্রতিরোধে আপনার করা পরিকল্পনাটি সম্পর্কে স্থানীয় জনস্বাস্থ্য কর্তৃপক্ষকে জানাতে হবে এবং প্রয়োজনে তাদের মতামত গ্রহণ করতে হবে।
  - দপ্তর বা সংস্থায় নিয়মিত টেলিযোগাযোগের মাধ্যমে কর্ম সম্পাদনের ব্যবস্থা করতে হবে। কোভিড-১৯ এর প্রাদুর্ভাব ঘটলে স্বাস্থ্য কর্তৃপক্ষ গণপরিবহন এবং জনসমাগম এড়াতে জনগণকে পরামর্শ দিতে পারে; সেক্ষেত্রে টেলিযোগাযোগ কর্মীদের নিরাপত্তা নিশ্চিত করার পাশাপাশি ব্যবসা বা কর্মক্ষেত্রকে সচল রাখতে সহায়তা করবে।
  - কোন সংস্থা বা প্রতিষ্ঠান যে এলাকায় অবস্থিত সেখানে কোভিড-১৯ এর প্রাদুর্ভাব ঘটলে তার জন্য একটি দুর্যোগকালীন ব্যবস্থাপনার পরিকল্পনা তৈরি করতে হবে যা-
    - ✓ প্রনয়নকৃত দুর্যোগকালীন ব্যবস্থাপনার পরিকল্পনা সংশ্লিষ্ট সংস্থাকে সমাজ বা কর্মক্ষেত্রে ছড়িয়ে পড়া কোভিড-১৯ মোকাবেলার সামর্থ্য করবে। অন্যান্য জরুরী স্বাস্থ্যসেবা প্রদানকারী সংস্থার ক্ষেত্রেও এই পরিকল্পনা প্রযোজ্য।
    - ✓ পরিকল্পনাটি এমন হতে হবে যেন অসুস্থতা বা স্থানীয় চলাচলে প্রতিবন্ধকতার জন্য উল্লেখযোগ্য সংখ্যক কর্মী, ঠিকাদার এবং সরবরাহকারীর অনুপস্থিতিতেও প্রতিষ্ঠানটি সচল থাকে।
    - ✓ পরিকল্পনাটির বিষয়ে আপনার কর্মকর্তা-কর্মচারী ও ঠিকাদারদের জানাতে হবে এবং দুর্যোগকালে তারা কি করবে আর কি করবে না তা তাদেরকে অবহিত করতে হবে। এক্ষেত্রে মূল বিষয়গুলোর উপরে অধিক গুরুত্ব আরোপ করতে হবে।
    - ✓ পরিকল্পনাটিতে যেন কোভিড-১৯ আক্রান্তের মানসিক স্বাস্থ্য ও সামাজর উপর কি প্রভাব পরে সে বিষয়টি আলোচিত হয় তা লক্ষ্য রাখতে হবে। কোভিড-১৯ সম্পর্কিত সঠিক তথ্য প্রাপ্তি এবং সহায়তা প্রদান নিশ্চিত করতে হবে।

- ✓ যেসব ক্ষুদ্র ও মাঝারী ব্যবসা প্রতিষ্ঠানগুলো জরুরীক্ষেত্রে নিজস্ব কর্মীদের স্বাস্থ্য ও কল্যাণের বিষয় নিশ্চিত করতে সমর্থ নয় তাদেরকে আগ্রিম স্থানীয় স্বাস্থ্যসেবা প্রদানকারীদের সাথে যৌথ পারস্পরিক সহযোগীতার পরিকল্পনা করতে হবে।
- ✓ এই পরিকল্পনা তৈরির জন্য স্থানীয় ও জাতীয় পর্যায়ের জনস্বাস্থ্য কর্তৃপক্ষ সহযোগীতা প্রদানেরও প্রস্তাব দিতে পারে।

মনে রাখা জরুরী:

কোভিড-১৯ এর জন্য প্রস্তুত হওয়ার সময় এখনই। এক্ষেত্রে সাধারণ সতর্কতা এবং সঠিক পরিকল্পনা গ্রহণ কোভিড-১৯ প্রতিরোধে বড় ভূমিকা রাখতে পারে। অবিলম্বে নেয়া সঠিক পদক্ষেপ আপনার কর্মক্ষেত্র ও কর্মচারীদের রক্ষা করতে সহায়তা করবে।

COVID-19 Health and Safety Guidance for the Construction Workforce

INSTRUCTIONS

Contractors are required to ensure health and safety of the workers and employees in accordance with environmental health and safety (EHS) provisions of the contract which is in line with ADB SPS 2009 and Bangladesh Labor Law 2006 (Chapter VIII). A supplementary EHS guidelines was prepared to ensure that workers and employees are safe from Pandemic COVID-19 infection while working at the constriction sites. This guideline should be used as a supplement to the project's Environmental Health and Safety (EHS) guidelines for the workers. Contractors are encouraged to prepare a site-specific Environmental Health and Safety (EHS) guidelines for reopening the sites and mobilizing labor and resources and get it approved by Executing Agency. The EHS guidelines and COVID-19 EHS guidelines should be available at worksite all the time with no exception.

Prerequisites for Reopening Worksite

1. Consider reopening at limited scale by identifying and engaging essential labor force
2. Avoid worker intensive works as much as possible; encourage use of equipment
3. Engage fulltime EHS professional to oversee the implementation of EHS guidelines
4. Engage a medical professional to prepare health record of the workers and daily health checkup
5. Ensure coverall Personal Protective Equipment (PPE) for medical professional
6. Prepare a list of equipment and vehicles to be used frequently and ensure routine disinfection
7. Make available thermometer, soap, hand sanitizer, disinfectant, and PPE (mask, gloves, boot) at worksite and camp
8. Place adequate number of washbasins, disinfectant tub, dispenser for sanitizer
9. Establish electronic payment system (e.g., BKash, Nagad, Rocket) to pay the daily wage
10. Follow the guidance as provided below.

Locate the closest medical facility equipped with COVID -19 and contact them.

Place washbasins and disinfectant tub for shoes.

Engage EHS professional. Engage Medical professional (fulltime/ part-time).

Place a few COVID-19 signed covered trash bin for disposal of used PPEs.

Supply soap and sanitizer to labor and staff for after office for disinfection.

Worksite Entrance Protocol

Everyone entering the worksite must wear a mask and gloves.

During worksite entry que, maintain physical distance of minimum 1m (3ft).

Every personnel should wash their hands with soap for 20 seconds. Display hand washing protocol at entrance.

Spray bottom of shoes of every personnel entering worksite/ campsite with disinfectant. Disinfect all vehicles entering site.

use thermometer gun to check temperature. If body temperature found > 37°C send to the designated medical facility.

Worksite Management

Frequently clean and disinfect highly used tools, machineries and surfaces (e.g. tables, toilets) by workers.

Mandatory morning briefing on COVID awareness at site maintaining physical distance.

Use alcohol-based wipe to clean tools, equipment, vehicle before and after use.

Discourage gathering at site. Discourage unnecessary entrance and exit at site.

Camp Management

1. Provide soap, sanitizer, washing facility and safe water at the workers' dwelling. Encourage frequent hand washing.
2. Ensure separate covered bin for disposal of used PPEs.
3. Protect against heat, cold, damp, noise, fire, and disease-carrying animals.
4. Maintain good housekeeping and social distancing in kitchens, meal rooms, canteens.
5. Ensure personal distance at least 1 meter (3 feet), preferably 2m (6ft) during lunch, dinner and prayer.
6. Ensure ample ventilation at the camp.

Place covered waste bins at worksite
Do not forget to dispose your used PPEs in the bins!!

Work at Site Awareness

Inform the designated ESH/Medical personnel immediately if any person starts showing the symptoms of COVID-19.

Encourage respiratory etiquette, including covering coughs and sneezes. Don't touch nose/eye/ mouth if not washed recently, do not spit.

Encourage the workers at camp to go out for supplies not more than once a week.

Shorten toolbox meetings. Initiate remote meeting protocol to avoid physical contact.

Stay informed. Get news from WHO and Government news outlets. Ask your EAs. Ask ADB.

COVID-19 Health and Safety guidance for the construction workforce

COVID-19 Health and Safety Guidance for the Construction Workforce

USE OF THIS DOCUMENT

This document should be used as a supplement to the Environmental Health and Safety (EHS) Manual for the workers. Make all the documents available at site all the time. Executing Agencies (EAs) are responsible for providing both documents to the contractors. Contractors should provide both documents at site. The current document should be used in conjunction with ESH manual. Consider this document as 'live document' which should be updated as new information available. A site-specific version of this document should be adopted for specific project sites.

Section 1: Pre-requisite for reopening/opening worksite/campsite:

1. Plan to open/reopen worksite at limited scale (i.e. only essential works at worksite). Map essential/unavoidable works that must be attended at this moment. Identify and engage essential labor force initially. Increase labor force step by step as necessary. Do not engage labor until necessary preparation is done as stipulated in the next paragraphs.
2. Locate the closest medical establishment equipped with COVID -19 response facilities. Establish contact with the medical facility and make agreements with them for cases of potential COVID patient from the work site.
3. Engage a full time EHS professional at site. Also engage a part-time/fulltime medical professional based on the workforce and project size/type.
4. Prepare list of potential workforce/labors. With the help of the EHS/medical professional prepare health records of the labors to be engaged. Seek assistance from registered medical centers if required. Keep the record at site office.
5. Purchase thermometer gun, soap, hand sanitizer, disinfectants and PPEs (mask, hand gloves, hard shoes etc.) and keep it at worksite office. Disinfectants can be diluted bleaching power as directed by Environmental Protection Agency (EPA).
6. Establish site entrance protocol as depicted in **Section 2** below. Redesign the site safety notices/signboards/protocol according to the guidelines provided in this document.
7. Arrange washbasin, soap and clean water at the entrance of every worksite/campsite. Also keep either a disinfectant tub for shoes or keep disinfectant spray that must be sprayed under the boots/hard shoes of the persons entering worksite. Put signboard/poster in front of the washbasin instructing the workers/staff/site visitors to wash both hands for 20 seconds. The board/poster should also display proper hand washing techniques as per WHO guidelines.
8. Provide every personnel working in the site with mask, hand gloves and hard shoes for their personal use. Strictly follow the HSE manual at site. The contractor must have a copy of the HSE manual at site. For assistance contact with relevant EAs.
9. Identify and note a list of commonly used machines/tools and surfaces (e.g. tables, doorknobs, handrail etc.) by workers and camp site dwellers.

10. Make arrangements of electronic payment system affordable for the workers (e.g. bKash, Nogod, Rocket etc.). Update company polices of paid sick leave, medical allowance and medical insurance.

Section 2: Worksite entrance protocol

1. Everyone entering the worksite must wear a mask, gloves and hard shoes. Strictly follow and implement the EHS manual at worksite.

2. At the entrance of the worksite/camp site every personnel must wash their hands for 20 second with maintaining a distance of at least 1m (3 ft) from each other. At this rate 180 person can enter the site in an hour. Depending on this calculation (hourly rate 180pax per washbasin) the contractor can calculate the number of washbasins he/she needs to provide. The wash basins should maintain at least 1.5m distance from each other and the entrance que must maintain 1m distance from each other.

3. Spray bottom of shoes of every personnel entering worksite/campsite with disinfectant or provide shoe storage for worker storing shoe in poly bag before entering the worksite.

4. Procure and use a thermometer gun to check temperature of everyone entering the site. If body temperature is found > 37 degrees, send this person to the designated medical facility for further examination and follow instruction of the medical person in-charge.

5. Prepare disinfectant using ICCDR, B or EPA registered household disinfectant formula (e.g. diluted bleaching powder) and disinfect vehicles upon entry to the worksite/campsite.

Section 3: Daily worksite protocols

1. A designated EHS and medical person should stay all time during work. The EHS/Medical person should also monitor campsite. He/she will be in charge of ensuring physical distances (minimum 1m) among workers, disinfecting surfaces that are commonly used and investigate workers/site personnel health and safety.

2. The designated EHS/medical person (or assistant) must frequently clean and disinfect highly used tools and machineries by workers and surfaces including doorknobs, handrails, toilets, work surfaces, and common areas such as tables, assembly place etc.

3. At the start and end of the day disinfect the total worksite. For campsite, disinfect the total area before the workers/camp dwellers are back from site.

4. Always check if the stock of disinfectant, PPEs, medical supplies are sufficient.

5. Encourage site personnel/camp dwellers to not touch their eyes, mouth or nose if not washed thoroughly with soap recently. Also discourage hand shaking or hugs.

6. Arrange a mandatory site brief on COVID awareness in the morning. The session must be conducted by the EHS/medical professional.

7. Encourage workers/site personnel/camp dwellers to inform the designated ESH/Medical personnel immediately if any colleague starts showing the symptoms of COVID-19.

8. While worksites are commonly well ventilated (if not make sure the work sites are well ventilated), ensure that the camp sites including the rooms designated for the camp dwellers are well ventilated and spacious.

9. Before sharing common tools/machines at worksite, ensure to disinfect.

10. Discourage site personnel to gather and gossip at any time, rather encourage physical distance while chatting/discussing.

11. Keep the day-to-day toolbox meetings as short as possible. Ensure physical distance during meetings.

12. Increase use for internet/phone-based meetings/site visits as much as possible to avoid travelling and physical communication.

13. Restrict worksite personnel to go outside unnecessarily. Also restrict campsite personnel to go outside without any valid cause.

14. If any person related at worksite/campsite fall victim to COVID-19 or being kept isolated for pre-caution, consider paid leave with no exception allowed.

Section 4: Everyday training

1. Train workers on how to properly put on, use/wear, and take off protective clothing and equipment. The on-site EHS/Medical person should be in-charge of these trainings. These trainings must maintain the WHO's social distancing protocol. Make these trainings mandatory at worksites. Provide 10-15 minutes of a workday for such 'training and encouragement' activities.

2. Encourage respiratory etiquette, including covering coughs and sneezes. Train the site personnel as needed.

3. Contact with EAs/ADB designated professional for any help with training material/knowledge/miscellaneous.

Section 5: Campsite management

1. Ensure sufficient stock of soap, sanitizer, washing facility and safe water at the workers' dwelling (both camp site and home). Encourage frequent hand washing and social distancing at campsite.

2. Ensure a separate covered bin in place at every campsite/worker's dwelling for disposal of used PPEs.

3. Check and ensure if camps are well ventilated and protected against heat, cold, damp, noise, fire, and disease-carrying animals.

4. Maintain good housekeeping and social distancing in kitchens, meal rooms, canteens and toilets. Make sure campsites are using sanitary toilets.

5. Ensure personal distance at least 1 meter (3 feet), preferably 2m (6ft) during lunch, dinner and prayer.

Section 6: Knowledge management and documentation

1. During CODIV-19 outbreak new information is coming everyday as the science develops. Site management needs to evolve as new information/current protocol

emerges. It is difficult for site medical/EHS professional to keep up with the new knowledge/information that is coming every day in absence of fast internet. Hence, he/she should keep in close contact with the designated EAs/ADB professional for updated information and protocol. This documents also needs to be considered as live document and should be updated as necessary.

Emergency response team (COVID-19)

EMERGENCY/CRISIS RESPOSE TEAM
(Roles and Responsibilities)

A. Overview

An integrated approach to emergency response involves a range of stakeholders, including the primary responder (i.e., the contractor), supervision consultants, the secondary responder (i.e. EA/IAs) and the tertiary responder (i.e. Donor agencies (e.g. ADB)) along with the local authorities, regulatory agencies and the general public. Such a system therefore requires robust processes regarding information dissemination, training, and designation of responsibility, management actions, monitoring, control, and corrective actions. The Emergency/Crisis Response Team therefore needs to be fully equipped and well communicated.

B. Organization chart of crisis response team

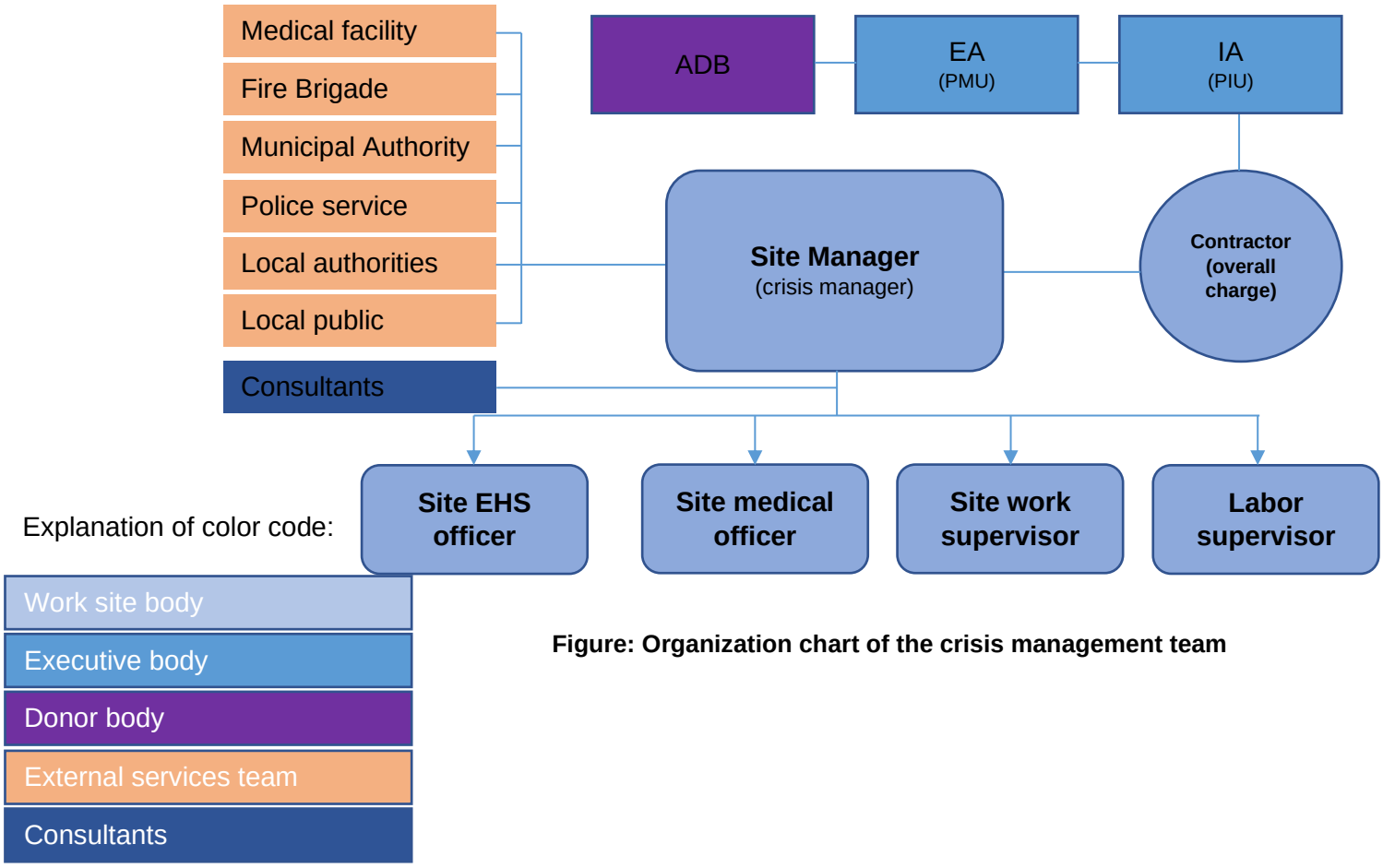


Figure: Organization chart of the crisis management team

Table: Crisis response team

No.	Name	Designation	Mobile no.
1		Site Manager	
2		EHS officer	
3		Medical officer	
4		Worksite supervisor	
5		Labor supervisor	
6		Contractor	
7		Local hospital	
8		Local police station	
9		Local fire brigade	
..			

Appendix 7: Summary of public consultation

As part of the impact assessment, the consultants conducted a focus group discussion with selected group. Focus groups are useful in obtaining a particular kind of information that would be difficult to obtain using other methodologies. Further Public consultations and Focus Group Discussions (FGD) were conducted for the proposed Drains on 1st and 5th November,2021 at the existing Drain with 126 local people (Male-90 and Female-36). The objective of the FGD's was to further appraise the stakeholders about the current progress of the subproject and to reiterate environmental and social impacts of the proposed subproject and safeguards to mitigate the same. Comments or questions raised by the group were discussed until they were satisfied with the level of information provided.

Key issues discussed were similar to those already voiced during the community consultation meetings and included:

- Community benefits realized as a result of the Drain schemes;
- Resettlement and social issues and mitigation measures according to Resettlement Framework prepared and approved by ADB and government Bangladesh for this project;
- Participation of local community during the construction phase;
- Roles and responsibilities of different stakeholders for realizing desired outcome;
- Potential social and economic impacts of the proposed Drain construction/ improvement.
- Awareness of the local community about the proposed Drains;
- Opinion of the local people about its need;
- Community support and participation;
- Construction and maintenance of the Drains;
- Participation of local people for construction and maintenance

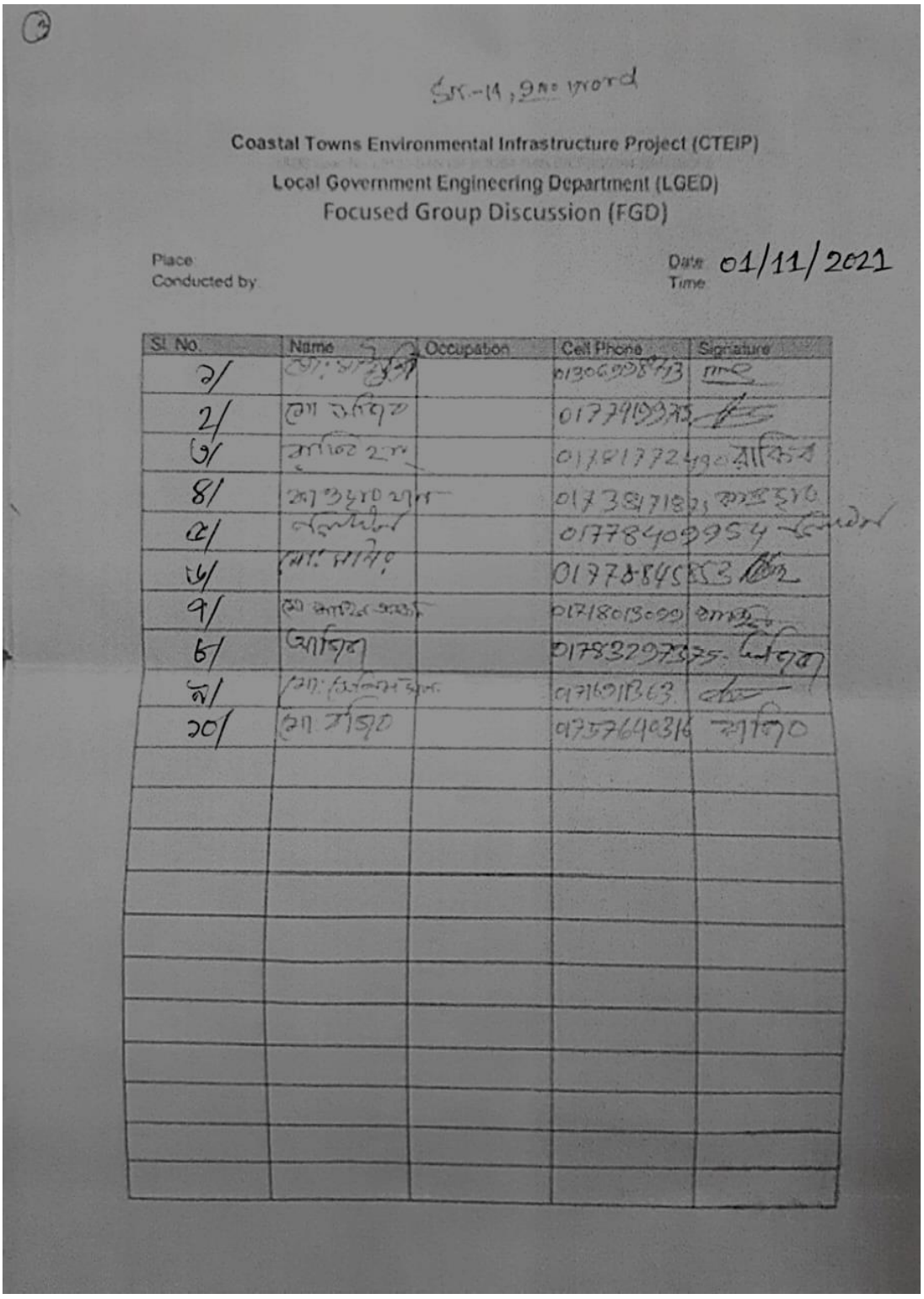
Summary of discussion;
Existing condition of the Drains is poor and needs development for improvement of water logging problem. Local people expressed their deep interest for development of the selected Drains under the Project. The people appreciated ADB's Resettlement Policy for eligibility criteria, entitlement for compensation and resettlement assistance, as well as the provisions of the approved Resettlement Framework for the project.

The Drain schemes will improve socioeconomic conditions of the local people through creating more opportunity of income and employment, as well as exploiting local resources for boosting local productions.

It was communicated by the project consultants to the participants that any damages caused to the secondary structures eg. boundary wall, stairs, ramps will be reconstructed and repaired by the contractors.

The concern raised was related to if they have to close their business or they have to shift, it was mentioned to them that for any disruption they would be compensated as per the entitlement matrix.
During construction, construction spoils including debris, gravel, sand, bricks and cement shall be disposed of properly. Vigilance against undue water logging and/or water pooling within the area for the purpose, or as a result of, the construction methods, shall be made by the Contractor in avoiding places of mosquito breeding.

Regular removal of trash and general waste generated during the course of the construction and operational stage



Coastal Towns Environmental Infrastructure Project (CTEIP)

Local Government Engineering Department (LGED)

Focused Group Discussion (FGD)

Place:
Conducted by:

Date: 01/11/2021
Time:

Sl. No.	Name	Occupation	Cell Phone	Signature
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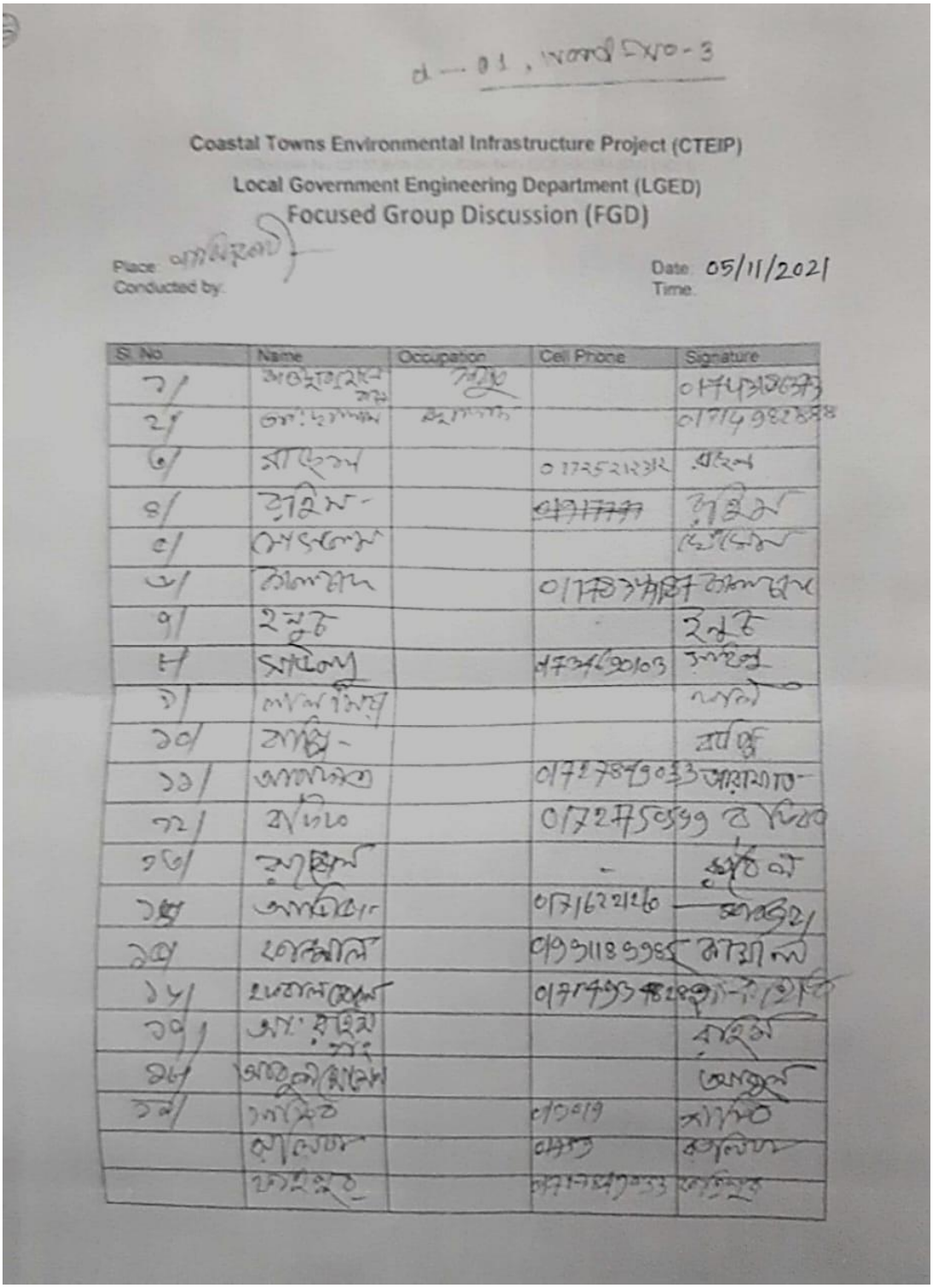

d – 01, Ward No-3

Coastal Towns Environmental Infrastructure Project (CTEIP)

Local Government Engineering Department (LGED)

Focused Group Discussion (FGD)

Place:
Conducted by:

Date: 05/11/2021
Time:

Sl. No	Name	Occupation	Cell Phone	Signature
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22.36061362N 90.34753064E
71° E
Patuakhali District
Barisal Division
Altitude:-52.9m
Speed:0.0km/h
Index number: 865


5 Nov 2021 10:59:23 am
22.36541048N 90.34667348E
10° N
1 Sadar Road
Patuakhali District
Barisal Division
Altitude:-42.0m
Speed:0.0km/h
Index number: 1026


5 Nov 2021 11:20:58 am
22.3637616N 90.33788499E
119° SE
Sadar Road
Patuakhali District
Barisal Division
Altitude:-59.6m
Speed:3.6km/h
Index number: 1032

Appendix 8:Sample Grievance Redress Form

(To be available in English or other local languages)

The LGED welcomes complaints, suggestions, queries, and comments regarding the project implementation. We encourage any person or group with a grievance to provide their name and contact information to get in touch with you for clarification and feedback.

Should you choose to include your details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

Date		**Place of registration**				
Contact Information/Personal Details						
Name		Gender	Male Female		Age	
Home Address						
Village / Town						
District						
Phone no.						
E-mail						
Complaint/Suggestion/Comment/Question Please provide details of the grievance (who, what, where, and how): _____ _____ ***Note: You may attach a document, letter, or note in the grievance form.**						
How do you want us to reach you for feedback or updates on your comment/grievance?						

OFFICIAL USE ONLY

Registered by: (Name of official registering grievance)	
If – then mode: 1. Note/Letter 2. E-mail 3. Verbal/Telephonic	
Reviewed by: (Name, Signature, Position)	
Action Taken:(Date, Venue of Meeting, Other details)	
Whether Action Taken Disclosed:	**4. Yes** **5. No**
Means of Disclosure:	

GRIEVANCES RECORD AND ACTION TAKEN

Sr. No.	Date	Name and Contact No. of Complainant	Type of Complaint	Place	Status of Redress	Remarks

Appendix 9: Sample Daily Inspection/Monitoring Checklist of Contractor

Monitoring and Reporting Template
Environmental Health and Safety Monitoring

A. Environmental Health and Safety Checklist

Sl. no.	Item	Exist in the worksite?		Recommendation And/ or Remarks	Time frame to comply
		Yes □	No □		
1	Site readiness (e.g. is worksite fenced and can be distinguished from general establishment? Is an EHS professional at site? Has he/she been fulltime professional? Has he/she been present at site every day?)				
2	Site access (e.g., is site access road wide and easily accessible?)				
3	Signboard with safety warnings (e.g. with general EHS safety signboards, are COVID 19 response signboards visible at every corner of worksite?)				
4	Lighting (e.g. is every corner of the worksite is well lit?)				
5	Appropriate PPEs (Helmet, Safety Shoe, Vest, Ear plug, Musk etc.) e.g. Is every person in site is wearing appropriate PPEs?				
6	Fall protection measures (e.g. is the fall protection measures at worksite appropriate and adequate?				
7	Fire extinguishers (e.g. are they at site? How many? Are they placed at vulnerable/most accessible places?)				
8	Housekeeping (e.g., are all workers health records kept? Is the EMP and EHS manual at site? Has the morning briefing on EHS conducted? Is there any vehicle record/material register/attendance register/complain register kept?)				
9	Garbage bins (e.g., are there garbage bins at site? Are the numbers adequate? Is waste thrown to bins? Are the bins well places?				
10	Drinking water supply (e.g. safe drinking water for worksite been supplied? Is drinking water adequate?				
11	Sanitation facilities (e.g. is there separate male and female toilets established? Are they adequate? Hand wash materials and water being provided at toilets? Are those toilets sanitary?				
12	Dust protection measures (e.g. is mask provided for worksite personnel? Is water sprayed frequently as needed to suppress dust? Are sand class materials covered with plastic sheets?				
13	Noise barrier and reduction equipment (e.g. how much noise is generated by site? Does it exceed maximum human exposure limit? Are workers provided with noise reduction gears such as ear mufflers?)				
14	Shelter (e.g. is there a site office or shelter good enough to take shelter during rain or storm event?)				
15	First aid box (e.g. is there a first aid box at site? Are the contents of the first aid box adequate for primary treatment? Is the first aid box handled by at EHS/medical professional				
16	Toolbox meetings (e.g. are toolbox meeting regularly arranged? Are records kept?)				
17	Others (many other checklists can be formulated by the EHS professional on board)				

COVID -19 protocols on top of usual EHS checklist (this applied to campsite also)					
18	COVID-19 posters/signboards (e.g., are COVID-19 awareness/protocol posters are showing all visible corners of the site?)				
19	Entrance protocol (e.g., Is the COVID-19 worksite entrance protocol been followed as stipulated in the COVID -19 response guidance? Are adequate soaps, water has been kept at site entry? Are workers at entrance que using mask, hand gloves and hard shoes? Are disinfectant spray kept at site entry to disinfect underneath the boots of entering persons?)				
20	Vehicle entry protocol (e.g. has the vehicle disinfection protocol has been initiated?)				
21	Social distancing (e.g. are the workers maintaining social distancing all the time?)				
22	Sharing tools/machineries (e.g. are the tools and machineries are wiped to disinfect before sharing/working?				
23	Disinfecting work area (e.g. is the worksite/ common surfaces, toilets etc. are disinfected before worksite opened in the morning? Has record being kept? Has the worksite been disinfected yesterday after closing for the day?)				
24	Restriction on worksite entry and exit (e.g. has workers being discouraged to travel frequently out of worksite or entering? Has records being kept?)				
25	Stock of disinfectant (e.g. is the stock of disinfectants, soap, PPEs are adequate at worksite?)				

*Attach photos
**Enter additional criteria as required for site specific measures

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)
Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	**Name** **Designation** **Signature** **Date**	

B. Accident/ Incident Investigation Report

Class of Incident		Reported
☐ Injure	☐ Property/ Plant Damage	Yes ☐ No ☐ Details:
☐ Near Miss	☐ Environmental	Further Action Required
		☐ Report to Authorities ☐ Other

Details of Incident			
Date of Incident		Time of Incident	am ☐ pm ☐
Witness Name		Witness Contact	
Nature of Incident			
Location of Incident			
Description of Incident			
Details of damage to equipment/property			

Injured Person/s (if applicable)			
Name			
Address Date of Birth Occupation Referred/transferred to		Employer	

Recommended Preventive Action	
Details	

Completed by			
Name		Position	
Signature		Date	

C. Safety patrol/inspection report form

Date						
Inspector						
No	**Location**	**Comment/instruction**	**Photo**	**Corrective action**	**Deadline**	**Responsible person**

Reported by (ESC)	Checked by (TL)	Approved by (EA/IA)

Name Designation Signature Date	Name Designation Signature Date	Name Designation Signature Date
Received and agreed to comply by the representative of the contractor	**Name** **Designation** **Signature** **Date**	

Appendix 10: Sample Inspection Checklist for PMU/Divisional/Regional Office/PIU

SAMPLE INSPECTION CHECKLIST

(Note**:** This checklist is indicative which can be further enhanced depending on the project circumstances.)

[NAME OF ADB PROJECT]
SITE INSPECTION CHECKLIST

Subproject / Location:_____ Date: _____

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
1.	Supervision and Management On-Site	Yes	No	NA	
	a. Is an EHS supervisor available?				
	b. Is a copy of the SEMP available?				
	c. Are daily toolbox talks conducted on site?				
2.	The Facilities	Yes	No	NA	
	a. Are there a medical and first aid kits on site?				
	b. Are emergency contact details available on-site?				
	c. Are there PPEs available? What are they?				
	d. Are the PPEs in good condition?				
	e. Are there firefighting equipment on site?				
	f. Are there separate sanitary facilities for male and female workers?				
	g. Is drinking water supply available for workers?				
	h. Is there a rest area for workers?				
	i. Are storage areas for chemicals available and with protection? in safe locations?				
3.	Occupational Health and Safety	Yes	No	NA	
	a. Are the PPEs being used by workers?				
	b. Are excavation trenches provided with shores or protection from landslide?				
	c. Is breaktime for workers provided?				
	d. How many for each type of collection vehicle is in current use?				
4.	Community Safety	Yes	No	NA	
	a) Are excavation areas provided with barricades around them?				
	b) Are safety signages posted around the sites?				
	c) Are temporary and safe walkways for pedestrians available near work sites?				
	d) Is there a record of treated wastewater quality testing/measurement?				
5.	Solid Waste Management	Yes	No	NA	
	a. Are excavated materials placed sufficiently away from water courses?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	b. Is solid waste segregation and management in place?				
	c. Is there a regular collection of solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	a) Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	b) Is any wastewater discharged to storm drains?				
	c) Is any wastewater being treated prior to discharge?				
	d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
7.	Dust Control	Yes	No	NA	
	a. Is the construction site watered to minimize generation of dust?				
	b. Are roads within and around the construction sites sprayed with water on regular intervals?				
	c. Is there a speed control for vehicles at construction sites?				
	d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	e. Are construction vehicles carrying soils and other spoils covered?				
	f. Are generators provided with air pollution control devices?				
	g. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?				
8.	Noise Control	Yes	No	NA	
	a) Is the work only taking place between 7 am and 7 pm, week days?				
	b) Do generators operate with doors closed or provided with sound barrier around them?				
	c) Is idle equipment turned off or throttled down?				
	d) Are there noise mitigation measures adopted at construction sites?				
	e) Are neighboring residents notified in advance of any noisy activities expected at construction sites?				
9.	Traffic Management	Yes	No	NA	
	a) Are traffic signages available around the construction sites and nearby roads?				
	b) Are re-routing signages sufficient to guide motorists?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	c) Are the excavation sites along roads provided with barricades with reflectors?				
	d) Are the excavation sites provided with sufficient lighting at night?				
10.	Recording System	Yes	No	NA	
	a) Do the contractors have recording system for SEMP implementation?				
	b) Are the daily monitoring sheets accomplished by the contractor EHS supervisor (or equivalent) properly compiled?				
	c) Are laboratory results of environmental sampling conducted since the commencement of construction activities properly compiled?				
	d) Are these records readily available at the site and to the inspection team?				

Other Issues: _____

_____

_____

_____

_____

Prepared by: _____

Name, Designation and Signature

Appendix 11: Semi-annual Environmental Monitoring Report Template

1. Introduction

- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009

2. Project Safeguards Team

- Identify the role/s of Safeguards Team including schedule of on-site verification of reports submitted by consultants and contractors.

Name	Designation/Office	Email Address	Contact Number
1. PMU			
2. PIUs			
3. Consultants			

3. Overall project and subproject/package progress and status

- Indicate (i) status of design – preliminary design or final design, (ii) status of implementation - under bidding, contract awarded but no works yet, contract awarded with works, civil works completed, or O&M

Package Number	Components/List of Works	Type of Contract *(specify if DBO, DB or civil works)*	Status of Implementation *(specify if Preliminary Design, Detailed Design, On-going Construction, Completed Works, or O&M phase)*[1]	Contract Status *(specify if under bidding or contract awarded)*	If On-going Construction	
					%Physical Progress	Expected Completion Date

- For package with awarded contract, provide name/s and contact details of contractor/s' nodal person/s for environmental safeguards.

Package-wise Contractor/s' Nodal Persons for Environmental Safeguards

Package Name	IEE Cleared by ADB *(provide date)*	Contractor	HSE Nodal Person	Email Address	Contact Number

4. STATUS OF IEE PER SUBPROJECT/PACKAGE

- Provide status of updated/final IEE[2] per package.

Package-wise Implementation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director?[3] *(Yes/No)*	Remarks
	Not yet due *(detailed design not yet completed)*	Submitted to ADB *(provide date of submission)*	Disclosed on project website *(provide link)*	Final IEE provided to Contractor/s *(Yes/No)*		

5. Compliance status with National/State/Local statutory environmental requirements[4]

Package No.	Statutory Environmental Requirements[5]	Status of Compliance *(Specify if obtained, submitted and awaiting approval, application not yet submitted)*	Validity Date(s) *(if already obtained)*	Action Required	Specific Conditions that will require environmental monitoring[6]

6. Compliance status with environmental loan covenants

Schedule No. and Item *(see Project Loan Agreement and list provisions relevant to environmental safeguards, core labor standards and occupational health and safety)*	Covenant	Status of Compliance	Action Required

7. Compliance status with the environmental management plan (refer to EMP tables in approved IEE/s)

- Confirm in IEE/s if contractors are required to submit site-specific EMP (SEMP)/construction EMPs (CEMP). If not, describe the methodology of monitoring each package under implementation.

- Provide over-all compliance of the contractors with SEMP/CEMP. This should be supported by contractors' monthly monitoring reports to PIU(s) and/or verification reports of PIU(s) or project consultants. Include as appendix supporting documents such as **signed** monthly environmental site inspection reports prepared by consultants and/or contractors.

Overall Compliance with SEMP/CEMP

Package No.	Status of SEMP/CEMP Implementation *(Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)*	Action Proposed and Additional Measures Required

- Provide description based on site observations and records:
    - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
    - Identify muddy water was escaping site boundaries or muddy tracks were seen on adjacent roads.
    - Identify type of erosion and sediment control measures installed on site/s, condition of erosion and sediment control measures including if these were intact following heavy rain;
    - Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area.
    - Confirm spill kits on site and site procedure for handling emergencies.
    - Identify any chemical stored on site and provide information on storage condition. Attach photograph.
    - Describe management of stockpiles in each work site (construction materials, excavated soils, spoils, etc.). Provide photographs.
    - Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
    - Provide information on barricades, signages, and on-site boards. Provide photographs.
    - Provide information on workers labor camp(s). Provide photographs.
    - Provide information on work-related accidents and incidents. Describe actions implemented.
    - Provide information on if there are any activities being under taken out of working hours and how that is being managed.

- Provide list of trainings on environmental safeguards, core labor standards, and OSH conducted during the reporting period. Include ADB-organized workshop, trainings, seminars, etc)

Trainings, Workshops and Seminars Conducted

Date	Topic	Conducted by	No. of Participants (Total)	No. of Participants (Female)	Remarks

- Provide the monitoring results as per the parameters outlined in the approved EMP (or site-specific EMP/construction EMP when applicable).

Summary of Environmental Monitoring Activities (for the Reporting Period)[7]

Impacts *(List from SEMP/CEMP)*	Mitigation Measures *(List from SEMP/CEMP)*	Parameters Monitored *(As identified in the SEMP/CEMP)*	Method of Monitoring *(Visual, Actual Sampling, etc)*	Location of Monitoring *(Provide GPS Coordinates)*[8]	Date of Monitoring Conducted	Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						

Impacts *(List from SEMP/CEMP)*	Mitigation Measures *(List from SEMP/CEMP)*	Parameters Monitored *(As identified in the SEMP/CEMP)*	Method of Monitoring *(Visual, Actual Sampling, etc)*	Location of Monitoring *(Provide GPS Coordinates)*[8]	Date of Monitoring Conducted	Person Who Conducted the Monitoring
Operational Phase						

8. Monitoring of environmental IMPACTS on PROJECT SURROUNDINGS
   - Confirm records of pre-work condition of roads, agricultural land or other infrastructure prior to starting to transport materials and construction.

Package No.	Status of Pre-Work Conditions *(Recorded / Not Recorded)*	Baseline Environmental Conditions (air, water, noise) Documented *(Yes / No)*	Action Proposed and Additional Measures Required

   - Provide information on monitoring activities conducted during reporting period. If not conducted, provide justification. Compare results with baseline and internationally recognized standards.[9]

Air Quality Monitoring Results

Site No.	Date of Testing	Site Location *(Provide GPS Coordinates)*[10]	Parameters *(as required by statutory clearances or as mentioned in the IEE)*			Remarks
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3	

Water Quality Monitoring Results

Site No.	Date of Sampling	Site Location	Parameters *(as required by statutory clearances or as mentioned in the IEE)*						Remarks
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L	

Noise Quality Monitoring Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) *(as required by statutory clearances or as mentioned in the IEE)*		Remarks
			Day Time	Night Time	

9. INFORMATION DISCLOSURE AND CONSULTATIONS
   - Confirm PMU/PIU/contractors provide project-related information to stakeholders, communities and/or affected people before and during construction works.[11]
   - Provide information on consultations conducted during reporting period such dates, topics discussed, type of consultation, issues/concerns raised, safeguards team member present. Attach minutes of meetings (ensure English translation is provided), attendance sheet, and photos.

Date of Consultation	Location	Number of Participants *(specify total, male and female)*	Issues/Concerns Raised	Response to issues/concerns

10. Grievance Redress Mechanism
   - **Grievance Redress Mechanism.** Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (package-wise if applicable).

   - **Complaints Received during the Reporting Period.** Provide information on number, nature, and resolution of complaints received during reporting period. Attach records as per GRM in the approved IEE. Identify safeguards team member/s involved in the GRM process. Attach minutes of meetings (ensure English translation is provided).

11. SUMMARY OF KEY ISSUES/CONCERNS IDENTIFIED DURING THE REPORTING PERIOD AND REMEDIAL ACTIONS
   - Provide corrective action plan which should include all issues/concerns, actions required to be implemented, responsible entities, and target dates.

12. STATUS OF CORRECTIVE ACTIONS FROM PREVIOUS SEMR(S)
   - Provide information on corrective actions to be implemented as reported in the previous SEMR(s). Include status of implementation of feedbacks/comments/suggestions as provided by ADB, if any.

Corrective Action Plan Status

Issues/Concerns	Corrective Action	Status	Remarks

13. APPENDIXES
   - Photos
   - Records of consultations
   - Copies of environmental clearances and permits (if not provided in the previous SEMR)
   - Environmental site inspection report (if not provided in the previous SEMR)
   - Other

[1] If on-going construction, include %physical progress and expected date of completion
[2] IEE prepared based on preliminary design and cleared by ADB with condition that updated/Final IEE based on detailed design will be submitted.
[3] Works will not be allowed until SEMP/CEMP is approved by project implementation unit or project management unit.
[4] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.
[5] Specify statutory requirements: environmental clearance? Permit/consent to establish? Forest clearance? Workers/Labor permit, etc.
[6] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*
[7] Attach Laboratory Results and Sampling Map/Locations
[8] If GPS coordinate is not available, provide landmark(s) and/or chainage.
[9] ADB Safeguard Policy Statement (SPS) Appendix 1, para 33: During the design, construction, and operation of the project the borrower/client will apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When host country regulations differ from these levels and measures, the borrower/client will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the borrower/client will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in the SPS.
[10] If GPS coordinate is not available, provide landmark(s) and/or chainage.
[11] Check EMP requirement on information disclosure. At a minimum, PIU thru the contractor should notify communities/affected persons/sensitive receptors 7 days and again 1 day before start of works.