Environmental Assessment and Review Framework (EARF)

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Bangladesh: Climate Resilient Integrated Southwest Project for Water Resources Management

Prepared by Bangladesh Water Development Board (BWDB), Government of Bangladesh for the Asian Development Bank (ADB).

Environmental Assessment and Review Framework (EARF)

October 2023

Bangladesh: Climate Resilient Integrated Southwest Project for Water Resources Management

Prepared by the Finance Division under the Bangladesh Water Development Board (BWDB) of the Ministry of Water Resources (MoWR) for the Asian Development Bank.

ABBREVIATIONS

ADB	-	Asian Development Bank
AF	-	Additional Finance
BWDB	-	Bangladesh Water Development Board
DoE	-	Department of Environment
EARF	-	Environmental Assessment and Review Framework
ECA	-	Environment Conservation Act
ECC	-	Environmental Clearance Certificate
ECoP	-	Environmental Code of Practice
ECR	-	Environment Conservation Rules
EDC	-	Executive Development Centers
EIA	-	Environmental impact assessment
EMP	-	Environmental management Plan
FCD/I	-	Flood Control Drainage / Irrigation
FGD	-	Focus Group Discussions
IEE	-	Initial Environmental Examination
ISPMC	-	institutional strengthening and project management consultants
IT	-	Information Technology
LCC	-	Location Clearance Certificate
MOF	-	Ministry of Finance
MoEFCC	-	Ministry of Environment, Forest and Climate Change
MoLE	-	Ministry of Labour and Employment
MOWR	-	Ministry of Water Resources
NEMAP	-	National Environmental Management Action Plan
NEP	-	National Environmental Policy
NOC	-	No Objection certificate
NWP	-	National Water Policy
REA	-	Rapid Environmental Assessment
SAIWRMP	-	Southwest Area Integrated Water Resources Planning and Management Project
SPS	-	Safeguard Policy Statement
WMA	-	Water Management Association
WMG	-	Water Management Group
WMO	-	Water Management Organization

WEIGHTS AND MEASURES

ha	hectares
km	kilometers
m	meters

CURRENCY EQUIVALENTS

(as of 1 July 2023)

Currency unit	–	taka (Tk)
Tk1.00	=	$0.0092
$1.00	=	Tk 108.99

EXECUTIVE SUMMARY

Introduction

1. The proposed Climate Resilient Integrated Southwest Project for Water Resources Management will be aiming to support sustainable water resource management for improving agricultural and fisheries production, livelihood support and disaster and climate resilience in southwest part of Bangladesh. The project will cover Tungipara and Kotalipara upazillas with an estimated total area of 55,165 hectares (ha) comprising of four subprojectsubprojects viz. Tarail-Pachuria (21,606 ha), Satla-Bagda Polder-1 (14,600 ha), Ramshil-Kafulabari (6,959 ha) and Rajoir-Kotalipara (12,000 ha) with proposed 17 water management associations (WMA) and 172 water management groups (WMG). The physical interventions under the ensuing project will include strengthening climate change- and disaster-resilience of the flood control drainage/irrigation (FCD/I) structures, such as river and channel dredging, re-sectioning and construction of embankments, rehabilitation of existing regulators/ boat pass and gates and construction of new regulators/ boat pass, re-excavation of khals, protective works, and construction of other structures, while the non-physical interventions will include support for capacity building and training of beneficiaries and relevant stakeholders in O&M of assets developed under the ongoing and ensuing projects, increase productivity of agriculture and fisheries, and gender and livelihood trainings. The Bangladesh Water Development Board (BWDB) is the Executive Agency for the project.

This Environmental Assessment and Review Framework (EARF) has been prepared to support timely and effective implementation of environmental safeguards to comply with the Safeguard Policy Statement (SPS) 2009 in relation to the infrastructure investments included under Output 2, which constitute the investment project. The EARF outlines environmental screening procedures, assessment methodologies, environmental management (mitigation, monitoring and documentation), and reporting for the components of the Project; and to specify institutional structure and mechanism to carryout compliance to environmental management plan.

Policies, Legal and Institutional framework

The lead environmental agency in Bangladesh is the Department of Environment (DOE), under the Ministry of Environment, Forests and Climate Change (MOEFCC). DOE is charged with furthering environmental conservation, improvement of environmental standards, and control and mitigation of environmental pollution. This mandate positions DOE as a key regulator of a broad range of developments in the infrastructure, industrial and commercial sectors, including both publicly and privately funded initiatives. DOE is responsible for administering the country's central environmental law, which provides the framework for environmental impact assessment.

The proposals for infrastructure development at specific locations in the project's initial concept paper are broadly indicative and preliminary. Further site-specific scoping and design work, as well as environmental analysis, will be required before the appropriate categorization can be confirmed with DOE. Most elements of the initial infrastructure proposal fall clearly within the orange or red category, e.g., river protection works, and dredging/excavation/re-excavation fall within red category, construction of boat pass and regulators fall under orange category. Since red is the highest category of interventions proposed, the entire project has been categorized as red. Thus, all of the investment locations are expected to have to be assessed through preparation of at least an IEE, later an environmental impact assessment (EIA) under Environmental Conservation Rules (ECR) 2023. The project is categorized “B” for environment as per ADB SPS

2009 as it will involve civil works for majority of interventions with location-specific, time-bound impacts during construction. A Rapid Environmental Assessment (REA) checklist has been prepared for the project to assess ADB's environmental categorization of the project (Appendix 2).

Methodology

A harmonized ADB – DoE framework of project categorization and environmental due diligence requirements (explained in Figure III 2) and a simplified process has been adopted for impact identification and mitigation. Step 1: Screening of proposed subprojects against PIAL; Step 2: Categorization of subprojectsubprojects/components; Step 3: Harmonized categorization framework and Identification of appropriate tools for environmental assessment and mitigation; Step 4: Preparation of IEEs for category B subprojectsubprojects; Step 5: Development of Environmental Code of Practice (ECoP) for category C subprojectsubprojects; Step 6: Submission of subprojectsubproject proposal including IEE and ECOP, as appropriate, for ADB's review and endorsement; and Step 7: Discloser the reports approved by ADB.

Potential Impacts and Mitigation measures

The scale of operations and facilities, as well as the precise placement of infrastructure, are not presently well established for any proposed project investments, which makes prediction of specific impacts on particular receptors from construction and operations tenuous. Nevertheless, it is possible to define broad categories of potential impacts, based on the types of infrastructure planned under the investment project and typical characteristics of the investment settings. Potential impacts and mitigation measures are discussed in Section V.

Institutional arrangement and responsibilities

The Executing Agency of the project is the Bangladesh Water Development Board (BWDB). For central coordination, a Project Steering Committee (PSC) will be formed comprising representatives of the concerned ministries and agencies. Under this central setup, a PMO will be established in Gopalgonj with a liaison office in Dhaka. A Superintending Engineer/Addl. Chief Engineer having multidisciplinary experience will head the PMO as full-time project director (PD). Two Subproject Management Offices (SMOs) will be established at the project level in Gopalgonj, both under the control of the PMO. These SMOs will be responsible for overseeing the implementation of the five subprojects. One SMO will be the existing BWDB's O&M division located in Gopalganj. The other SMO will be managed by a 'Specialized Division,' which will be formed solely for the purpose of the project. All the Subdivisional Engineers/ Assistant Engineers of the SMOs will monitor the implementation of the environmental and social safeguards.

In addition to the activity of the environmental consultants, the project's environmental management and supervision will be enhanced by engagement of a licensed laboratory to undertake quarterly site monitoring, including quantitative measurement of air quality and noise levels at all active construction sites; this importation of technical monitoring expertise will ensure adherence to DoE standards. Finally, all contractors will be required to hire an Environment, Health and Safety Officer (EHSO) for each site under their control and empower that officer to manage the implementation of an Environment, Health and Safety Management Plan (EHSMP) for the site. With the guidance, support and supervision of the environmental consultants, the

EHSOs will play a key role in ensuring sound implementation of environmental mitigation measures prescribed by the EMP.

Assessment, reporting and monitoring plan

In preparing IEEs, secondary data will be collected for subproject-influence sites. An assessment of civil work impacts and risks on biodiversity and natural resources will also be undertaken and incorporated with the IEEs. Issues regarding natural and critical habitats will be covered in the IEE report.

All IEEs and EMPs will be prepared prior to the award of construction contracts. The bid documents will include the requirement to incorporate necessary resources to implement the EMP. The EMP will form part of the contract document, and if required, will need to be further updated during the construction phase of a Sub-project. Any changes or updates on the IEE will be subject to ADB's review and disclosure.

Consultation, information disclosure, and grievance redress mechanism (GRM)

At minimum, stakeholders will be consulted regarding the scope of an impact assessment before work commences and they will be informed of the likely impacts of the subproject and proposed mitigation once the draft IEE and EMP documents are prepared. The safeguards documents will record views of stakeholders and indicate how these have been taken into account in project development. To meet disclosure requirements of ADB, a one-page project brief (both in Bangla and English) will be posted in the website of BWDB and print-outs will be made available in the site offices of the PIU to interested individuals. The project brief will include the details of the GRM and the contact details of the designated focal person.

A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information campaign.

Conclusion and recommendation

The limited and minor negative impacts due to the project are, over an insignificantly very short period, mainly associated with water logging, dust and noise pollution, occupational health hazards, risk from poor sanitation system, and management of labor at the sites. Moreover, most of the associated impacts are expected to be limited to the building repair/renovation phase and, will therefore, be absolutely temporary in nature. Adequate mitigation actions will be undertaken in line with management and monitoring of the set of recommended mitigation measures. Regular monitoring of the recommended mitigation measures shall also be carried out during the implementation phase of the project.

CONTENTS

APPENDIXES

List of Tables

List Figures

I. INTRODUCTION

A. Background

1. ADB supported the Southwest Area Integrated Water Resources Planning and Management Project (SAIWRMP) in 2005 whose successes in pioneering sustainable and participatory approaches in WRM were replicated under a subsequent additional financing project in 2015. Important lessons from these projects and other interventions in the country and sector are: (i) communities are central for social, environmental and financial sustainability of ground level adaptation initiatives, (ii) highly localized demand based strategy is needed for design of FCD/I infrastructure, (iii) poverty reduction initiatives need to be integrated with agri-value chains for multiplier effect on the rural economy, (iv) knowledge management of climate-related information is necessary at the institutional and community levels for decentralized, effective and sustainable WRM, (v) ground level coordination and integrated delivery of government interventions is critical for effective utilization of funds, and (vi) nature-based solutions (NBS) and innovations are location-specific and new solutions need to be continuously piloted in small scale and successful innovations selected for scaling.

2. The proposed Climate Resilient Integrated Southwest Project for Water Resources Management will be aiming to support sustainable water resource management for improving agricultural and fisheries production, livelihood support and disaster and climate resilience in southwest part of Bangladesh. The project will cover Tungipara and Kotalipara upazillas with an estimated total area of 55,165 hectares (ha) comprising of four subprojects viz. Tarail-Pachuria (21,606 ha), Satla-Bagda Polder-1 (14,600 ha), Ramshil-Kafulabari (6,959 ha) and Rajoir-Kotalipara (12,000 ha) with proposed 17 water management associations (WMA) and 172 water management groups (WMG). The physical interventions under the project will include strengthening climate change- and disaster- resilience of FCD/I structures, such as river and channel dredging, re-sectioning and construction of embankments, rehabilitation of existing regulators/ boat pass and gates and construction of new regulators/ boat pass, re-excavation of khals, protective works, and construction of other structures, while the non-physical interventions will include support for capacity building and training of beneficiaries and relevant stakeholders in O&M of assets developed under the ongoing and ensuing projects, increase productivity of agriculture and fisheries, and gender and livelihood trainings. The Bangladesh Water Development Board (BWDB) is the executing agency for the project.

3. The project focuses on building resilience to climate shocks through climate resilient water resources management (WRM) and agricultural practices. It is aligned with and contributes to targets of NAP, BDP2100, Eighth Five Year Plan, and Mujib Climate Prosperity Plan.[1] Within

[1] Source: Government of Bangladesh. 2022. National Adaptation Plan of Bangladesh (2023-2050). Dhaka. ADB. 2021. Bangladesh: Country Partnership Strategy (2021–2025). Manila. Government of Bangladesh. 2020. Eighth Five Year Plan (July 2020–June 2025): Promoting Prosperity and Fostering Inclusiveness. Dhaka. Government of Bangladesh. 2022. Mujib Climate Prosperity Plan 2022-2041. Dhaka. The project will contribute to NAP targets through protection of (i) 1.10 million hectares of croplands from flood inundation, (ii) critical infrastructures from frequent climate induced disasters , (iii) 300,000 households from flood related sicknesses annually, (iv) livelihoods of 4.0 million households dependent on fisheries from water-related disasters, and sustainably increase (v) rice production by 10.3 million tons a year to benefit 70% crop-dependent households, and (vi) livestock production by 5%. The project will also contribute to NAP's high priority actions: (i) WRM7: construction and rehabilitation of flood and drainage management measures with eco-engineering solutions, (ii) WRM21: remodeling of water-regulating and cross drainage structures considering climate change scenarios, (iii) WRM18: planned, participatory and coordinated land and water resources management, (iv) WRM4: strengthening early warning and dissemination services for climate change-induced slow onset and sudden extreme water hazards using ICT and AI, and (v) CDM6: Increase the resilience of vulnerable poor communities by introducing gender-, age- and disability-responsive diversified livelihoods, effective insurance mechanisms and climate resilience funds.

ADB, the project contributes to (i) operational priorities of ADB's Strategy 2030; (ii) country partnership strategy for Bangladesh, 2021–2025, in particular strategic objective 2 (promote green growth and climate resilience) and 3 (strengthen human capital and social protection), (iii) country sector strategy by providing tailored solutions to address specific agronomic, hydrological, ecological, social, and climatic challenges of the project area[2], and (iv) $100 billion climate adaptation finance target. The project complements national programs of other development partners engaged in the sector as well as ADB initiatives in the country and will coordinate efforts.

B. Need of the Climate Resilient Integrated Southwest Project for Water Resources Management

4. The areas of Tungipara Upazila and Kotalipara Upazila under Gopalganj District are under severe drainage congestion. The land elevation of Tungipara and Kotalipara is lower compared to the surrounding areas, consequently local rainfall runoff accumulates in the proposed areas, specially the major haor-like depressions existing in the two Upazilas under Gopalganj District. Drainage of the areas is also impeded by high water levels of the peripheral rivers during monsoon along with tidal backwater effects from the perennial tidal rivers. The long-time intensive drainage congestion of the areas affects the agriculture, fishery, livestock practices of the area affecting income generation, social and environmental issues of the population and the areas affecting total development potentials. The proposed project will ensure the implementation of an integrated water resources management project for improvement of drainage congestion in Tungipara and Kotalipara upazillas under Gopalganj district.

[2] ADB. 2023. Bangladesh's Agriculture, Natural Resources, and Rural Development Sector Assessment and Strategy. Manila.

II. THE PROPOSED PROJECT

A. Impact and outcome

5. The proposed project will build on past successes in enhancing the rural household incomes by improving productivity, effectiveness, and sustainability of existing underperforming FCDI schemes, enhancing livelihood opportunities and ensuring participatory water resource management for economic purposes. The project interventions under the four subprojects, (i) Tarail–Pachuria, (ii) Ramshil–Kafulabari, (iii) Satla–Bagda, and (iv) Rajoir–Kotalipara, will improve drainage across 55,165 ha benefitting about 460,000 people by addressing constraints in agriculture, fisheries and livelihood development through holistic, gender-sensitive and socially inclusive participatory planning, digitization of water resources management and associated support services. It will also prepare an integrated water management plan (IWMP) for Beel-Kajulia covering about 26,800 ha area with 192,000 people. The project is aligned with the following impact: Enhanced climate resilient economic growth and reduced poverty in rural areas of the selected subregions in the southwest area of Bangladesh. The project will have the following outcome: climate resilience and productivity of the selected existing FCD/I systems enhanced.

B. Outputs

6. The project has the following outputs:

7. **Output 1. Capacity of Water Management Organizations for sustainable climate resilient planning and management of water resources and livelihood development strengthened.** Participatory and climate adaptive operations and maintenance (O&M) approaches to FCD/I infrastructure will ensure operational efficiency, effectiveness, social and financial sustainability and resilience throughout the life of project assets. The output will support (i) formation of water management organizations' (WMOs) in four subproject areas with 70% beneficiary households enrolled as members, including 33% women members, (ii) capacity development of 172 water management groups (WMGs) to participate in the design, construction and O&M of FCD/I infrastructure based on principles of climate resilience and the government's guidelines for participatory WRM, and (iii) establishment of joint management committees for O&M of FCD/I assets. The output will support formulation of one integrated water management plan (IWMP) and 17 subunit implementation plans (SIPs) based on community demand, and train WMGs in implementation of IWMP and SIPs, that will include specific requirements for climate resilient management of FCD/I assets, mechanism for collecting and managing user fees, and audit procedures, thereby ensuring financial sustainability of FCD/I assets. As part of the project's poverty reduction and community-led adaptation strategy to increase resilience of rural households to climate shocks, the SIPs will implement a localized and value-chain based livelihood diversification plan that will aim to intensify and diversify livelihoods and provide trainings to WMGs in adopting climate resilient practices in agriculture, livestock, fisheries and other emerging green livelihoods.

8. **Output 2: Adaptive resilience of FCD/I schemes in project areas enhanced.** Reliability and resilience of critical WRM infrastructure and services is a critical challenge that is sought to be addressed under this output. The FCD/I interventions are designed based on hydrological subunits, considering the complex and dynamic socio-hydrological systems and co-dependent sociological and hydrological cycles of the project area, to increase productivity and efficiency of WRM and withstand and respond to climate-induced biophysical variability. Climate adaptive engineering solutions and scaling of NBS piloted under previous ADB supported projects in the region and piloting of new NBS approaches will be supported under this output. The FCD/I

schemes will help resolve flooding and drainage congestion challenges and increase the overall availability of land and water resources, enhancing cropping intensity and directly contributing to food security. Drainage will be improved in over 55,165 ha in four hydrological units to benefit about 460,000 people, and IWMP in fifth hydrological unit will 26,800 ha to benefit 192,000 people. About 50% beneficiaries will be women. Besides FCD/I schemes, the output will also support the construction of arsenic-free tube wells, WMO training centers, and other community infrastructure to facilitate access to services and economic opportunities and improve overall quality of life. The FCD/I assets will empower communities to effectively manage water resources based on seasonal requirements of diverse economic activities, strengthening resilience of communities to climate shocks.

9. **Output 3: Institutional capacity for mainstreaming climate resilience, and sustainable participatory and integrated water resources planning, and management strengthened.** The output supports institutional capacity development of BWDB at the national level for participatory WRM for (i) efficient coordination with government departments, including departments of agricultural extension, fisheries and livestock services; (ii) management and monitoring of WMO activities; and (iii) performance monitoring and O&M of FCD/I infrastructure. The project will establish mechanisms for sustained collaboration among ground level staff of departments of agricultural extension, fisheries and livestock and others to pilot innovative adaptation practices. Mainstreaming of climate adaptation in BWDB operations will be supported through (ii) development of farmer-information databases, (ii) establishment of knowledge management platform of climate related information by design, development and deployment of a digital operations dashboard that will (a) digitalize WRM operations by WMGs, (b) collect and disseminate timely information and advisory to WMGs on weather, climate resilient agricultural and fisheries practices, innovative climate resilient production technologies, sustainable fertilizers usage, integrated pest management, market prices, etc. through mobile alerts, and (c) enable collection of water- and produce- related data for future planning purposes. WMGs will be trained to use climate information to manage economic activities. Larger poverty reduction and community resilience objectives will be further supported by enabling access to finance for microenterprises by WMG members by facilitating use of WMG corpus through a legal regulatory mechanism under the overall audit supervision of BWDB. The output will also support readiness activities for a subsequent larger national-level policy-based program that will adopt a much wider approach to WRM—and build a comprehensive programmatic approach to project interventions including flood, drainage, riverbank erosion, irrigation and coastal management from a climate lens. The follow-on program will support NAP implementation and align with BDP2100 strategies and ADB operational priorities, integrate climate-resilient strategies and sustainable management of water as an economic resource.

C. Project interventions

10. The project strengthens critical infrastructures of riverbank protection, drainage and flood control through socioeconomically, hydrologically, and environmentally sustainable and climate resilient approaches to WRM, and builds BWDB's capacity in tackling climate impacts. The project places communities at the center of sustainable, inclusive and locally led poverty reduction and climate resilience strategies in line with priorities set out in the NAP and ADB CPS 2021–2025. About 12 months of project period is allocated to maximizing enrolment of beneficiary households and building capacities of 172 WMGs to identify and operate FCD/I assets to best meets the economic, social and environmental needs of water and extant climate risks. SIP strategies target the climate–gender–poverty nexus by encouraging emerging sustainable green livelihood opportunities under the project. Structured knowledge management platform will be established for climate information for institutional stakeholders and communities.

11. The initial study of the proposed project covers four subprojects mainly located in the eastern side of Ghagor River. The proposed interventions in Rajoir–Kotalipara will be impacted by the hydrological behavior of the Beel-Kajulia area in the western side of the Ghagor river. The BWDB identified an area adjacent to Ramshil–Kafulabari which is also under the hydraulic influence of the Ghagor River and not initially included within the project. Considering this, the ADB and BWDB agreed to include these additional areas within the project, raising the total project area to around 82,000 ha with five subprojects (i) Tarail–Pachuria, (ii) Ramshil–Kafulabari, (iii) Satla–Bagda (Polder-1), (iv) Rajoir–Kotalipara, and (v) Beel-Kajulia, and an estimated total population of 651,208 (including Beel-Kajulia). The project will prepare and implement the IWMP for Beel-Kajulia and the PMO will include this new area in the environmental impact assessment (EIA) as per Environmental Conservation Rules (ECR) 2023 which has been prepared.

12. Based on the survey covering the initial four subproject areas, 17 WMA will be formed, supervising 172 WMG that will be established. Additional WMA and WMG corresponding to the area of Beel-Kajulia will be determined later. Table II-1 below details the proposed WMOs in the project:

Table II-1: the project : Proposed WMOs per Sub-project

Sub-project	Tarail Pachuria	Ramshil-Kafulabari	Satla-Bagda	Rajoir-Kotalipara	Beel-Kajulia	Total
WMA	6	4	4	3	tbd	17
WMG	64	30	42	36	tbd	172

tbd = to be determined, WMA = water management associations, WMG = water management groups
Source: PMO, BWDB

13. The proposed main interventions included in the project are listed in Table II-2 below:

Table II-2: the project: Proposed Intervention per Sub-project

No.	Intervention	Unit	Sub-project					
			Tarail Pachuria	Ramshil-Kafulabari	Satla-Bagda	Rajoir-Kotalipara	Beel-Kajulia	Total
1	Regulator/boat pass (rehab)	No.	52	6	15	-	tbd	**73**
2	Regulator / Boat pass (new)	No.	5	3	3	3	tbd	**14**
3	Khal re-excavation	km	330	10	166	25	tbd	**531**
4	Embankment re-sectioning	km	20	1	-	3	tbd	**24**
5	Embankment Construction	km	-	-	-	2	tbd	**2**
6	Check structures (new)	No.	8	-	4	-	tbd	**12**
7	bridge / culvert (new)	No.	20	3	5	3	tbd	**31**
8	River dredging	km	8	-	8	5	tbd	**21**
9	Protective work	km	2	-	-	-	tbd	**2**
10	BWDB Office building / IB	No.	1	-	-	1	tbd	**2**
11	WMO Training Center	No.	6	4	4	3	tbd	**17**
12	Arsenic free tube-well	No.	104	72	72	60	tbd	**308**
13	Inlet/Outlet (Rehabilitation)	No.	10	11	4	-	tbd	**25**
14	Inlet/Outlet (New)	No.	2	1	3	1	tbd	**7**
15	MS Gate replace EM hoist	No.	99	37	41	7	tbd	**184**

IB = inspection bungalows, EM = electro-mechanical, O&M = operation and maintenance, tbd = to be determined, WMO = water management organizations.
Source: PMO, BWDB

D. Implementation arrangement

14. Implementation arrangements are summarized in Table II-3.

Table II-3: Implementation Arrangements

Aspects	Arrangements
Implementation period	January 2024 – June 2029
Estimated completion date	31 December 2028
Estimated loan closing date	30 June 2029
Management	
(i) Oversight body	MOF – ERD, MOWR
(ii) Executing agency	BWDB
(iii) Key implementing agencies	BWDB
(iv) Implementation unit	A PMO headed by a Project Director and two SMOs headed by the Executive Engineers in the Project area (Gopalganj) and a liaison office in Dhaka will be established.

Source(s): Bangladesh Water Development Board and Asian Development Bank.

BWDB= Bangladesh Water Development Board, ERD=economic relation division, MOF=ministry of finance, MOWR=ministry of water resources, PMO=project management office, QCBS=quality- and cost- based selection, and SMO=subproject management office.

15. BWDB, under MOWR, is the executing agency. A proposed PMO and two subproject management office (SMOs) in the project area (Gopalganj), to be established by BWDB, will manage implementation of the proposed project. The PMO will be headed by the Project Director. It will consist of an Engineering unit consisting of 10 officers and a WMO unit consisting of 6 officers to monitor the WMO activities headed by a Principal Extension Officer (PEO). The project will also have two SMOs- one at the existing BWDB division O&M office and one at Gopalganj (specialized division as SMO-2). The two SMOs will implement the subprojects. Each SMO will consist of 20 people (6 officers) headed by an Executive Engineer.

16. A project steering committee (PSC) constituted under the project will undertake central inter-ministerial coordination. A project implementation committee (PIC) will be formed for timely interdepartmental coordination. The Department of Agriculture Extension (DAE), Department of Fisheries (DOF) and the Department of Livestock Services (DLS) will provide technical inputs and related support services through MOU to the project, under BWDB logistical support as per the ongoing southwest area integrated water resources planning and management project. The project will be implemented in five years, from January 2024 to December 2028.

E. Capacity building

17. Capacity building of each executing agency/Implementing agency(s) staff and stakeholders in environmental management will aim to ensure effective implementation of the EARF and proper supervision and monitoring of environmental safeguards during implementation of various FCD/I interventions and construction of other structures. To support the PMO, a consulting team led by an international firm and comprising international and national experts will be engaged for project management and capacity strengthening. An environment, health and safety specialist is included in the team. In addition, a focal person from the PMO as well as all the Subdivisional Engineers/ Assistant Engineers of the SMOs will monitor the implementation of the environmental and social safeguards.. They are tasked with the compliance and implementation of safeguards issues as per EMPs and capacity building of the other BWDB local office staff for supervision and monitoring purposes.

F. Objective of this EARF

18. This Environmental Assessment and Review Framework (EARF) has been prepared to support timely and effective implementation of environmental safeguards in relation to the infrastructure investments included under Output 2 of the Program, which constitute the Investment Project, in accordance with the Safeguard Policy Statement (SPS) 2009. An EARF is required for ADB sector loans, Result Based Lending (RBL), multi-tranche financing facilities and other financing modalities under which one or more Sub-projects are foreseen for development after approval of the umbrella program. An EARF is intended to help ensure that the borrower has an agreed system in place to prepare safeguards documents and implement environmental safeguards plans for future Sub-projects, without the need for additional project preparatory assistance or direct involvement of ADB.

19. **Proposed Locations.** The proposed locations of the subprojects are: (i) Tarail-Pachuria; (ii) Beel-Kajulia; (iii) Rajoir-Kotalipara; (iv) Ramshil-Kafulabari and (v) Satla-Bagda. All the proposed areas belong to beel system (wetland system) that connected to the adjoining rivers such as Modhumati River, Ghaghor River, Jhanjhania River and Arial Khan River. Details of all proposed infrastructure investments remain to be fully determined at the time of EARF preparation and are subject to modification as a result of ongoing field investigation of the sites and consultation with the proponent agencies. Anticipated works, necessarily expressed in somewhat generic terms, are outlined in Table 2. Possible socio-economical interventions that may interact with the enviornmental components are also yet to be fully determined and pinpointed within Sub-project. A Location map of the Sub-project areas under project is presented in Figure II-1.

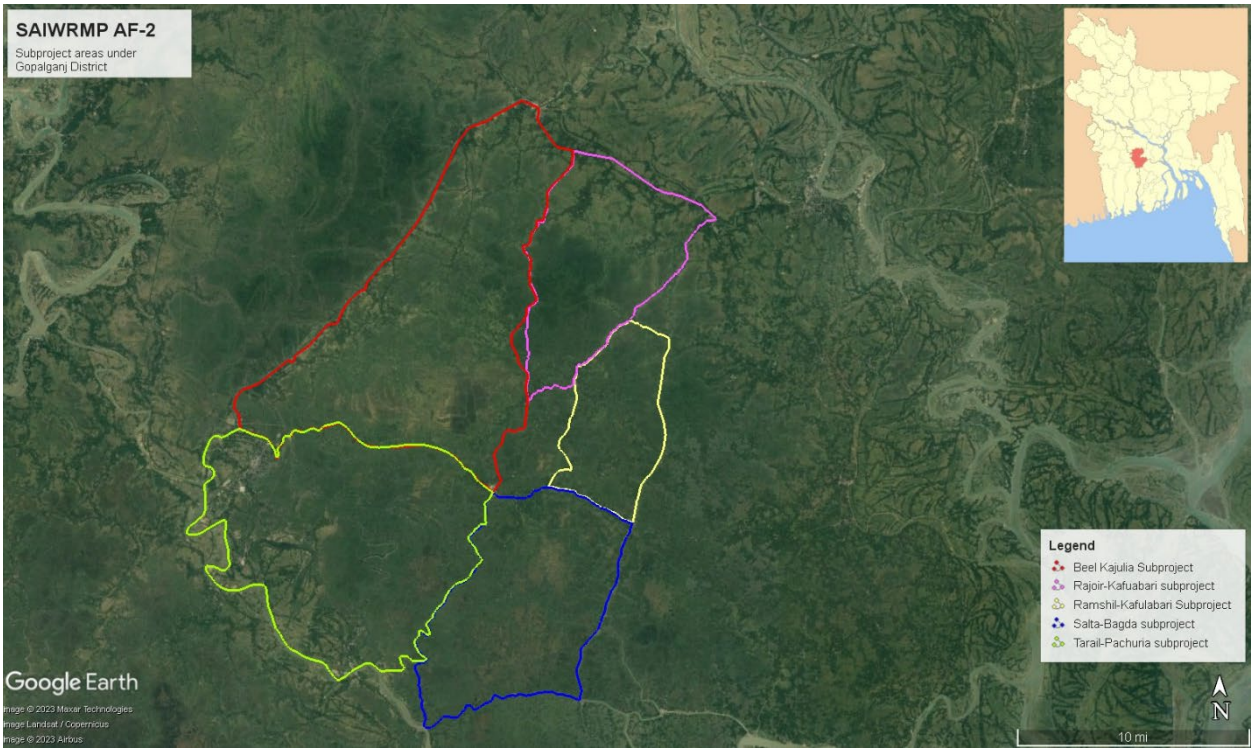

Figure II-1: Map of the Subproject areas under the Project.

Source: prepared by TA consultants

G. Purpose of the Environmental Assessment and Review Framework (EARF)

20. EARF has been prepared to support the implementing agency to deal with potential environmental issues that may arise during implementation of the various civil works and project components or “Sub-projects”.. The specific objectives of EARF are to specify appropriate roles and responsibilities to carryout environmental screening, mitigation measure, monitoring and reporting related to implementation of project components/ “Sub-projects” and to avoid potential adverse environmental impacts and enhance environmental outcomes of the activities implemented under project components or “Sub-projects”.

21. This EARF provides general policies, guidelines, and procedures to be integrated into the implementation of all infrastructures under the Project. In preparing this document, relevant environmental safeguard practices, compliance, and past experience in the sector were reviewed. The review also included consultations with the associated stakeholders; qualitative and quantitative assessments of environmental safeguard compliance processes in the Department of Environment (DoE); capacity assessment of the implementing agency; and information on the capacity of their field level staff. This EARF is intended to be used as a practical tool during renovation/repair and maintenance of training institutes or minor civil works planning, design, implementation, and monitoring. The Framework describes the steps involved in identifying and mitigating the potential adverse environmental impacts from minor civil works implementation activities, EARF ensures protection of health and hygiene of trainee, environmental sustainability, and welfare of affected stakeholders. The EARF outlines environmental screening procedures, assessment methodologies, environmental management (mitigation, monitoring and documentation), and reporting for the components of the Project; and to specify institutional structure and mechanism to carryout compliance to environmental management plan.

III. POLICIES, LEGAL AND INSTITUTIONAL FRAMEWORK

A. Overview

22. The Ministry of Environment, Forest and Climate Change (MoEFCC), particularly, DoE of the Government of the People's Republic of Bangladesh, has the overall responsibility of setting standards for the various parameters of the country's environment. This section presents an overview of the institutional context and major policies, laws, regulations and international commitments that govern environmental protection and environmental assessment of development projects in the country. The environmental assessment requirements of both the Government of Bangladesh and ADB are outlined in the following paragraphs.

B. Institutional Context

23. The lead environmental agency in Bangladesh is the DoE, under the MOEFCC. DOE is charged with furthering environmental conservation, improvement of environmental standards, and control and mitigation of environmental pollution. This mandate positions DOE as a key regulator of a broad range of developments in the infrastructure, industrial and commercial sectors, including both publicly and privately funded initiatives. DOE is responsible for administering the country's central environmental law, which provides the framework for environmental impact assessment.

24. Other agencies with important environmental mandates include the Bangladesh Forests Department (also under the MOEFCC), the Ministry of Water Resources, the Ministry of Fisheries, and the Ministry of Land. The laws and regulations administered and enforced by these agencies do not structure the environmental assessment process directly, however may often come into play in the consideration of the suitability and permissibility of proposed infrastructure developments by DOE.

25. Occupational health and safety are key considerations of the environmental assessment of proposed infrastructure. The Ministry of Labour and Employment (MoLE), particularly its Department of Labour and Department of Inspection for Factories and Establishments, is of direct relevance to the environmental assessment process, as it administers and enforces the country's legislation, rules and standards governing industrial workplaces, including construction sites and most industrial facilities where physical labour is undertaken.

C. National Policies, Laws and Rules

1. Central policy instruments

a. National Environment Policy 2018

26. The National Environment Policy (NEP) 2018 sets out the basic framework for environmental action together with a set of broad sectoral guidelines for action. Major elements of the policy are:

(i) maintaining the ecological balance for ensuring sustainable development;
(ii) protection against natural disasters;
(iii) identifying and controlling activities which are polluting and/or destroying the environment;
(iv) ensuring environment-friendly development in all sectors;
(v) promoting sustainable and sound management of natural resources; and

(vi) active collaboration with international initiatives related to the environment.

27. The NEP, amongst other aims, seeks to ensure that transport systems, including roads and inland water transport, do not pollute the environment or degrade resources. The policy states that environmental impact assessment should be conducted before projects are undertaken. The NEP 2018 includes additional elements addressing climate change mitigation and adaptation as key environmental issues facing the country and integrating a comprehensive 3R approach to the massive and growing problem of industrial and household waste that has swelled along with the country's urbanization.

28. Following are the key subject matters relevant to the preparation and implementation of the project aligned with the requirements of NEP 2018:

(i) Ensuring sustainable development through reducing human pressure on nature and natural resources
(ii) Considering environment protection as integral part of the development programs planned to meet the need of the present and future generation
(iii) Making natural resources extraction, use, environmental conservation etc. to be based on science
(iv) Considering environmental impacts and risks in extracting and using natural resources
(v) Evaluating economic contribution of ecosystem services simultaneously to that of natural resources
(vi) Giving priority to poor and under privileged group of people in order to ensure their participation, equity, justice, accessibility to the use of natural resources and getting ecosystem services on which, they are dependent
(vii) Taking initiatives to prevent misuse and ensure optimum of water, land, natural gas and other natural resources in the production process as well as day-to-day purposes
(viii) Encouraging sustainable use of new and renewable resources
(ix) Enhancing long term poverty alleviation and food security through conserving biological diversity
(x) Realizing compensation from persons and institutes those who are liable to environmental pollution through applying polluter pay principle
(xi) Including environmental conservation and preservation in all national policies and ensuring implementation of the environment policy at both government and non-government level
(xii) Giving priority to preventive measures over curative measures in environmental conservation
(xiii) Including adaptation and mitigation program in all development projects in order to address adverse impacts of climate change
(xiv) Ensure sustainable utilization of ecosystem goods and services
(xv) Implementation of 3R principle in utilization of resources
(xvi) Strengthening institutional and legal capacity of institution (Government, local, private and technical) relevant to the enforcing and implementation of rules and regulation relating to environment policy and environment conservation
(xvii) Ensuring considerations of climate change and challenges of calamities in all kinds of infrastructure projects
(xviii) Reducing of all SLCP (short-lived climate pollutants) which are harmful to health and environment

(xix) Taking development programs considering sustainable production and consumption as integral part of environmental conservation to meet the need of present and future generation
(xx) Allocating necessary funds to all areas of environmental conservation, preservation and control
(xxi) Taking up programs in favor of flourishing environment friendly economy
(xxii) Including environmental and ecological conservation particularly to introduce the environment and ecological concept in the environmental academic curriculum and textbooks of schools and colleges.

29. NEP 2018, therefore will guide all kinds of environmental assessments, guidelines, protocols and mitigation measures in this loan project. Each intervention under the project, whether infrastructural or non-infrastructural, needs to be checked and justified against the NEP 2018. Each intervention needs to answer the following question that satisfy the NEP 2018:

(i) Is the intervention based on scientific knowledge?
(ii) Does the intervention consider climatic changes and act to reduce carbon emission?
(iii) Does it prioritize environmental preventive measures over curative measures?
(iv) Does it enhance long term poverty alleviation and food security?
(v) Does it encourage the use of new and renewable resources? and
(vi) Does it have environmental impacts and risks in extracting and using natural resources?

30. the project has been designed in line of the NEP 2018 in every aspect, especially the clauses (i) – (ix), xiii, xiv, xvi, xvii, xix and xxi of para. 28.

b. National Environmental Management Action Plan (NEMAP), 1995

31. The NEMAP is built on the NEP 1992 to address specific issues and management requirements during the period 1995-2005 and remains a backbone of efforts to articulate national sustainability strategies. The plan includes a framework within which the recommendations of a National Conservation Strategy (NCS) are to be implemented. The NEMAP was developed with the following objectives:

(i) Identify key environmental issues affecting Bangladesh
(ii) Identify actions to halt or reduce the rate of environmental degradation
(iii) Improve management of the natural environment
(iv) Conserve and protect habitats and biodiversity
(v) Promote sustainable development
(vi) Improve the quality of life

32. To this end, the NEMAP grouped all the relevant necessary actions under four heads: institutional, sectoral, location-specific, and long-term issues. The institutional aspects reflect the need for inter-sectoral cooperation to tackle environmental problems requiring new institutional mechanisms at national and local levels. The sectoral aspects reflect the way the ministries and agencies are organized and make it easier to identify the agency to carry out the recommended actions. The location-specific aspect focuses on particularly acute environmental problems at local levels. And the long-term issues include environmental degradation trends that threaten to

emerge as serious threats to the country's environmental quality and well-being if not proactively addressed.

33. Although NEMAP is old and many of the plans have been covered by latest plans, policies and programs (PPPs), the plan still needs to be consulted to ensure the project's long-term sustainability.

2. Other Environment-Related Plan and Policies

34. In addition to the central environmental policy instruments, a number of other national policy efforts have significant environmental content which are relevant to the project . Prominent policy documents include the following National Plans, Policies Guidelines that confirm, compliment and support the National Environmental Policy:

(i) National Bio-safety Strategy & Action Plan 1995
(ii) National Biodiversity Strategy & Action Plan of Bangladesh 2016-2021
(iii) Ecologically Critical Area Management Rules, 2016.
(iv) Bangladesh Biosafety Rules, 2012
(v) Bangladesh Biological Diversity Act 2017
(vi) Natural Water Reservoir Conservation Act, 2000
(vii) National Forestry Policy 2016
(viii) National Conservation Strategy 1998 and Draft Update 2013
(ix) National 3R (Reduce, Reuse & Recycle) Strategy 2010
(x) Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009
(xi) Bangladesh Delta Plan 2100
(xii) National Disaster Management Plan 2010.
(xiii) Nationally Determined Contributions (NDCs)
(xiv) Five Year Plan
(xv) Sustainable Development Goals (SDGs)
(xvi) National Adaptation Program (NAP) 2022

35. During the environmental assessment of this project, Ecologically Critical Area Management Rules, 2016; Natural Water Reservoir Conservation Act, 2000; Bangladesh Climate Change Strategy & Action Plan (BCCSAP) 2009; Bangladesh Delta Plan 2100; National Disaster Management Plan 2010; Nationally Determined Contributions (NDCs); Five Year Plan; Sustainable Development Goals (SDGs) and National Adaptation Program (NAP) 2022 should be considered.

3. Legislations

a. Bangladesh Environment Conservation Act (BECA), 1995 (as amended in 2000, 2002 & 2010)

36. The Bangladesh Environmental Conservation Act (BECA), 1995 is the main legislation for conservation of the environment, improvement of environmental standards, and control and mitigation of environmental pollution. The enabling powers of the BECA are wide ranging, where in Section 4 the Director General (DG) to take various actions or measures to enforce the act. BECA authorizes the DOE to undertake any activity to conserve and enhance the quality of the environment and to control, prevent and mitigate pollution. The DOE is designated as the regulatory body and enforcement agency for all environment-related activities. The Act enables the following critical components of DOE's tasks:

(i) declaration of Ecologically Critical Areas;
(ii) administration of the procedure for obtaining Environmental Clearance Certificates for new industrial projects;
(iii) regulation with respect to vehicles emitting smoke harmful to the environment;
(iv) environmental regulations for development activities;
(v) standards for quality of air, water, noise, and soils (including river bed materials) for different areas and for different purposes;
(vi) acceptable limits for discharging and emitting waste; and
(vii) formulation of environmental guidelines to control and mitigate environmental pollution, conservation and improvement of the environment.

37. Amendments to the ECA in 2000, 2002 and 2010 added significant substantive and procedural scope, defining the following new areas of authority:

(i) ascertaining responsibility for compensation in cases of damage to ecosystems;
(ii) increased provision of preventive measures, including fines and imprisonment, and the authority to take cognizance of offences;
(iii) restrictions on polluting automobiles;
(iv) restrictions on the production and sale of environmentally harmful items like polythene bags;
(v) obtaining assistance from law enforcement agencies for environmental actions;
(vi) definition and enforcement of punitive measures;
(vii) authority to try environmental cases;
(viii) prohibition on hill cutting except where established to be in the national interest;
(ix) authority to regulate management of hazardous waste produced by ship breaking yards;
(x) prohibition of filling or alteration of waterways except when judged to be in the national interest; and
(xi) additional powers to compel compliance with emissions standards.

38. Section 12, requiring an Environmental Clearance Certificate (ECC), is effectively enforced by way of The Environmental Conservation Rules, 1997, which is made pursuant to the powers provided under Section 20 of the BECA.

b. Environment Conservation Rules, 2023

39. The Ministry of Environment, Forest and Climate Change of Bangladesh enacted the Environmental Conservation Rules (ECR) 2023 to implement the Environmental Conservation Act 1995. The rules have been effective from March 5, 2023 by repealing the Environmental Conservation Rules 1997. ECR 2023 is the most important set of regulations giving procedural substance and tools of enforcement to the aims articulated in the BECA 1995 and its amendments. The Rules specify the categorization of projects or industrial establishments by judging the severity of the project's (or industry's) impact on environment and human health.

40. ECR 2023 replaces all the old schedules stipulated in ECR 1997 and replaces the old four environmental categories i.e., 'green', 'orange A', 'orange B' and 'red' by new four categories i.e., 'green', 'yellow', 'orange' and 'red'. The new ECR also shades more lights on the determinants of environmental categorization of projects or industrial establishments, sets guideline for environmental impact assessment process and report preparation along with the qualification of environmental consultants and subject matter experts responsible for preparing environmental impact assessment reports. There are 14 schedules in the ECR 2023 describing various

standards and guidelines. The most highlighted changes in the ECR 2023 from 1997 edition is the inclusion of stakeholder engagement in the EIA process, adoption of impact of human health, setting qualification of environmental consultants for EIA study, setting standards for wastewater quality, inclusion of a comprehensive indicative list of categorized project/industries according to its impact on environment and human health, guidelines for location setting of a project or industry, guideline for ToR preparation for EIA study, indicative buffer distance between project/industry and sensitive area, indicative EIA reporting guideline and guidelines for inclusion of environmental consultants within EIA study team.

c. Environment Court Act 2010

41. The Environment Court Act 2010 was passed with a view to ensuring the expedited disposal of environmental cases. The Act, consisting of 24 sections, amends and consolidates the existing law in establishing courts and related matters to expedite the trial of environmental crimes. It establishes administrative and legal proceedings of the above-mentioned Environment Court, as well requirements to be met by said court, which may direct the investigating officer or person for further investigation into a criminal case related to a case pending against him and may determine the deadline for reporting the report. The court may impose any power environment passed by this Act or the Environment Law. A lawyer appointed by the Director General shall conduct all the cases related to the trial in the Environment Court and the prosecuted lawyer shall be deemed to be a special public prosecutor in the case of a special public prosecutor and civil nature case, in case of prosecution: Provided that empowered by the Inspector or the Director General Any officer to assist the lawyer in managing the case. Subject to the provisions of this Act, in relation to the trial and settlement of compensation cases, the provisions of the Code of Civil Procedure shall apply, and, in that case, the Court of the Environment shall be deemed to be a civil court and enforce all the powers of the Civil Court in the trial of any compensation suit under this Act.

4. Other environment related rules and legislations

42. In addition to the BECA 1995 and ECR 2023, numerous laws and supporting rules have been passed and developed to regulate the use of natural resources and protect the natural environment from deleterious activity. A summary of environment-related laws and rules, any of which may be relevant or applicable to proposed infrastructure development, is provided in Table 3. Depending on the nature of project activities and infrastructure, No Objection Certificates (NOCs) may need to be obtained from the agencies overseeing environment-related laws and regulations as part of the environmental clearance process directed by DOE, to ensure compliance with all relevant national laws.

Table III-1: Summary of Environmental Legislations Applicable to the Proposed Project

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
1	National Forestry Policy (2016) Draft	The National Forestry Policy (NFP) provides the framework for the protection of the remaining forests in the country and the restoration of about 20% of the country's land under the afforestation programs The priority protection areas are the habitats which encompass representative flora and fauna in the core area of national parks,	Protected areas within the forest cannot be encroached by any project construction activities. No felling, cutting within protected or reserved forest is permitted. **Not triggered by the project as the project area is outside designated forest areas declared by GoB. However, if there are any social forestry program being implemented which are within the buffer zone of**	Department of Forests

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
		wildlife sanctuaries and game reserves. Multiple-use of forest, water and fish of the Sundarbans through sustained management will be ensured, keeping the bio-environment of the area intact.	**proposed intervention, the policy must apply.**	
2	The Forest Act (1927) and Forest (Amendment) Act (2000)	An act to control trespassing, illegal resource extraction and provide a framework for the forestry revenue collection system. To accommodate social forestry, the act was amended in 2000.	Requires clearances for any project within forest areas and clearances for any felling, extraction, and transport of forest produce. **Not triggered by the project as the project area is outside designated forest areas declared by GoB**	Department of Forests
3	Bangladesh Protected Area Management Rules 2017	The rules portray the engagement process of the government authorities and local communities how to be engaged in protected area management declared by the government. The rules cover the protective activities such as regular inspections, security maintenance, annual planning of protection, actions against illegal activities, declaration of special reservation area etc.	No activity inside a declared PA is prohibited. **Not triggered by the project. The project boundaries selected are outside the designated PAs, national parks and sanctuaries.**	Department of Forests
4	National Safe Drinking Water Supply and Sanitation Policy of 1998	Ensures access to safe water and sanitation services at an affordable cost	Pourashavas 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. Pourashavas shall be responsible for solid waste collection, disposal and their management. **Triggered by the project. The EMP section will layout the plan for supplying safe drinking water for the construction workers and communities.**	Ministry of Local Government, Rural Development, and Cooperatives
9	National Water Act 2013; National Water Rules 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.	Secure clearance certificate on water resource development Sub-projects. **Not triggered by the project.**	Ministry of Water Resources
10	Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of natural waterbodies such as lakes, ponds, beels[3], 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	In case of diversion of water from any lake, detailed assessment will be done. **Not triggered. No wetlands are not nearby, as per project prerequisite.**	Ministry of Water Resources

[3] A beel is a billabong or a lake-like wetland with static water (as opposed to moving water in rivers and canals - typically called khals), in the Ganges - Brahmaputra flood plains of the Eastern Indian states of West Bengal, and Assam and in the country of Bangladesh.

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
		clearance of vegetation on newly accreted land.		
11	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 Sub-project 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. **Triggered. During building design, construction and operation the acts were considered and applied.**	Local Authorities
12	National Adaptation Plan 2022	With an underlying objective of reducing risks and vulnerabilities to climate change impacts, the NAP envisions building a climate-resilient nation through effective adaptation strategies that foster a robust society and ecosystems and stimulate sustainable economic growth.	NAP ensures protection against climate change variability and induced natural disasters; supports development of climate-smart cities for improved urban environment and well-being, and enhancement through integration of adaptation into the planning process. Triggered. The project will deal with climate resilience structures and climate smart productions and technologies.	MOEFCC
13	Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 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. **Triggered. The BCCSAP 2009 has been considered in building design and also in the entire project consideration.**	Ministry of Environment, Forests and Climate Change
14	Building Construction (Amendment) Act and Building Construction Rules, Bangladesh National Building Code (BNBC) 2020	Regulates technical details of building construction and to maintain standards of building construction	Follow specifications to ensure structural integrity of buildings. **Triggered. BNBC has been considered during building design.**	Ministry of Housing and Public Works
15	Electricity Act 2018	Requires compensation for any damage, detriment or inconvenience caused by the project; Requires precautionary measures in laying down electricity supply lines near or where any metallic substance or line crosses to avoid electrocution; directs in powerline laying construction related activities to avoid public nuisance.	Secure permission to supply energy and lay down or place electricity supply lines for the conveyance and transmission of electricity from respective authorities prior to any works. Give full compensation for any damage, detriment or inconvenience caused by him or by anyone employed by him/her. Take precautions in laying down electricity supply lines near or where any metallic substance or line crosses in order to avoid electrocution. **Not triggered.**	Ministry of Power, Energy and Mineral Resources
16	The National Energy Policy (1996 and Updated 2004)	Ensures environmentally sound sustainable energy development programs causing minimum damage to the environment, to encourage public and private sector participation in the development and management of the energy sector and to bring the entire country under electrification.	Public and private sector participation in the development and management of the energy Sub-projects. Provides guidelines for renewable energy Sub-projects. **Triggered. Renewable energy provisions will be considered in the proposed interventions.**	Ministry of Power, Energy and Mineral Resources

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
17	Standing Order on Disaster, 1999 (Updated 2010)	Enhances capacity at all tiers of government administrative and social structures for coping with and recovering from disasters	**Triggered. All FCD/I structures and buildings are designed to cope with local disasters (historical)**	Ministry of Disaster Management and Relief
18	National Disaster Management Act of 2012	Establishes a framework for managing disasters in a comprehensive way.	Setting-up emergency response procedures. **Triggered. The project structure is to follow the setup of the Act.**	Ministry of Disaster and Relief
19	Public Procurement Rule (2008)	Applies to the procurement of goods, works or services by any government, semi-government or any statutory body established under any law; includes measures regarding the safety, security and protection of the environment in construction works; requires Contractors to take all reasonable steps to safeguard the health and safety of all workers on site, protect the environment on and off the site, and avoid damage or nuisance to persons or to property of the public or others	**Triggered.** The PPR (2008) will be followed during procurement process of the Sub-projects	Ministry of Public Works

Source: Compiled by the TA consultants

5. Health and safety related rules and legislations

43. During construction, the Sub-project will conform to the occupational and health-related rules as outlined in the Table III-2 below.

Table III-2 Occupational and Health Safety-related rules in Bangladesh

Title of Laws and Rules	Descriptions	Relevance with the project
Social Security under the Act, 1923 and an amendment in 1980	According to the Act social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions.	**Triggered.** The project has been screened against the possible social impacts. The program does not have any negative social impact rather positive impact on livelihoods diversification and income generating activities
Bangladesh Labour (Amendment) Law, 2018	- Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement - Prohibition of employment of children and adolescent	**Triggered.** The law is applicable during construction and operation. The environmental due diligence documentation will provide guidelines on these issues
Labour Rules 2015	The Labor Rules give substantial practical heft to the Labor Act, specifying standards for workplace dimensions and features, responsibilities of employers and facility owners, limits on working hours, special rules for young workers, and many other workplace safety and worker protection matters. The Rules provide the basis for inspections of construction sites and industrial facilities by the Department of Inspection for Factories	**Triggered.** The law is applicable during construction and operation. The environmental due diligence documentation will provide guidelines on these issues

Title of Laws and Rules	Descriptions	Relevance with the project
	and Establishments (DIFE) under Ministry of Labour and Employment (MoLE).	
The Employer's Liability Act, 1938	The Act declares that the doctrine of common employment and of assumed risk shall not be raised as a defense in suits for damages in respect of employment injuries. Under the Maternity Benefit Act, 1939, the Maternity Benefit Act, 1950, the Mines Maternity Benefit Act, 1941, and finally the rules framed thereunder, women employees are entitled to various benefits for maternity, but in practice they enjoy leave of 6 weeks before and 6 weeks after delivery.	**Triggered.** This will be ensured during construction through implementation of the EMP or ECoP
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.	
The Employees State Insurance Act, 1948	It has to be noted that health, injury and sickness benefit should be paid to people, particularly respective workers at workplace under the Act.	

Source: Compiled by TA consultant

6. International commitments

44. Bangladesh has signed many international treaties, conventions and protocols that pertain to environmental conservation, pollution control, and working conditions, and these needs to be considered alongside national laws and regulations in the context of infrastructure planning and nonstructural interventions. A list of the most relevant international treaties and conventions to which Bangladesh is a party is presented in Table III-3.

Table III-3: Treaties and conventions joined by Bangladesh and applicable to this project.

Treaty or Convention applicable to this project	Brief description	Relevance
International Plant Protection Convention (Rome, 1951) & Plant Protection Agreement for SE Asia and Pacific (1999 Revision)	Aims to ensure that construction work and construction materials do not introduce plant pests	Ensures that works or construction materials do not introduce plant pests. **WMO interventions may trigger this convention. Should be considered before proposing a social and economic activity that includes plant.**

Treaty or Convention applicable to this project	Brief description	Relevance
Conservation of Wetlands of International Importance specially as waterfowl Habitat ("Ramsar Convention": Iran, 1971)	Conservation and proper use of wetlands and their resources; protection of significant wetlands and prevention of draining or filling during construction	Protection of significant wetland and prevention of draining or filling during construction. **Triggered by the project. The entire project area is a wetland system. Draining and filling activities needs to be screened against this convention. Detailed analysis should be done before any intervention is taken.**
Convention Concerning the Protection of the World Cultural and Natural Heritage (Paris, 1972)	Prevention of damage or destruction of culturally and/or historically significant sites, monuments, etc.	Prevention of damage or destruction of culturally and/or historically significant sites, monuments, etc. **Triggered by the project. Social and economic activities need to be screened against this convention.**
CITES Convention (Convention on International Trade in Endangered Species)	Aims to ensure that international trade in specimens of wild animals and plants does not threaten their survival	Protection of biodiversity during construction and operation. Assessment should be conducted at construction sites to see whether there is any endangered species within the site. **Triggered by the project. All activities need to be screened against trade of endangered species if found inside the project boundary.**
Occupational hazards due to air pollution, noise & vibration (Geneva)	Aims to protect workers against occupational hazards in the working environment	Ensures protection from environmental pollution at site. **Triggered. Needs to be implemented during construction.**
Occupational safety and health in working environment (Geneva)	Prevent accidents and injury to health by minimizing hazards in the working environment	Ensures OHS at site which are implemented through EMP. **Triggered. Needs to be implemented during construction.**
Occupational health services (Geneva)	To promote a safe and healthy working environment	Same as above
Convention on Biological Diversity, (Rio de Janeiro, 1992)	Protection of biodiversity during construction and operation; underpins the value of natural resources that provide food and livelihoods throughout the world	Ensures that component work or construction materials do not disturb biodiversity. **Triggered. EMP needs to be followed in protection of biodiversity.**
International (United Nations Framework) Convention on Climate Change (Kyoto Protocol, 1997)	International treaty on climate change and emission of greenhouse gases, reduce greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system	Ensures reduction of carbon footprint of the construction and operation. **Triggered. Carbon footprint needed to be lessened during construction and operation of the interventions. Also, NBS should be considered to reduce future carbon emissions.**

Source: Compiled by TA consultant

7. Environmental Assessment Process and Requirements

45. This project is subject to the environmental safeguards requirements of both the government and ADB. These requirements share some concepts and terminology and are non-contradictory. The two procedural frameworks for environmental impact assessment are described in turn below.

8. National Environmental Clearance Process

46. **Categorization schemes.** The ECR 2023 stipulate a four-level color-coded typology of impact potential as the basis for determining the environmental clearance process for different types of proposed projects, and the extent of environmental assessment work that must be done in support of clearance applications submitted by proponents. The categorization framework is outlined in Table III-4.

Table III-4: DoE categorization schemes and requirements

Category	General Environmental Assessment Requirement
Green	No environmental assessment required to support application for environmental clearance
Yellow	No environmental assessment required, but detailed project information, including process flow diagrams and effluent treatment arrangement, must accompany application for environmental clearance
Orange	Initial Environmental Examination (IEE) required, and project can proceed to environmental clearance application once IEE is approved by DOE
Red	Brief IEE required to establish ToR for comprehensive Environmental Impact Assessment (EIA), and project can proceed to environmental clearance application after EIA and Environmental Management Plan (EMP) have been approved by DOE, often subject to conditions

Source: TA Consultant's compilation from ECR 2023

47. **Environmental clearance process.** According to the ECR 2023, all projects/industries must apply for a Location Clearance certificate (LCC) prior to the application for Environmental Clearance certificate (ECC) (Figure III-1). The DoE is responsible for awarding both certificates. Regardless of the assessment category assigned, all applications for environmental clearance must be accompanied by a NOC obtained from local authorities (Union Parishad Chairman or Upazila Nirbahi Officer), and by an application fee. NOCs may also be required from key agencies (e.g., Water Resources Planning Organization, Forests Department, Ministry of Fisheries) if the proposed project has any potential relevance for the natural resources under their remit. The proponent is responsible for obtaining the NOCs and paying the application fee. The proponent is also responsible for renewing the clearance certificate, once obtained, on a yearly (for orange and red category projects), 2-yearly (for yellow category project) or 5-yearly (for green category

project) basis, paying a fee for each renewal. Fines are levied when the proponent allows the clearance certificate to lapse.

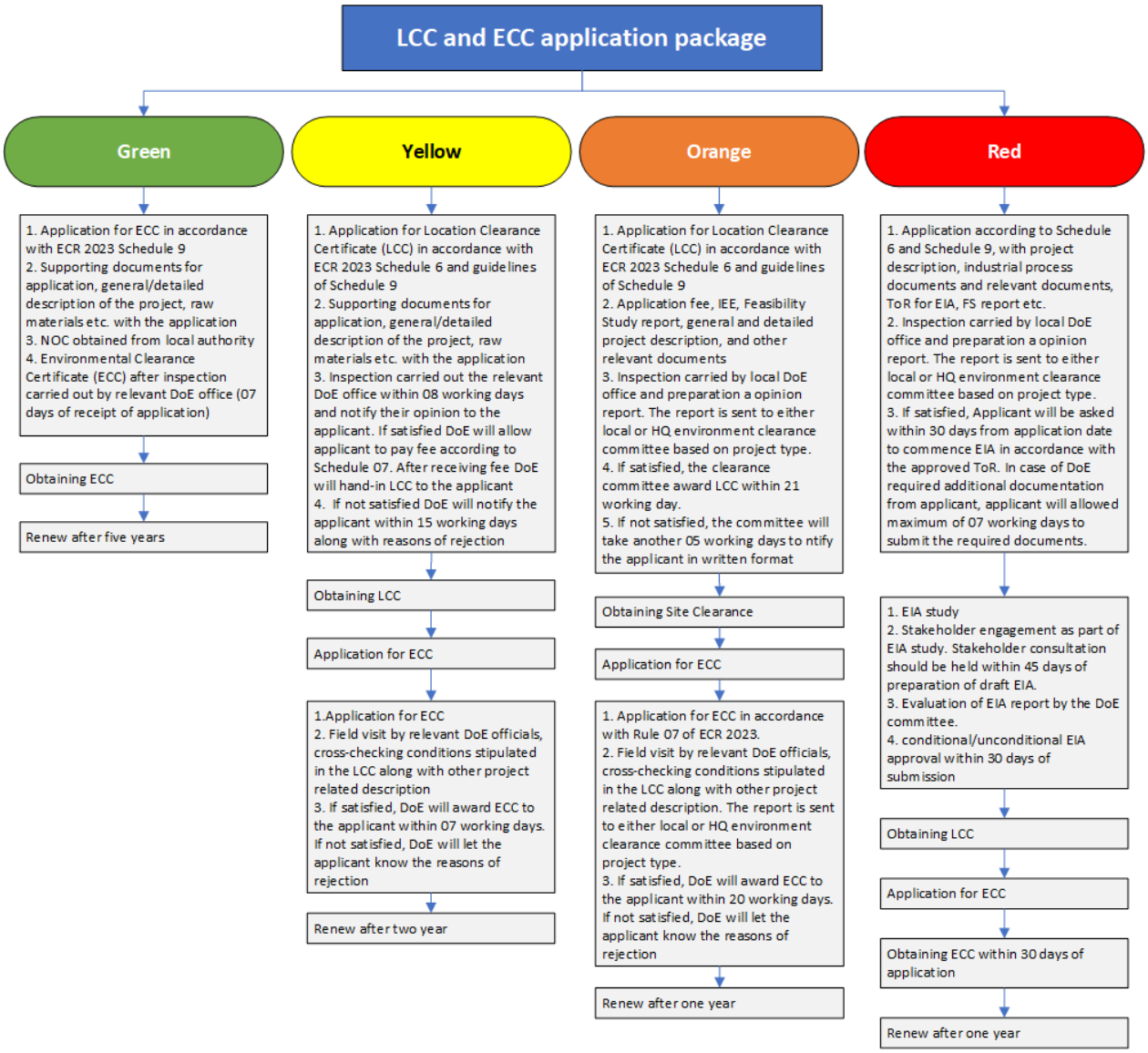

Figure III-1: Location Clearance Certificate (LCC) and Environmental Clearance certificate (ECC) application and awarding process from DoE

48. For subproject components that require an environmental assessment report (Orange and Red projects), DoE will review and approve the report before approving the clearance application. The approval may be subject to certain conditions, which the proponent is bound to meet in order

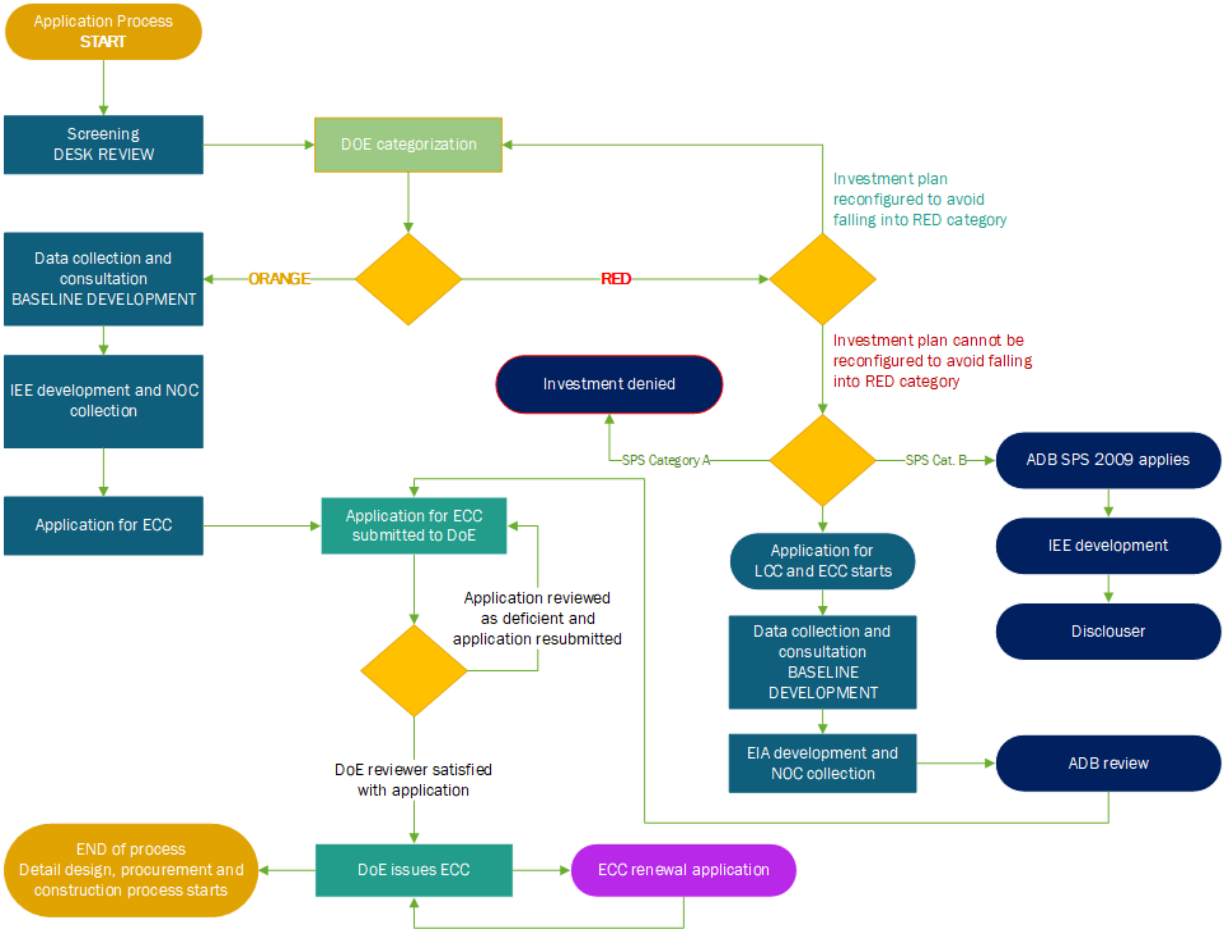

Figure III-2: Environmental Clearance Process of DoE that is adopted for this project.

to keep the clearance certificate current. Review of clearance applications by DOE will require up to 60 days from receipt.[4] A schematic of the environmental clearance process for *orange* and *red* undertakings is presented in Figure III-2.

49. Regardless of assessment category, all applications for environmental clearance must be accompanied by a NOC obtained from local authorities (Union Parishad Chairman or Upazila Nirbahi Officer in rural investment locations, and from several entities in urban locations such as Dhaka), and by an application fee. NOCs may also be required from key agencies (e.g., Water Resources Planning Organization, Forests Department, Ministry of Fisheries) if the proposed project has any potential relevance for the natural resources under their remit. The proponent is responsible for obtaining the NOCs and paying the application fee. The proponent is also responsible for renewing the clearance certificate, once obtained, on a yearly basis, paying a fee for each renewal. Fines are levied when the proponent allows the clearance certificate to lapse.

[4] A useful and accessible reference on the clearance process is Department of Environment. 2010. A Guide to Environmental Clearance Procedure. Dhaka, August 2010.

50. **Anticipated categorizations.** The proposals for infrastructure development at specific locations in the project's initial concept paper are broadly indicative and preliminary.[5] Further site-specific scoping and design work, as well as environmental analysis, will be required before the appropriate categorization can be confirmed with DoE. Most elements of the initial infrastructure proposal fall clearly within the *orange* or *red* category, e.g., river protection works, and dredging/excavation/re-excavation fall within *red* category, construction of boat pass and regulators fall under *orange* category. Since *red* is the highest category of interventions proposed, the entire project has been categorized as *red*. Thus, all of the investment locations are expected to have to be assessed through preparation of at least an IEE, later an EIA under ECR 2023.

9. ADB Environmental Assessment Requirements

51. Safeguard requirements for all projects funded by the ADB are defined in the SPS 2009. This document establishes an environmental review process to ensure that projects undertaken as part of programs funded through ADB loans are environmentally sound, are designed to operate in compliance with applicable regulatory requirements, and are not likely to cause significant environmental, health, or safety hazards. The SPS 2009 is one of the key Bank Policies collected in the ADB Operations Manual. The policy promotes international good practice as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.

52. The SPS provides a framework of expectations for environmental analysis, engagement with stakeholders and communities potentially affected by projects, reporting, and follow-up implementation. Key prescriptions include the following:

(i) At an early stage of project preparation, the borrower/client will identify potential direct, indirect, cumulative and induced environmental impacts on and risks to physical, biological, socioeconomic, and cultural resources and determine their significance and scope, in consultation with stakeholders, including affected people and concerned NGOs. If potentially adverse environmental impacts and risks are identified, the borrower/client will undertake an environmental assessment as early as possible in the project cycle. For projects with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, the borrower/client will examine alternatives to the project's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks;
(ii) The assessment process will be based on current information, including an accurate project description, and appropriate environmental and social baseline data;
(iii) Impacts and risks will be analyzed in the context of the project's area of influence;
(iv) Environmental impacts and risks will be analyzed for all relevant stages of the project cycle, including pre-construction, construction, operations, decommissioning, and post- closure activities such as rehabilitation or restoration;
(v) The assessment will identify potential trans-boundary effects as well as global impacts; and
(vi) Depending on the significance of project impacts and risks, the assessment may comprise a full-scale environmental impact assessment (EIA) for Category A projects, an initial environmental examination (IEE) or equivalent process for Category B projects, or a desk review.

[5] See ADB. 2019. Concept Paper - Proposed Loans and Technical Assistance Grant Bangladesh: South Asia Subregional Economic Cooperation Integrated Trade Facilitation Sector Development Program. November 2019, Project No. 53260-001.

53. Screening for potential social and environmental impacts is a critical early step in the preparation of a proposed ADB-funded project. Preliminary project conceptual designs and sites are evaluated using a standard checklist, and assigned to one of four categories, as follows:

(i) **Category A.** A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that 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 is required.
(ii) **Category B.** A proposed project is classified as category B if its potential adverse environmental impacts 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 is required.
(iii) **Category C.** A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required, although environmental implications need to be reviewed.
(iv) **Category FI.** A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

54. **Environmental Management Plan (EMP):** According to the SPS 2009:

> "Avoid, and where avoidance is not possible, minimize, mitigate, and/or offset adverse impacts and enhance positive impacts by means of environmental planning and management. Prepare an environmental management plan (EMP) that includes the proposed mitigation measures, environmental monitoring and reporting requirements, related institutional or organizational arrangements, capacity development and training measures, implementation schedule, cost estimates, and performance indicators. Key considerations for EMP preparation include mitigation of potential adverse impacts to the level of no significant harm to third parties, and the polluter pays principle."

55. **Information Disclosure:** Disclose a draft environmental assessment (including the EMP) in a timely manner, before project appraisal, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. Disclose the final environmental assessment, and its updates if any, to affected people and other stakeholders.

56. **Consultation and Participation**. Carry out meaningful consultation with affected people and facilitate their informed participation. Ensure women's participation in consultation. Involve stakeholders, including affected people and concerned nongovernment organizations, early in the project preparation process and ensure that their views and concerns are made known to and understood by decision makers and taken into account. Continue consultations with stakeholders throughout project implementation as necessary to address issues related to environmental assessment. Establish a grievance redress mechanism to receive and facilitate resolution of the affected people's concerns and grievances regarding the project's environmental performance. . Meaningful consultation is 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.

57. **Monitoring and Reporting**. Procedures are to be established and followed to monitor the implementation of environmental management plans, verify compliance with safeguard measures and progress toward intended safeguard outcomes, and prepare and disclose periodic environmental monitoring reports. PMO will submit the semi-annual environmental monitoring report (EMR) since commencement to issuance of Project completion report (PCR) under the Project.

58. **Grievance Redress Mechanisms (GRM)**. Projects are to develop and maintain a GRM to resolve and facilitate resolution of affected peoples' concerns and grievances on environmental and social performance. The GRM is to address concerns and complaints promptly, using understandable and transparent processes that are gender responsive, culturally appropriate, readily accessible to all segments of the affected people, and that do not impede access to the national judicial or administrative remedies.

59. **Unanticipated Environmental Impacts**. Where unanticipated environmental impacts become apparent during project implementation, the environmental assessment and EMP will be updated by the PMO or will 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.

60. **Biodiversity Protection and natural resources management.** The PMO will assess the significance of project impacts and risks on biodiversity and natural resources as an integral part of the environmental assessment process. The assessment will focus on the major threats to biodiversity, which include the destruction of habitat and introduction of invasive alien species, and on the use of natural resources in an unsustainable manner. The PMO will identify measures to avoid, minimize, or mitigate potential adverse impacts and risks and, as a last resort, propose compensatory measures, such as biodiversity offsets to achieve no net loss or a net gain of the affected biodiversity.

61. **Pollution prevention and abatement**. ADB SPS 2009 requires the PMO to apply pollution prevention and control techniques and practices consistent with international good practice as reflected in internationally recognized standards such as the World Bank Group's (i) General Environmental, Health and Safety (EHS) Guidelines [6]; (ii) Waste Management, and others as may be applicable. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of India regulations differ from these levels and measures, the PMY will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMO will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS 2009 and EHS Guidelines.

62. **Occupational Health and Safety.** Project will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, including: (i) identifying and minimizing the causes of potential hazards to workers; (ii) providing preventive and protective measures; (iii) providing appropriate equipment to minimize risks and requiring and

[6] World Bank Group. 2007. *Environmental, Health, and Safety General Guidelines*. Washington, D.C.

enforcing its use; (iv) training workers and providing them with appropriate incentives; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

63. The PMO will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work, and apply preventive and protective measures consistent with international good practice such as the International Finance Corporation (IFC) EHS guidelines on Occupational Health and Safety.[7]

64. **Community Health and Safety.** The PMO will 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. These measures will favor the prevention or avoidance of risks and impacts over their minimization and reduction. Consideration will be given to potential exposure to both accidental and natural hazards, especially where the structural elements of the project are accessible to members of the affected community or where failure could result in injury to the community.

65. The PMO and PIU will 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. These measures will favor the prevention or avoidance of risks and impacts over their minimization and reduction. Consideration will be given to potential exposure to both accidental and natural hazards, especially where the structural elements of the project are accessible to members of the affected community or where failure could result in injury to the community.

66. **Physical Cultural Resources (PCR)**. The PMO is responsible for the siting and designing of the project to avoid significant damage to PCR. [8] Such resources likely to be affected by the project will be identified and qualified. Experienced experts will assess the projects' potential impacts on these resources using field-based surveys as an integral part of the environmental assessment process.

[7] IFC. Manual and Guideline: Environmental, Health, and Safety Guidelines.

[8] Defined as movable or immovable objects, sites, structures, groups of structures, and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Physical cultural resources may be located in urban or rural settings and may be above or below ground or under water. Their cultural interest may be at the local, provincial, national, or international level.

IV. METHODOLOGY FOR ENVIRONMENTAL ASSESSMENT

A. Environmental guideline for Environmental Assessment

67. Output 2 of the project mainly aims to provide infrastructure facilities of flood control, drainage, and irrigation schemes in the subproject areas. All details of the civil works are not envisaged yet, although type of the activities have been identified and presented in Table II-2. The overall environment at construction sites is expected to be impacted in varied significances in terms of appropriate drainage, waste management, soil-air-water-noise pollution and traffic congestion. These impacts are site-specific and subject to envisage design of the construction and its process.

68. the project will also contribute positively to the local environment specific to the dredging and river protection works by better retaining water and adding to the net local and global cooling effect. Besides, construction and rehabilitation of regulators, inlets and outlets will help in reducing waterlogging and promote higher primary production.

69. This section explains overall environmental management process for the project. A harmonized ADB – DoE framework of project categorization and environmental due diligence requirements (explained in Figure III-2) and a simplified process has been adopted for impact identification and mitigation. The process includes 7 steps as shown below:

Step 1:	Screening of proposed Sub-projects against PIAL
Step 2:	Categorization of Sub-projects/components
Step 3:	Harmonized categorization framework and Identification of appropriate tools for environmental assessment and mitigation
Step 4:	Preparation of IEE for category B Sub-projects
Step 5:	Development of Environmental Code of Practice (ECoP) for category C Sub-projects
Step 6:	Submission of Sub-project proposal including IEE and ECOP, as appropriate, for ADB's review and endorsement
Step 7:	Disclose the reports approved by ADB.

1. Step – 1: Screening and application of Prohibited Investment Activities List (PIAL)

70. The construction and repair work selection criteria exclude Category A Sub-projects or Sub-projects likely to have significant impacts that are irreversible, diverse, or unprecedented. Sub-projects with activities described in ADB's Prohibited Investment Activities List (Appendix 1) will also be excluded from the Project. All the subprojects and interventions will be screened by the executing agency appointed Environmental Specialist and checked by ADB relevant staff.

2. Step – 2: Categorization of Sub-projects/components

71. As stated earlier, during program preparation, the project is classified by ADB as Category B with impacts that are expected to be site-specific, with few (if any) of them are irreversible and in most cases mitigation measures can be designed readily. In general, the civil works selection criteria have two criteria for environment:

(i) the construction (civil works) and rehabilitation works will conform to ADB's Safeguards Policy Statement, 2009 (SPS) with respect to social and environmental considerations. Sub-project with significant

(category A) environmental and resettlement impact, or with impacts on indigenous peoples (category A and B), will be excluded; and

(ii) proposed Sub-projects will not be undertaken in critical habitats and protected areas including those either legally protected or officially proposed for protection.

72. The construction and rehabilitation work selected will not have significant environmental impacts. The indicative categorization consistent with Bangladesh country system and ADB SPS (2009) are provided in the below table (Table IV-1):

Table IV-1: ADB – GoB Harmonized framework of indicative categorization for proposed interventions under the project

Item no.	Proposed interventions	Safeguard categorization		Harmonized categorization framework[1]	Required Safeguard measures
		ECR 2023	SPS 2009		
1	Regulator/boat pass (rehab)	Orange	B	Cat – 3	Environmental screening, IEE including EMP
2	Regulator / Boat pass (new)	Orange	B	Cat – 3	Environmental screening, IEE including EMP
3	Khal re-excavation	Red	B	Cat – 3	Environmental screening, IEE including EMP. EIA as per ECR 2023
4	Embankment re-sectioning	Orange	B	Cat – 3	Environmental screening, IEE including EMP
5	Embankment Construction	Red	B	Cat – 3	Environmental screening, IEE including EMP EIA as per ECR 2023
6	Check structures (new)	Orange	B	Cat – 3	Environmental screening, IEE including EMP
7	bridge / culvert (new)	Orange	B	Cat – 3	Environmental screening, IEE including EMP
8	River dredging	Red	B	Cat – 3	Environmental screening, IEE including EMP. EIA as per ECR 2023
9	Protective work	Red	B	Cat – 3	Environmental screening, IEE including EMP. EIA as per ECR 2023
10	BWDB Office building / IB	Orange	B	Cat – 3	Environmental screening, IEE including EMP
11	WMO Training Center	Yellow	B	Cat – 2	Environmental screening, ECOPs
12	Arsenic free tube-well	Yellow	B	Cat – 2	Environmental screening, ECOPs
13	Inlet/Outlet (Rehabilitation)	Yellow	C	Cat – 2	Environmental screening, ECOPs
14	Inlet/Outlet (New)	Yellow	C	Cat – 2	Environmental screening, ECOPs
15	MS Gate replace EM hoist	Yellow	C	Cat – 2	Environmental screening, ECOPs

[1]for details of harmonized framework please see para. 71-72
Source: Consultant's interpretation

73. Environmental guidelines for Sub-project selection in Table IV-2 provide further guidance to avoid or minimize adverse impacts during the identification and finalization of construction and repair works.

Table IV-2: Environmental guidelines for construction and repair works based on ADB SPS applicable to the project .

Component	Environmental Guidelines for civil works Selection
Overall	• Comply with all applicable national and local laws, regulations, and standards. • Comply with ADB's SPS (2009) • Avoid land acquisition and involuntary resettlement as much as possible and have no impacts on indigenous peoples • Avoid protected areas and areas of historical/cultural value • Avoid building or setting-up construction camp sites along protected areas/wildlife sanctuaries/forested land under jurisdiction of the Forest Department
Boat pass, Regulator, embankment, office building, bridge-culverts, inlet-outlet (new), tube well sinking	• Do not build facilities in places vulnerable to frequent flooding, wetlands nearby, protected or restricted forests nearby. • Choose construction works so that access roads need minimum or no widening • Avoid cutting trees on the roadside and if any trees have to be removed, plant two new trees for every tree lost. • Consult the relevant archaeological agency regarding archaeological potential Sub-project areas to ensure that these are located in areas where there is a low risk of chance finds.
Excavation, dredging, river protection works	• Consult communities to develop comprehensive dredging management plan • Avoid spraying dredged material on trees, vegetation cover, agricultural lands and homesteads. • Prefer nature-based solutions instead of hard engineering where possible
Inlet/outlet rehabilitation, sinking tube-well	• Use the ECoP as guidelines for environmental management at sites as illustrated in this EARF as Appendix 4 • Comply with all applicable national and local laws, regulations, and standards.

Source: Consultant's work

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3. Step – 3: Harmonized categorization framework and Identification of appropriate tools for environmental assessment and mitigation

74. Although, the specific design and location of some sites are yet to be identified, an indicative list of activities and interventions has been identified, while some has been finalized (see Table II-1 and Table II-2). It is also expected that some of the interventions will not have any negative impacts but nevertheless present opportunities for enhancing environmental and social benefits. The proposed civil works are expected to be small in size in most cases and local in nature inducing minor to moderate impacts.

75. Following the harmonized framework of DoE and ADB SPS categorization (Table IV-1), proposed activities will be categorized in the following manner:

a) **Category 1 (ADB SPS category C – No environmental assessment required).** Demonstration of climate smart technology or products and skills and capacity building program (e.g., skills trainings, curriculum development (non-structural interventions are not mentioned in Table IV-1) are categorically excluded from the requirements for an environmental assessment. These activities do not lead to any adverse environmental impacts, but instead provide positive environmental and social benefits.

b) **Category 2 (ADB SPS category C – Activities Requiring Environmental Screening)**. Proposed activities that may have some minor environmental impacts

due to minor repair, upgradation or retrofitting works are grouped under category 2 (Item no. 11,13-15 of Table IV-1). Impacts of these activities can be identified through Environmental Screening and managed by appropriate Environmental Code of Practices (ECOPs). A list of ECOPs is attached with this document in Appendix 4.

c) **Category 3 (ADB SPS category B – Activities Requiring IEE including EMP).** Proposed activities such as river protection works, dredging/excavation/re-excavation etc. are grouped into category 3 (Item no. 1-10 of Table IV-1) and will require an Initial Environmental Examination (IEE) including Environmental Management Plan (EMP). Impacts of these activities will be addressed through a well-developed Environmental Management Plan (EMP).

76. The harmonized categorization shall be done using the ADB's Rapid Environmental Assessment (REA) checklist. The checklists will be filled out primarily by the executing agency appointed Environmental Specialist and finally checked and approved by ADB relevant staff.

4. Step – 4: Preparation of IEE for category B Sub-projects

77. Sub-projects with adverse environmental impacts which are not considered significant (Category B) require an IEE and an EMP. A list of important tools and outputs specified by the SPS 2009 for IEEs have been discussed in para. 49. Site specific IEE including EMP will be prepared based on the nature, number of interventions, and location within the same geographic area. Appendix 3 provides an outline of an IEE which contains the EMP. A generalized EMP table for likely infrastructure works is also presented in Table V-1. executing agency appointed Environmental, Health and Safety Specialist (a consulting firm) will be responsible for the preparation of the required IEEs.

78. In preparing IEEs, primary data through site visits and surveys where necessary and data from secondary sources, should be collected for Sub-project-influence sites. An assessment of Sub-project impacts and risks on biodiversity and natural resources shall also be undertaken. Issues regarding natural and critical habitats shall be covered in the IEE report. In case of Sub-projects located within buffer zone of protected areas, a review of management plans and consultation with concerned management staff of the protected area, local communities, and key stakeholders shall be undertaken and reflected in the IEE report. Pollution prevention for conservation of resources, particularly technology for management of process wastes will be addressed in the IEE report. Occupational health and safety and community health and safety will be properly addressed in the EMP section of the IEE report. Asbestos screening, and risk assessment and management, as needed, will be prepared following ADB's Good Practice Guidance for the Management and Control of Asbestos: Protecting Workplaces and Communities from Asbestos Exposure Risks. In case Sub-projects are likely to have adverse impacts on physical cultural resources, appropriate mitigation measures will be planned and reflected in the IEE. The IEE will also reflect how meaningful consultation will be undertaken and disclosure procedures with a provision of grievance redress mechanism.

79. An EMP for each interventions will be developed as part of the IEE. EMPs describe the environmental management measures that will be carried out to mitigate negative impacts or enhance the environment during implementation of a Sub-project, and the environmental monitoring to be conducted to ensure that mitigation is provided and is effective in reducing impacts, or to determine the long-term impacts of a Sub-project. EMPs will outline specific mitigation measures, environmental monitoring requirements, and related institutional arrangements, including budget requirements for implementation. Where impacts and risks cannot be avoided or prevented, mitigation measures and actions will be identified so that the

Sub-project is designed, constructed, and operated in compliance with applicable laws and regulations and meets the requirements specified in this document. The level of detail and complexity of the environmental planning documents and the priority of the identified measures and actions will be commensurate with the intervention's impacts and risks. Key considerations include mitigation of potential adverse impacts to the level of "no significant harm to third parties," the polluter pays principle, the precautionary approach, and adaptive management.

80. For ease of work, similar interventions are often clustered and put under a 'package' for bidding purposes. For example, re-excavation of Total 71.00 km of Singi para khal, Gobor danga khal, Tera baka khal, Muncbi bari khal, Gojalia khal, Notun bazar khal Kalmadanga khal, Gojalia munshir char khal, Tungi para khal, Gima danga purbo para khal, Patgati to tungi para khal, Kushli khal & Chamarer khal under Tarail Pachuria Sub-Project has been considered by BWDB as one 'package' in the Development Project Proposal (DPP) approved in the ECNEC. In such a case, preparation of one IEE (if triggers ADB category B) for the entire 'package' shall be considered.

5. Step – 5: Development of ECOP for category C Sub-projects

81. Proposed activities involving rehabilitation, upgradation, repairs, tube-well sinking etc. will require an environmental screening (Category 2, para.72). For example, rehabilitation of the inlets and outlets, sinking of tube-wells etc. will involve construction tools and materials transportation, minor construction activities where dust generation, noise generation and disposal of waste may generate minor impacts if not managed properly. In such cases, environmental impacts, whether that is minimum or negligible, will be managed through Environmental Code of Practices (ECOPs). An outline of ECOP is attached to this document as Appendix 4.

6. Step – 6: Submission of Sub-project proposal including IEE and ECOP, as appropriate, for ADB's review and endorsement.

82. All IEEs and EMPs should be prepared prior to the award of construction contracts. The bid documents should include the requirement to incorporate necessary resources to implement the EMP. The EMP should form part of the contract document and EMP cost to be included in the BOQ should be a non-competitive item included under the provisional sum. The EMP needs to be further updated during the construction phase of a Sub-project, if required.

83. The IEE and EMP must be updated if there are any change to the location and design of the Sub-project intervention and any changes or updates on the IEE will be subject to ADB's review and disclosure. IEEs will be reviewed initially by the safeguards unit at PMO. In case an environmental clearance is required, the IEEs are to be forwarded to the DOE for approval. No work shall commence without an approved national environmental clearance.

7. Step – 7: Disclosure the reports approved by ADB

84. The IEEs, EMPs and ECOPs will be reviewed by the safeguards unit of PMO and, if considered satisfactory based on the requirements of SPS 2009, the latter will submit them to ADB for final review and clearance. Once cleared by ADB, the IEEs will be publicly disclosed on the ADB and government websites, and locally through consultations, leaflets, etc. as appropriate.

B. Methodology and Approach for Environmental Assessment

85. The following activities shall be undertaken for the purpose of conducting environmental assessment:

(i) Reconnaissance visits to the sites and consultations with the locals;
(ii) Consultation with the project preparation team at ADB and BWDB;
(iii) Desk review of information such as maps, reports, past feasibility studies etc. for the project. Preparation of checklist for collecting project related information;
(iv) Review of national policy, laws/regulations and procedures relating to environment, health and safety, resettlement and rehabilitation, etc.
(v) Focusing on the environmental baselines on which SAIWRMP and AF is operating;
(vi) Prediction of environmental impacts to be generated from the project preparatory activities and proposing mitigation measures;
(vii) Taking into account the benefits or positive impacts of the project operations and proposing benefit enhancement measures.

86. **Environment Assessment Methods:** An outline of the activities for conducting Environmental Assessment Studies is presented below:

(i) **Desk Study**: Review of information such as maps, reports, and EARF for the Project. A checklist for collecting site information shall be finalized.
(ii) **Consultations**: Major stakeholders shall be consulted by means of Focus Group Discussions (FGD). If required, discussion with concerned government offices (DoE; Construction contractors; Administrative and relevant department of training institutes; etc.) will also be undertaken. There are many social and non-structural interventions proposed in the project. Consultations shall be done to assess what environmental benefits or consequences they are producing.
(iii) **Field Assessment**: Assessment of the potential and significant environmental concerns shall be done to collect data and analyze any potential impacts.
(iv) **Sampling and Testing**: Special tests may be necessary in certain cases where water, air, soil and noise pollution issues need to be investigated (for example, water quality for arsenic or fluoride content, iron, salinity, etc., soil quality for carbon content, organic matter etc., ambient noise level, air quality for $PM_{2.5}$ /PM_{10}, SO_x, NO_x etc.).
(v) **Consideration of Alternatives**: The environmental implications of different alternatives will be briefly assessed, particularly focusing on location of infrastructure, renovation, design and orientation, method of construction, source of construction materials, and schedule of construction).
(vi) **Identification of Environmental Impacts and Mitigation Measures**: The impacts will be identified in terms of their significance, extent, reversibility, and duration.
(vii) **Design of Environmental Monitoring Plan:** The environmental impact studies (most likely IEE) shall propose EMP where monitoring requirements for potential environmental impacts are identified, mitigation measures prepared, method of mitigation measure developed, indicators suggested, frequency of undertaking monitoring activity decided, cost estimated, and responsible agency for undertaking the monitoring identified.
(viii) **IEE Report:** IEE report shall be prepared in brief following the framework later presented in Appendix 3.

87. Implementation of the project is to be governed by the national laws and laws concerning the environment, the Environment Conservation Act, 1995 (ECA, ’95) and it’s amendments and the Environment Conservation Rules, 2023 (ECR, ’23). ECR, ’23 sets forth standards for various environmental parameters as well as put forward the guidelines for impact assessment that is

acceptable to the DOE. Implementation of SAIWRMP will also to be guided by ADB's Safeguard Policy Statement (2009) and Operational Manual F1 (2013). Compliance is required in all stages of the project implementation.

C. Environmental assessment and reporting under harmonized framework

88. Under the proposed the project, a total of 15 types of intervention are proposed. Given the number of interventions and for ease of environmental assessment, this framework proposes to summon all the interventions into 5 groups based on their types and intensity and magnitude of generic impacts. Table IV-3 below explains the groups and their respective environmental assessment process in detail:

Table IV-3: Harmonized categorization and required environmental assessment for 5 groups of interventions under the project

Group	Interventions	Category under harmonized framework	Required assessment
Group – 1	Khal re-excavation, River dredging, protective work, Embankment re-sectioning; Embankment Construction	Cat – 3	IEE with EMP
Group – 2	Regulator/boat pass (rehab); Regulator / Boat pass (new); Inlet/Outlet (Rehabilitation); Inlet/Outlet (New); Check structures (new)	Cat – 3	IEE with EMP
Group – 3	Bridge / culvert (new)	Cat – 3	IEE with EMP
Group – 4	BWDB Office building (inspection bungalow) / IB; WMO Training center	Cat – 2	Environmental screening, ECOP, Due Diligence report
Group – 5	Arsenic free tube-well	Cat – 2	Environmental screening, ECOP, Due Diligence report

V. POTENTIAL IMPACTS AND MITIGATION MESURES

A. Cross Cutting and intertwining issues

89. Considering that management of water-related risk is identified as fundamental for economic growth and resilience which will support BWDB in formulation of ensuing project, including strengthening measures for climate change- and disaster-resilience of existing FCD/1 schemes, due diligence for all technical, economic, financial, procurement, gender, environmental and social safeguards aspects, and climate risk vulnerability assessments. These activities are well aligned with the Bangladesh Delta Plan (BDP) 2100 that identifies flooding, drainage congestion, water logging, arsenic contamination of groundwater, and water deficits in dry season as the principal challenges affecting areas of ensuing project. Goal 1 of BDP 2100 is to 'ensure safety from flood and climate change related disasters.' To meet this goal, structural and non-structural combinations of flood risk mitigation strategies have been designed in a nature-based and climate resilient way.

90. The Bangladesh Climate Change Strategy and Action Plan (2009) recommends capacity and resilience building measures to face the challenges of climate change. Water resources development goals focus on protection of the environment and mitigation of climate change effects. The project will ensure the improvement of drainage systems and restoration of distributaries as well as significantly improving the disaster resilience of the area through engineering and capacity building measures.

91. Interventions under the ADB's ongoing and ensuing projects will significantly impact livelihood patterns as flood protection works will increase cropping intensity, but also cause a net reduction in capture fishing productivity that will necessitate livelihood shift towards culture fishing and intensification of agricultural patterns, both of which require knowledge of and skills to adopt modern technologies as well as access to support systems during the shift. These activities are well aligned with the government's National Adaptation Plan (NAP) approved in November 2022, specially with "Goal 1: Ensure protection against climate change variability and induced natural disasters"; and "Goal 6: Ensure transformative capacity-building and innovation for climate change adaptation". The proposed project will directly contribute to the climate adaptation investment required under the NAP through rolling out of some of the good practices that have been developed. The innovative climate resilience infrastructure and adaptation through skill development and climate friendly product development under the project can be used as a benchmark for infrastructure development in other climate hotspots of the country.

B. Anticipated Impacts

92. The scale of operations and facilities, as well as the precise placement of infrastructure, are not presently well established for any proposed Investment Project investments, which makes prediction of specific impacts on particular receptors from construction and operations tenuous. Nevertheless, it is possible to define broad categories of potential impacts, based on the types of infrastructure planned under the Investment Project and typical characteristics of the investment settings. The following general anticipated impacts are based on five groups defined earlier (see para. 89 and Table IV-3) of possible interventions.

1. Group – 1: river and canal intervention involving protective works and excavation/dredging

93. This group of civil works include river dredging, khal excavation, embankment construction/restructuring and river erosion protective works. Pre-requisite of environmental

assessment of these proposed civil works will include: (i) Conduct study for river dredging; (ii) Conduct study based on water elevation; (iii) Improved and design blocks considering strength and sustainability; (iv) Identify key areas that need to be improved; (v) While reconstruction of embankment, protection of biodiversity has to be considered, therefore borrow bit should not affect the water bodies, crop lands and fisheries; (vi) Impact identification of river bank erosion; and (vii) possible nature-based solutions (NBS) that can be co-implemented with hard engineering works.

a. Design phase

94. **Siting.** All the proposed dredging works, excavation/re-excavation, embankment construction etc. will not require land acquisition. However, for the locations of dredging and excavation sites, special care needs to be taken for hydrological studies with consideration of the sensitive beel ecosystem of high biodiversity. It needs to be considered that the beel system is supposed to silting up with time. The ecology of the beel system revolves around the siltation. Hence, siting of the dredging/excavation should be backed up with detailed studies so that there is a trade-of between human interest and local ecosystem.

95. **Design.** The design process is typically a significant opportunity to lessen the potential for negative environmental impacts, and also to enhance the project environment. The sites are located in the vast beel system (wetland system) which has immense potential in greenhouse gas reduction. The greenhouse gas emission potential and water demand of the proposed infrastructure, for example, may be significantly reduced by incorporating blue-green design features to lower cooling needs and capture and store rainwater. Installation of only high-efficiency electrical appliances and inclusion of state-of-the-art waste management systems are also areas in which design can lower the potential for environmental impacts. Similarly, the redesign of approach roads offers the opportunity to add enhanced safety features that are currently lacking, such as sidewalks, guardrails and protected pedestrian crossing points. By the same token, failure to design for impact reduction may result in existing safety problems being exacerbated during the operation phase.

96. With regards to dredging/excavation and embankment/protective works, careful design will be essential to limiting the potential for harmful releases of hazardous materials to the environment, as well as prevention of occupational health and safety impacts. Dredging may produce both liquid effluent and solid waste, as well as vaporous releases depending of the drilling fluids being used. The type of tests to be conducted, substances used in testing, and the volume of testing are all unknown at the time of writing, but all infrastructures will present the risk of hazardous releases if adequate systems for management of all components of the waste stream are not included in facility designs. The institutional and operational capacity for hazardous waste treatment and disposal is extraordinarily weak in Bangladesh, so the effective management of solid wastes from construction may have to include on-site treatment or long-term storage, the latter of which may be feasible if testing volumes are relatively low.

97. **Procurement.** Procurement is another pre-construction process that offers opportunities to reduce environmental impacts. Thoughtful selection of building materials may yield significant reductions in the carbon footprint of the Investment Project infrastructure, and selection of contractors with strong environmental compliance track records will help to reduce the incidence of avoidable environmental and safety impacts during construction. Another potentially significant procurement choice is to require that contractors hire entirely or mostly local workers; this can completely prevent the many environmental and social impacts associated with residential

construction camps, and greatly boost the positive economic impact of the Investment Project for the local communities.

b. Construction phase

98. **Air Quality.** The potential sources of air pollution during the construction stage include dust, debris, and particulate materials from construction that may blow to surrounding river embankment structures and cause nuisance to surrounding families and businesses, especially vulnerable persons (children, elderly, etc.).

99. **Noise and Vibration.** During construction, noise is likely to be generated from site development, excavation, concrete mixing, and operation of generators and proximity of the work area to the nearby inhabitants. The anticipated noise problems will be localized and minor, may disturb others especially in areas with hospitals, homes for the elderly, and schools. Noise during dredging may travel far from the place of origin due to reflective surface of river water.

100. **Land and Soil.** Land and soil may be contaminated through inappropriate construction methods and improper management of spoils. Any embankments/platforms etc. must have a slope which should be protected implementing bioengineering technology (vetiver) particularly in the beel areas. Strengthening of flood control measures should be ensured using climate resilience design of irrigation infrastructure.

101. **Borrow Pits and Quarry Sites.** Extraction of materials for embankments repair can disrupt natural land contours and vegetation, resulting in accelerated erosion, disturbance in natural drainage patterns, ponding, waterlogging and water pollution. Borrow pits and quarry sites will be selected avoiding protected and sensitive areas, nearby settlements, water sources, and in forest areas and fertile agricultural lands. Following the guideline for slope/embankment protection, the borrow pit should be 50 meters away from the slope/embankment. The project will require all contractors to adhere to the rules set forth by DOE for the dredging and disposal of materials from riverbeds and haors. The contractor's agreement will include instructions for dredging and disposing of dredge material, and it will make their adoption compulsory by incorporation of appropriate protective clause to be followed by the contractor. The quality of the bed materials will be assessed before the dredging process begins by testing for the presence of heavy metals that are harmful to human health and the environment.

102. **Agriculture.** Ensure no crops are damaged during repair and reconstruction of embankments, sluices and tree plantation.

103. **Loss of Vegetation.** Proposed areas may entail cutting of trees and shrubs. Loss of vegetation may affect ecological balance. For Sub-projects which will involve cutting of trees[9], necessary permits will have to be secured from the Forest Department and bare slopes of the flood control embankment and submersible embankment etc. will be identified for reforestation and growing grass etc. In addition, for a significant amount of tree cutting, ADB will need to be consulted. Workers camps will not be allowed within protected areas, its regulated zones, or proposed protected areas.

104. Tree species should be chosen based on their resilience and ability to fight against normal flood height in the beel region. Water-sustaining species like Hijal, Karach, and Barun trees should be chosen for planting in the haor area taking into account the hydrology, ecology, and character of the region. On the other hand, particular species, such as Jam, Banyan, Palas, Krishnachura,

[9] If considerable number of trees need to be cut, BWDB will get approval of ADB.

Shonalu, Kadam, Fig, Jarul, and Shimul, may be chosen for planting because of their ability to bloom and fruit yielding during the winter and summer.

105. **Hydrology and Drainage.** Dredging and excavation have been proposed in the most important hydrological connections in the region, all of which are connected with the upstream and downstream of the Modhumati river. The beel system receives all of its water from Modhumati at upstream and all the excess water is also drained through downstream of the same river. This gives utmost importance to consider the drainage channel fluidity and hydrological connection between upstream and downstream.

106. Obstruction of natural drainage basin by community infrastructure or extraction of water may modify the natural flow of surface runoff by concentrating flow at certain points. As a result, the velocity of flow may increase or decrease. In turn, diversion or disruption of natural surface water and drainage patterns is inevitable. In addition, stockpiling materials dredged from riverbeds for road embankment construction/repair may result in increased erosion and subsequent siltation in adjacent water bodies if exposed to floods. However, the stockpiling of earth shall not cause any interruption of the regular water flow in the surface water streams. If the area does not have enough space for stockpiling the dredged material or construction soil, the contractor will be asked to stockpile in a nearby location suitable for stock piling and transport them as and when needed.

107. **Surface Water and Groundwater Contamination.** Use of toxic materials such as 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 camps may also contaminate surface water and groundwater if there are no adequate sanitary facilities. Uncontrolled storage of raw material or unsound construction techniques could result in leakage of construction material into rivers, water bodies causing sedimentation, turbidity, and siltation (especially due to stored excavated mud for embankment repair).

108. **Loss of Natural Habitats and Wildlife Disturbance.** Clearing of existing vegetation may result in loss of associated ecological habitats and their fauna. Noise, vibrations, and intrusive activities related to construction works may scare away animals remaining onsite after vegetation clearance.

109. **Stockpiling of Materials.** Improper selection of storage areas and stockpiling of material may cause siltation, water pollution, and air pollution due to dust generation, loss of topsoil and productivity, and disturbance to private property. Since the construction/modification sites are likely to be side of a road adjacent to a beel where water moves in both directions in turn, improper site selection of stockpile of materials may create havoc in creating water pollution.

110. **Explosive, Combustible, and Toxic Materials**. Storage and use of explosives, petrol, diesel, oil and lubricants, bitumen, and solvents may cause fire and explosion hazards, soil and water pollution through leaks and accidental spillage.

111. **Dredged material disposal.** Management of dredged materials will be the most challenging environmental obstacle. If dredged material is dumped on the banks of the river/khal without plan, the spoils can destroy biodiversity and livelihoods at the same time. If spoils are sprayed on agricultural field, crops can die instantly and take more than 5–10 years before it come back to production. A comprehensive dredged material management plan should be formed with elaborated community consultation and common agreement among the communities. The plan ensures that navigation vessels can safely transport commodities through the rivers/khals. The plans also help to reduce water quality issues, change hydrodynamics (the movement of water),

smother plants and animals that live on the seabed, and displace marine life. Disposed material may also move from its original disposal location, transported by wind, waves and tides, and river currents.

112. **Traffic.** Traffic flow will be disrupted if routes for delivery of construction materials and temporary blockages during construction activities are not planned or coordinated.

113. **Construction Camp.** Poor siting and improper management of construction camps may lead to several adverse impacts on environment: (i) loss of vegetation due to use of wood as fuel source for cooking, (ii) deterioration of nearby surface water quality, (iii) compaction and contamination of soil due to uncontrolled disposal of solid waste, (iv) increase in generation of domestic solid waste; (v) temporary air an noise pollution from machine operation; and (vi) poor sanitation resulting to transmission of communicable diseases.

114. **Occupational Health and Safety.** Insufficient supply and improper use of safety gear may cause injuries or fatal accidents. Close contact with persons afflicted with diseases and lack of sanitation in worker's camps may also pose health risks. Outbreaks of diseases like diphtheria and measles can be avoided by observing proper sanitation facilities and observing good personal hygiene habits.

115. **Community Health and Safety Hazards.** Community hazards may arise during construction (dust, air quality, noise, risk of fall, etc.). Traffic accidents and vehicle collisions with pedestrians during material and waste transportation may occur if no proper signages are placed.

116. **Social and Cultural Resources.** Ground disturbance can uncover and damage archaeological and historical remains. However, sites are likely to be inside the beel system where presence of archeological sites are unlikely.

c. Operation phase

117. **Community Health and Safety Hazards.** If left without proper restoration and clearing of waste, construction sites can be accident prone areas. Drainage canals, if not properly maintained, may create stagnant water conditions. This might create public health problems due to the increase in the number of vector species like mosquito, snails and others.

2. Group – 2: structures involving water-pass and water-passage

118. This group of civil works are construction (new) and rehabilitation of regulators and boat passes, construction (new) and rehabilitation of inlets/outlets, check structures (new), BWDB offices facilities, WMO office facilities etc. Impacts that may arise prior to the start of construction are related to siting, design and procurement decisions.

a. Design phase

119. **Siting.** Since all of the planned rehabilitation infrastructures are to be located within the old structure areas, land acquisition is not expected at any locations, and the widening of approach roads will not require additional land acquisition. However, even within pre-existing sites, siting decisions may affect the amount of land filling and cutting that is required. New construction might require land acquisition. Poor siting decisions may lead to unnecessary and environmentally harmful filling of water bodies, as well as loss of productive agricultural land. When flooding potential - including projected changes due to climate change - is poorly accounted

for in siting, costly and environmentally harmful problems such as mass erosion, building damage and releases of sewage and hazardous wastes are much more likely to occur.

120. **Design.** The design process is typically a significant opportunity to lessen the potential for negative environmental impacts, and also to enhance the project environment. The sites are located in the vast beel system (wetland system) which has immense potential in greenhouse gas reduction. The greenhouse gas emission potential and water demand of the proposed infrastructure, for example, may be significantly reduced by incorporating blue-green design features to lower cooling needs and capture and store rainwater. Installation of only high-efficiency electrical appliances and inclusion of state-of-the-art waste management systems are also areas in which design can lower the potential for environmental impacts. Similarly, the redesign of approach roads offers the opportunity to add enhanced safety features that are currently lacking, such as sidewalks, guardrails and protected pedestrian crossing points. By the same token, failure to design for impact reduction may result in existing safety problems being exacerbated during the operation phase.

121. With regards to regulators, boat passes, inlets/outlets and small BWDB office structures, careful design will be essential to limiting the potential for harmful releases of hazardous materials to the environment, as well as prevention of occupational health and safety impacts. Rehabilitation of regulators, boat passes etc. may produce both liquid effluent and solid waste, as well as vaporous releases depending of the construction materials, construction technics and chemical being used. The type of tests to be conducted, substances used in testing, and the volume of testing are all unknown at the time of writing, but all infrastructures will present the risk of hazardous releases if adequate systems for management of all components of the waste stream are not included in facility designs. The institutional and operational capacity for hazardous waste treatment and disposal is extraordinarily weak in Bangladesh, so the effective management of solid wastes from construction may have to include on-site treatment or long-term storage, the latter of which may be feasible if testing volumes are relatively low.

122. **Procurement.** Procurement is another pre-construction process that offers opportunities to reduce environmental impacts. Thoughtful selection of building materials may yield significant reductions in the carbon footprint of the Investment Project infrastructure, and selection of contractors with strong environmental compliance track records will help to reduce the incidence of avoidable environmental and safety impacts during construction. Another potentially significant procurement choice is to require that contractors hire entirely or mostly local workers; this can completely prevent the many environmental and social impacts associated with residential construction camps, and greatly boost the positive economic impact of the Investment Project for the local communities.

b. Construction Phase

123. **Air Quality:** The potential sources of air pollution during the construction stage include dust, debris, and particulate materials from construction that may blow to surrounding structures and cause nuisance to surrounding people living in the premises, especially vulnerable persons (children, elderly, etc.) and businesses around the periphery.

124. **Noise and Vibration.** Noise from construction machinery and equipment may disturb others especially in areas with hospitals, homes for the elderly, and schools.

125. **Land and Soil.** Land and soil may be contaminated through inappropriate construction methods and improper management of spoils. Special attention is needed since construction is

envisaged on lowland area where there is every chance to pollute river water outside the beel system, or even the beel system depending on the tidal flow direction.

126. **Borrow Pits and Quarry.** Extraction of materials can disrupt natural land contours and vegetation, resulting in accelerated erosion, disturbance in natural drainage patterns, ponding, waterlogging and water pollution. Borrow pits and quarry sites will be selected avoiding protected and sensitive areas, nearby settlements, water sources, and in forest areas and fertile agricultural lands.

127. **Loss of Vegetation.** Proposed areas may entail cutting of trees and shrubs. Loss of vegetation may affect ecological balance. For constructions which will involve cutting of trees, will be identified for replantation, if any available. It is assumed that the campus premises are not legally protected areas designated by the Forest Department or DoE. However, if it happens to be a protected area by any chance, no works will be implemented within protected areas, including its regulated zones or any proposed protected areas. Workers camps will not be allowed within protected areas, its regulated zones, or proposed protected areas.

128. **Loss of Natural Habitats and Wildlife Disturbance.** The campus premises are expected to be vegetated. Clearing of existing vegetation may result in loss of associated ecological habitats and their fauna. Noise, vibrations, and intrusive activities related to construction works may scare away animals remaining onsite after vegetation clearance.

129. **Hydrology and Drainage.** This is of outmost importance for this project. The entire area is lowland and beel area full of water which moves twice a day in different directions. Obstruction of natural drainage basin by community infrastructure or extraction of water may modify the natural flow of surface runoff by concentrating flow at certain points. As a result, velocity of flow may increase or decrease. Construction taking place in lowlands may disrupt natural flow of water or natural runoff, which may lead to temporary, or even permanent waterlogging.

130. **Surface Water and Groundwater Contamination.** Use of toxic materials such as 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.

131. **Loss of Natural Habitats and Wildlife Disturbance.** Clearing of existing vegetation may result in loss of associated ecological habitats and their fauna. Noise, vibrations, and intrusive activities related to construction works may scare away animals remaining onsite after vegetation clearance.

132. **Stockpiling of Materials.** Improper selection of storage areas and stockpiling of material may cause siltation, water pollution, and air pollution due to dust generation, loss of topsoil and productivity, and disturbance to private property. Since the construction/modification sites are likely to be side of a road adjacent to a beel where water moves in both directions in turn, improper site selection of stockpile of materials may create havoc in creating water pollution.

133. **Explosive, Combustible, and Toxic Materials**. Storage and use of explosives, petrol, diesel, oil and lubricants, bitumen, and solvents may cause fire and explosion hazards, soil and water pollution through leaks and accidental spillage.

134. **Construction Waste.** Debris generated through excavation of sites and access roads includes bitumen and other pavement materials with various chemicals, oils, and grease that pose hazards to human health.

135. **Traffic.** Traffic flow will be disrupted if routes for delivery of construction materials and temporary blockages during construction activities are not planned or coordinated.

136. **Impacts on Existing Utility Infrastructure.** Telephone lines, electric poles and wires, and existing water pipes may require shifting. Service delivery of existing infrastructure may be disrupted during construction.

137. **Construction Camp.** Poor siting and improper management of construction camps may lead to several adverse impacts on environment: (i) loss of vegetation due to use of wood as fuel source for cooking, (ii) deterioration of nearby surface water quality, (iii) compaction and contamination of soil due to uncontrolled disposal of solid waste, (iv) increase in generation of domestic solid waste; (v) temporary air an noise pollution from machine operation; and (vi) poor sanitation resulting to transmission of communicable diseases.

138. **Occupational Health and Safety.** Insufficient supply and improper use of safety gear may cause injuries or fatal accidents. Close contact with persons afflicted with diseases and lack of sanitation in workers camps may also pose health risks. Outbreaks of diseases like diphtheria and measles can be avoided by observing proper sanitation facilities and observing good personal hygiene habits.

139. **Community Health and Safety Hazards.** Community hazards may arise during construction (dust, air quality, noise, risk of fall, etc.). Traffic accidents and vehicle collisions with pedestrians during material and waste transportation may occur if no proper signages are placed.

140. **Social and Cultural Resources.** Ground disturbance can uncover and damage archaeological and historical remains. However, sites are likely to be inside beel system where presence of archeological sites are unlikely.

c. Operation phase

141. **Solid Waste Generation.** Unused construction materials, construction waste etc. If left unmanaged can provoke local waterlogging and soil and water pollution.

142. **Community Health and Safety Hazards.** If left without proper restoration and clearing of waste, construction sites can be accident prone areas. Drainage canals, if not properly maintained, may create stagnant water conditions. This might create public health problems due to the increase in the number of vector species like mosquitoes, snails and others.

3. Group – 3: road transportation structures involving bridges and culverts

143. This group of civil works are construction of bridges and culvers on existing roads. Impacts that may arise prior to the start of construction are related to siting, design and procurement decisions.

a. Design phase

144. **Siting.** Land acquisition may not be expected as the proposed bridges and culverts will be government owned road alignments. However, siting of the proposed interventions need to

consider the road width and commercial structures before widening and filling. Wrong siting may lead to dislocation of commercial building and excessive amount of land filling than it is required.

145. **Design.** The design process is typically a significant opportunity to lessen the potential for negative environmental impacts, and also to enhance the project environment. The sites are located in the vast beel system (wetland system) which has immense potential in greenhouse gas reduction. The greenhouse gas emission potential and water demand of the proposed infrastructure, for example, may be significantly reduced by incorporating blue-green design features to lower cooling needs and capture and store rainwater. Similarly, the redesign of approach roads offers the opportunity to add enhanced safety features that are currently lacking, such as sidewalks, guardrails and protected pedestrian crossing points. By the same token, failure to design for impact reduction may result in existing safety problems being exacerbated during the operation phase.

146. With regards to bridges and culverts, careful design will be essential to limiting the potential for harmful releases of hazardous materials to the environment, as well as prevention of occupational health and safety impacts. Rehabilitation of regulators, boat passes etc. may produce both liquid effluent and solid waste, as well as vaporous releases depending of the construction materials, construction technics and chemicals being used. The type of tests to be conducted, substances used in testing, and the volume of testing are all unknown at the time of writing, but all infrastructures will present the risk of hazardous releases if adequate systems for management of all components of the waste stream are not included in facility designs. The institutional and operational capacity for hazardous waste treatment and disposal is extraordinarily weak in Bangladesh, so the effective management of solid wastes from construction may have to include on-site treatment or long-term storage, the latter of which may be feasible if testing volumes are relatively low.

147. **Procurement.** Procurement is another pre-construction process that offers opportunities to reduce environmental impacts. Thoughtful selection of building materials may yield significant reductions in the carbon footprint of the Investment Project infrastructure, and selection of contractors with strong environmental compliance track records will help to reduce the incidence of avoidable environmental and safety impacts during construction. Another potentially significant procurement choice is to require that contractors hire entirely or mostly local workers; this can completely prevent the many environmental and social impacts associated with residential construction camps, and greatly boost the positive economic impact of the Investment Project for the local communities.

b. Construction phase

148. **Air Quality.** The potential sources of air pollution during the construction stage include: dust from earth works, emissions from the operation of construction equipment, machines, and crusher plants, fugitive emissions from vehicles plying the bridge/culvert access paths/road, fugitive emissions during the transport of construction materials, air pollution other than dust from combustion of hydrocarbons particularly from concrete mixing plants, and localized increased traffic congestion in construction areas such as culvert crossings.

149. **Noise and Vibration.** Ambient noise may increase temporarily in close vicinities of maintenance workshops and operated vehicles, earthmoving equipment, and crusher plants. Noise is expected to be intermittent and temporary. Noise levels will attenuate with increase in distance from the noise source. There can be vibration due to the operation of heavy machinery and equipment which may damage fragile houses or community infrastructure near roads, bridges

or culverts. Due to the presence of beel water, the noise generated can travel far from the place of origin.

150. **Land and Soil.** Soil may be contaminated through inappropriate construction methods and improper management of spoils. All the roads are adjacent to beel areas where water stays year-round. There can also be loss of topsoil, which not only is associated with soil and water pollution, but also can release stock carbon into air. Pollution risks may also originate from transportation of construction materials during bridge/access road construction and subsequent traffic operation. There will be temporary changes in land use because of access roads, construction camp, and storage of construction materials. This may also result in loss of soil productivity. There are risks of slope failure and soil erosion which require mitigation. Disturbance to fragile slopes during slope cutting and poor management of drainage water may cause accelerated erosion and slope instability, landslides, destruction of vegetation and property, siltation of surface water, and water pollution. All bridge and culvert sections must have a guide wall and slope which should be protected by implementing bioengineering technology (vetiver, other deep rooted native species), or hollow concrete cement block the thickness of which should be more than 4 inches to protect embankments or reconstruction activity. Strengthening of slopes and embankments for the bridges and culverts must be done using a climate resilient design.

151. **Borrow Pits and Quarry Sites.** Extraction of materials for bridges and culverts can disrupt natural land contours and vegetation, resulting in accelerated erosion, disturbance in natural drainage patterns, ponding, waterlogging and water pollution. Borrow pits and quarry sites will be selected avoiding protected and sensitive areas, nearby settlements, water sources, and in forest areas and fertile agricultural lands. Following the guideline for slope/embankment protection, the borrow pit should be 50 meters away from the slope/embankments. Sourcing of stone and sand should be ensured without disrupting the beel areas. In addition, slopes need to be protected implementing bioengineering.

152. The project will require all contractors to adhere to the rules set forth by DOE for the dredging and disposal of materials from riverbeds and beels. The contractor's agreement will include instructions for dredging and disposing of dredge material, and it will make their adoption compulsory by incorporation of appropriate protective clause to be followed by the contractor. The quality of the bed materials will be assessed before the dredging process begins by testing for the presence of heavy metals that are harmful to human health and the environment.

153. **Loss of Vegetation.** Construction of the bridges and culverts and setting-up of construction camps may entail cutting of trees and shrubs. Loss of vegetation may affect ecological balance. For Sub-projects which will involve cutting down trees, necessary permits will have to be secured by the proper authority which include local Union Parishad, Forest Department etc. To compensate, even if no trees are cut down, space along the embankment section of the bridges and culverts will be identified for reforestation and growing grass etc. In addition, for a significant amount of tree cutting, ADB will need to be consulted. No widening works will be implemented in existing roads that pass through beel areas, including its regulated zones or any proposed protected areas. Workers camps will not be allowed within protected areas, its regulated zones, or proposed protected areas.

154. Tree species should be chosen based on their resilience and ability to fight against high water levels in the beel region. Water-sustaining species like Hijal, Karach, and Barun trees should be chosen for planting in the haor area taking into account the hydrology, ecology, and character of the region. On the other hand, particular species, such as Jam, Banyan, Palas,

Krishnachura, Shonalu, Kadam, Fig, Jarul, and Shimul, may be chosen for planting because of their ability to bloom and fruit yield during the winter and summer.

155. **Hydrology and Drainage.** The entire area is sensitive beel ecosystem where water is mobile and rises and falls among seasons. In such areas, obstruction of natural drainage basin by temporary access roads may modify the natural flow of surface runoff by concentrating flow at certain points. As a result, the velocity of flow may increase. In turn, diversion or disruption of natural surface water and drainage patterns is inevitable. The construction of culverts/bridges shall consider the hydrology and drainage for the area. In addition, stockpiling materials dredged from riverbeds for road embankment construction/repair may result in increased erosion and subsequent siltation in adjacent water bodies if exposed to floods. However, the stockpiling of earth shall not cause any interruption of the regular water flow in the surface water streams. If the area does not have enough space for stockpiling the dredged material or construction soil, the contractor will be asked to stockpile in a nearby location suitable for stockpiling and transport them as and when needed.

156. **Surface Water and Groundwater Contamination.** Use of toxic materials such as 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 camps may also contaminate surface water and groundwater if there are no adequate sanitary facilities.

157. **Stockpiling of Materials.** Improper selection of storage areas and stockpiling of material may cause siltation, water pollution, and air pollution due to dust generation, loss of topsoil and productivity, and disturbance to private property.

158. **Explosive, Combustible, and Toxic Materials.** Storage and use of explosives, petrol, diesel, oil and lubricants, bitumen, and solvents may cause fire and explosion hazards, soil and water pollution through leaks and accidental spillage.

159. **Construction Waste.** Debris generated through excavation of existing culvert/bridge foundations, damaged road crossing includes concrete, muck, bitumen and construction materials, oils, and grease that pose hazards to human health.

160. **Construction Camp.** Poor siting and improper management of construction camps may lead to several adverse impacts on environment: (i) loss of vegetation due to use of wood as fuel source for cooking, (ii) deterioration of nearby surface water quality, (iii) compaction and contamination of soil due to uncontrolled disposal of solid waste, (iv) increase in generation of domestic solid waste; (v) temporary air an noise pollution from machine operation; and (vi) poor sanitation resulting to transmission of communicable diseases.

161. **Traffic.** Traffic flow at bridge/culvert crossings and access roads to bridges/culverts will be disrupted if routes for delivery of construction materials and temporary blockages during construction activities are not planned or coordinated.

162. **Occupational and Health and Safety Risks.** Occupational hazards may arise if not properly managed (deep excavations, falling objects, noise, etc.). Increase in dust may cause health problems to workers. Insufficient supply and improper use of personal protective equipment (PPE) and lack of safety procedures may cause injuries or fatal accidents. Close contact with persons afflicted with diseases and lack of sanitation in workers camps may also pose health risks. Outbreaks of COVID-19 pandemic has heightened concern about workplaces as transmission points for viral illnesses. Although much construction work is conducted in the open

air and thus can be considered relatively low risk, this is not always the case, especially as the construction process advances and doors and windows are installed. Whether it is COVID-19 or the next serious viral threat to come along, construction sites are potential trouble spots.

163. **Community Health and Safety Hazards.** Community hazards may arise during construction (dust, air quality, noise, risk of fall, etc.). Traffic accidents and vehicle collisions with pedestrians during material and waste transportation may occur if no proper signages are placed.

164. Consultations with the local communities will be carried out on an on-going basis and the construction schedule will be discussed with them to ensure that blockage of the local routes is minimized. The contractor shall take immediate corrective action on any complaint/grievance received by him and shall forward the details of the complaint, along with the action taken, to the environment management specialist within 48 hours of receipt of such complaint/grievance.

165. Lack of sanitation may pose health risks to the community if they are exposed to workers who are currently affected by communicable diseases. Outbreaks of diseases like diphtheria and measles can be avoided by observing proper sanitation facilities and observing good personal hygiene habits.

c. Operation phase

166. **Air Quality.** Engine/Locomotive emissions (either diesel or steam based as the track is not electrified will be the main source of air pollution during the operation phase.

167. **Noise and Vibration.** Noise generated by engine/locomotive movement will be the main source of noise. There can be vibration in adjoining infrastructure due to movement of engine and bogies along the bridge.

168. **Land and Soil.** Slope failure and soil erosion can occur due to natural and induced causes. This requires continuous monitoring especially during and after the rainy season or flooding.

169. **Hydrology and Drainage.** bridge slopes are prone to landslides and soil erosion from flooding. Consequently, drain blockage will be a perpetual problem and more severe during the rainy season or floods and must be unclogged regularly to avoid recurrent damage to bridges/culverts.

170. **Community Health and Safety Hazards, and Disturbance.** Maintenance activities along the bridges/culverts may cause disturbance to any adjoining sensitive receptors (i.e., increase in dust generation and increase in noise level).

4. Group – 4: building facilities (BWDB office, WMO training centers)

171. Apart from FCD/I structures, BWDB will construct an office facility in its own premises in Gopalganj and build a few small WMO training centers within the project area. The footprints of the proposed constructions are small, and potential of the environmental impacts are negligible. However, if not properly managed during construction, the construction materials can spread though the hydrological system of the beel and pollute a lot of area.

a. Design phase

172. **Siting.** Land acquisitions are not required for the proposed structures. The BWDB office structure is proposed within its premises. The WMO training centers need very small land which will require mostly some of kha land (government owned land). In some cases, the WMOs can decide to purchase land for their training centers. Siting of the proposed interventions sets need to consider the road width before widening and filling. Wrong siting may lead to dislocation of commercial building and excessive amount of land filling than it is required.

173. **Design.** The design process is typically a significant opportunity to lessen the potential for negative environmental impacts, and also to enhance the project environment. The sites are located in the vast beel system (wetland system) which has immense potential in greenhouse gas reduction. The greenhouse gas emission potential and water demand of the proposed infrastructure, for example, may be significantly reduced by incorporating blue-green design features to lower cooling needs and capture and store rainwater. Failure to design for impact reduction may result in existing safety problems being exacerbated during the operation phase.

174. **Procurement.** Procurement is another pre-construction process that offers opportunities to reduce environmental impacts. Thoughtful selection of building materials may yield significant reductions in the carbon footprint of the Investment Project infrastructure, and selection of contractors with strong environmental compliance track records will help to reduce the incidence of avoidable environmental and safety impacts during construction. Another potentially significant procurement choice is to require that contractors hire entirely or mostly local workers; this can completely prevent the many environmental and social impacts associated with residential construction camps, and greatly boost the positive economic impact of the Investment Project for the local communities.

b. Construction phase

175. **Air Quality.** The potential sources of air pollution during the construction of office/training center facilities include dust from earth works, emissions from the operation of construction equipment, fugitive emissions during the transport of construction materials, air pollution other than dust from combustion of hydrocarbons particularly from cement concrete plants.

176. **Noise and Vibration.** Ambient noise may increase temporarily in close vicinities of agricultural centers during construction. Noise is expected to be intermittent and temporary.

177. **Land and Soil.** Soil may be contaminated through inappropriate construction methods and improper management of spoils. There can also be loss of topsoil.

178. **Borrow Pits and Quarry.** Extraction of soil from borrow pits to raise the platforms for hand pumps, platforms for drinking water plants etc. for work camps can disrupt natural land contours and vegetation, resulting in accelerated erosion, disturbance in natural drainage patterns, ponding, waterlogging and water pollution. Borrow pits and quarry sites will be selected avoiding protected and sensitive areas, nearby settlements, water sources, and in forest areas and fertile agricultural lands. Following the guideline for slope/embankment protection, the borrow bit should be 50 meters away from any roadside slope/river embankment.

179. **Loss of Vegetation.** Workers camps will not be allowed within protected areas, its regulated zones, or proposed protected areas.

180. **Surface Water and Groundwater Contamination.** Human waste from construction workers may also contaminate surface water and groundwater if there are no adequate sanitary facilities.

181. **Stockpiling of Materials.** Improper selection of storage areas and stockpiling of material may cause siltation, water pollution, and air pollution due to dust generation, loss of topsoil and productivity, and disturbance to private property.

182. **Construction Camp.** Poor siting and improper management of small construction camps may lead to minimal adverse impacts on environment.

183. **Occupational and Health and Safety Risks.** Close contact with persons afflicted with diseases and lack of sanitation in workers camps may also pose health risks to the local farmers. Outbreaks of COVID-19 pandemic has heightened concern about workplaces as transmission points for viral illnesses. Although much construction work is conducted in the open air and thus can be considered relatively low risk, this is not always the case, especially as the construction process advances and doors and windows are installed. Whether it is COVID-19 or the next serious viral threat to come along, construction sites are potential trouble spots.

184. **Community Health and Safety Hazards.** Lack of sanitation may pose health risks to the community if they are exposed to workers who are currently affected by communicable diseases. Outbreaks of diseases like diphtheria and measles can be avoided by observing proper sanitation facilities and observing good personal hygiene habits. Consultations with the local communities will be carried out on an on-going basis and the construction schedule will be discussed with them. The contractor shall take immediate corrective action on any complaint/grievance received by him and shall forward the details of the complaint, along with the action taken, to the environment management specialist within 48 hours of receipt of such complaint/grievance.

c. Operation phase

185. **Community Health and Safety Hazards, and Disturbance.** Project activities may cause disturbance to sensitive receptors (i.e., increase in dust generation and increase in noise level).

5. Group – 5: water supply (arsenic free tube wells)

186. BWDB has proposed to sink 304 nos. arsenic free deep tube wells. The specifications of the proposed tube wells are still unknown, except that they will be hand pumps. Gopalganj area is affected by arsenic in shallow groundwater, which has been attributed to over extraction of groundwater creating large cone of depression chemically interacting with the naturally occurring iron oxide and arsenic in the subsurface of soil. Hence sinking of 304 nos. of arsenic free tube wells may create even larger cone of depression and let arsenic contaminate further downward to pollute deeper groundwater. Therefore, groundwater hydrological and geochemical analysis prior to the commencement of the sinking arsenic free tube wells (deep tube wells) is needed.

a. Design phase

187. **Siting.** The location of the tube wells will be the most important aspect of designing the subproject. The sitiing needs to be based on a prior study (discussed in earlier paragraph) so that the cone of depression does not merge with another one nearby to form larger cone of depression inviting arsenic in much deeper aquifer.

b. Construction phase

188. **Air Quality.** The potential of air pollution during sinking of tube wells is very low. The potential sources of air pollution during the construction stage include dust, debris, and particulate materials from construction that may blow to surrounding structures and cause nuisance to

surrounding families and businesses, especially vulnerable persons (children, elderly, etc.). However, the traditional method of sinking tube wells in Bangladesh is drilling with water, hence the potential of air pollution is very limited and contained within the construction site.

189. **Noise and vibration.** Usually tube well sinking in Bangladesh use hand-based drilling methods where noise generation is quite low and typically contained within the construction site.

190. **Borrow Pits and Quarry.** Extraction of soil from borrow pits to raise the platforms for hand pumps, platforms for drinking water plants etc. can disrupt natural land contours and vegetation, resulting in accelerated erosion, disturbance in natural drainage patterns, ponding, waterlogging and water pollution. Borrow pits and quarry sites will be selected avoiding protected and sensitive areas, nearby settlements, water sources, and in forest areas and fertile agricultural lands. Following the guideline for slope/embankment protection, the borrow bit should be 50 meters away from any roadside slope/river embankment.

191. **Surface Water and Groundwater Contamination.** Pit latrines cause the spread of fecal sludge / human excreta into the adjacent water bodies and results in water pollution and spreading of infectious epidemic diseases (typhoid, cholera, malaria etc.). it needs to be ensured during construction that the drilling areas are far from pit latrines so that neither surface water nor ground water is contaminated by pollutants.

192. **Stockpiling of Materials.** Improper selection of storage areas and stockpiling of material may cause siltation, water pollution, and air pollution due to dust generation, loss of topsoil and productivity, and disturbance to private property.

193. **Construction Waste.** Construction waste from the tube well sinking needs to be disposed of safely. Storage and use of explosives, petrol, diesel, oil and lubricants, bitumen, and solvents may cause fire and explosion hazards, soil and water pollution through leaks and accidental spillage.

194. **Traffic.** Traffic flow will be disrupted if routes for delivery of construction materials and temporary blockages during construction activities are not planned or coordinated.

195. **Accessibility.** Trenching water pipes, sewage pipes may disturb community access paths/roads, people, economic and social activities.

196. **Construction Camp.** Poor siting and improper management of construction camps may lead to several adverse impacts on environment: (i) loss of vegetation due to use of wood as fuel source for cooking; (ii) deterioration of nearby surface water quality; (iii) compaction and contamination of soil due to uncontrolled disposal of solid waste; (iv) increase in generation of domestic solid waste; (v) temporary air and noise pollution from machine operation; and (vi) poor sanitation resulting to transmission of communicable diseases.

197. **Occupational Health and Safety.** Insufficient supply and improper use of safety gear may cause injuries or fatal accidents. Close contact with persons afflicted with diseases and lack of sanitation in workers camps may also pose health risks. Outbreaks of COVID-19 pandemic has heightened concern about workplaces as transmission points for viral illnesses. Although much construction work is conducted in the open air and thus can be considered relatively low risk, this is not always the case, especially as the construction process advances and doors and windows are installed. Whether it is COVID-19 or the next serious viral threat to come along, construction sites are potential trouble spots.

198. **Community Health and Safety Hazards.** Community hazards may arise during construction (dust, air quality, noise, risk of fall, etc.). Traffic accidents and vehicle collisions with pedestrians during material and waste transportation may occur if no proper signages are placed. In other circumstances, construction works on the embankment may block local roads and routes and may prevent the local people crossing the construction area. Furthermore, the construction works and associated vehicular traffic may cause traffic congestion on local roads, particularly near boat jetties and local bazaars. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

199. Consultations with the local communities will be carried out on an on-going basis and the construction schedule will be discussed with them to ensure that blockage of the local routes is minimized. The construction works particularly at/near local bazaars and other public facilities will be carefully planned to minimize hindrance to the local communities. The contractor shall take immediate corrective action on any complaint/grievance received by him and shall forward the details of the complaint, along with the action taken, to the environment management specialist within 48 hours of receipt of such complaint/grievance.

c. Operation phase

200. **Groundwater Depletion.** Increase in water demand may lead to groundwater depletion if not properly managed. Regular check on groundwater table level and quality will be required by BWDB and act on the results.

201. **Community Health and Safety Hazards.** If left without proper restoration and clearing of waste, construction sites can be accident prone areas.

C. Generalized indicative Mitigation measures

202. Based on the anticipated impacts of the project civil works activities, a list of general mitigation measures/environmental enhancements are proposed in the following Table V-1. The 'impact magnitude' stated in Table V-1 is defined as the following order of ascending magnitude: 'none'[10], 'negligible'[11], 'minor'[12], 'major'[13] and 'catastrophic'[14]. Explanations are given in footnotes 11 - 14.

Table V-1: Generalized Potential Environmental Impacts with Mitigation Measures for the project

General Aspects and reference	Potential Impact	Magnitude of Impact	Mitigation/Enhancement Measures
Planning and Design Stage			
Legal permissions, No Objection Certificate (NOC) LCC and ECC from DoE	Without prior permission from proper authority construction or repairing civil works may hamper, even shut down.	Minor negative	Sought permission or NOC from proper authority (mainly Union parishad). Sought LCC and ECC from DOE by submitting EIA.

[10] None: No impact anticipated
[11] Negligible: Localized, long term degradation of sensitive habitat or widespread, short-term impacts to habitat, species or environmental media
[12] Minor: Impacts such as localized but irreversible habitat loss or widespread, long-term effects on habitat, species or environmental media
[13] Major: Widespread and persistent changes in habitat, species or environmental media
[14] Catastrophic: Persistent reduction in ecosystem function on a landscape scale or significant disruption of a sensitive species.

General Aspects and reference	Potential Impact	Magnitude of Impact	Mitigation/Enhancement Measures
Siting and design	Faulty siting and design may lead to degradation of environment within the site premises, specially within the beel system, impeding the natural flow of water and disturbing biodiversity	Major negative	Selection of site based on a combination of engineering and environmental recommendations. Try to avoid any delicate ecosystem with the sites.
Existing Utility relocation, restoration	Construction works may hamper existing utilities	Minor negative	At planning phase, existing utilities will be identified at all the project civil works sites so that if hampers notices can be made at least a week in advance and disturbed utilities can be restored to their original state
Environmental Awareness Training	If the contractors and construction supervision engineers are not aware about the implementation of this EMP, the project may not proceed and comply with ADB and GoB environmental policies.	Major negative	Project manager and all key workers will be required to undergo EMP implementation training including spoils management, Standard operating procedures (SOP) for construction works; health and safety (H&S), core labour laws, and applicable environmental laws.
Construction Phase			
Disturbance to local ecology	Construction in sensitive ecological areas like ponds and wetlands may lead to disturbance in the ecological balance	Major negative	During construction: avoid animal/bird breeding season, avoid monsoon season; follow site specific EMP prepared with approved IEE/EIA
Disturbance to local topography and hydrology	Construction in lowlands areas or in the path of local runoffs may alter hydrological system creating waterlogging and occasional flooding	Major negative	During designing, use prior hydrological studies; follow site specific EMP prepared with approved IEE/EIA
Air and noise pollution	Some construction sites are expected to release a major amount of dust or other air pollutants. Generation of noise will be common.	Minor negative	Frequent water spray, covering construction materials, use of environmentally certified fit machineries, use of low noise generating equipment will be in place to control air and noise pollution
Soil and water pollution	Solid waste generated from work camps, construction spoils, uncovered materials, wastewater discharge etc. may pollute soil and water, contamination of beel water or adjacent waterbodies might be common if not properly managed	Minor negative	Proper solid waste management system, systematic material storage, careful handling construction materials, operating during dry season etc. will lower the possibilities of soil and water pollution.
Traffic Congestion	Increase of traffic (i.e., construction vehicles) during construction and renovation may induce traffic congestion and increase chances pf accidents in locality	Minor negative	All the construction sites have wide access roads. New constructions sites are also chosen so that they have access roads wide enough for heavy traffic movement. Therefore, the chances of traffic congestion and accidents are low.
Worker's health and safety	Lack of health and safety equipment and awareness may lead to fatal accidents, even deaths	Major negative	Awareness training of health safety, continuous monitoring at workplace may reduce the chances of injuries
Community health and safety	Lack of awareness of community health and safety and caution may pose threat on community health and safety	Minor negative	Proper awareness training at the beginning of civil works and continuous monitoring at work sites may decrease the threat to community health and safety.

VI. INSTITUTIONAL ARRANGEMENT AND RESPONSIBILITIES

A. Project Organizational Structure

1. Executing Agency, Project Organization and Management

203. **Project Steering Committee (PSC).** For central coordination, a Project Steering Committee (PSC) will be formed comprising representatives of the concerned ministries and agencies. The secretary of the Ministry of Water Resources (MOWR) will chair the PSC, with the project director as member secretary. PSC will be held semi-annually during the first year and annually from the second year or whenever required.

204. **Project Implementation Committee (PIC).** For technical coordination, a Project Implementation Committee (PIC) as per standard government rule will be established at Central Level comprising of representatives of concerned ministries and agencies directly involved in the implementation of the project in the field. The committee is chaired by the DG of BWDB and includes focal points (members) representing DAE, DOF and a representative of OCWM & Audit Directorate of BWDB. Meetings will be held quarterly and whenever required.

205. **Project Management Office (PMO).** Under this central setup, a PMO will be established in Gopalgonj with a liaison office in Dhaka. A Superintending Engineer/Addl. Chief Engineer having multidisciplinary experience will head the PMO as full-time project director (PD). The PMO will (i) manage an overall implementation plan, annual work plans and budgets; (ii) liaise with BWDB, Water Resource Planning Office (WARPO) and other line agencies for technical backstopping, IWMP clearance (by WARPO), managerial support, and other central-level activities; (iii) prepare IWMPs of additional FCD/I systems with the support of the relevant SMOs; (iv) liaise with, monitor, and supervise SMOs for Sub-project implementation; (v) manage financial accounts; and (vi) prepare periodic reports on implementation progress, with the support of the ISPMC. The PMO will be responsible for: (i) overall coordination of the environmental safeguards; (ii) coordinate with and monitor the inputs of environment, health and safety specialist under ISPMC; (iii) review regular environmental monitoring report from environment, health and safety specialist and submit to ADB; and (iv) discuss with ADB and environmental, health and safety specialist regarding any environmental issues that might occur in future.

206. **Sub-project Management Office (SMO).** Two SMOs will be established at the project level, both under the control of the PMO. These SMOs will be responsible for overseeing the implementation of the five subprojects. One SMO will be the existing BWDB's O&M division located in Gopalganj. The other SMO will be managed by a 'Specialized Division,' which will be formed solely for the purpose of the project. Each SMO will be headed by a Executive Engineer with participatory experience to be appointed as subproject manager. The SMO is responsible for day-to-day implementation activities. It will (i) support the PMO planning unit to prepare IWMPs; (ii) manage the overall subproject implementation plans, annual work plans, and budgets; (iii) prepare and implement SIPs with proper recording and reporting to the PMO; and (iv) coordinate with line departments, LGIs, and NGOs. The SMO will be responsible for: (i) hosting the Environmental, Health and Safety Specialist; and (ii) monitoring environmental issues of the project and reporting back to PMO.

2. Supporting Agencies

207. **Line agencies.** To support coordinated planning and implementation of IWMPs, LGED will (i) provide technical inputs for preparing IWMPs, (ii) implement small subunits in IWMPs having less than 1,000 ha command area and limited relations with main FCD/I structures (following the NWP), and (iii) upgrade rural roads placed on flood embankments identified in IWMPs for joint use. Through their sub district offices, DAE and DOF will provide technical inputs for IWMP and SIP preparation and extension for agriculture and fishery development. The Ministry of Land will lease the water bodies managed with subproject structures to the concerned WMAs. The Office of the Chief Water Management will provide regulatory support to WMOs while conducting registration and audits of WMOs. The Department of Cooperatives will provide training for the registration and auditing of WMOs. The Department of Environment will clear the subproject environmental documents and monitor environmental impacts. Specific cooperation arrangements will be agreed upon under individual memorandums of understanding (MOUs) between BWDB/MOWR and the concerned agencies within 9 months of loan effectiveness.

208. **District Project Coordination Committee.** For coordination at District level, a District Project Coordination Committee will be established comprising of representatives of concerned line agencies directly involved in the implementation of the project in the field. The committee is chaired by the Project Director of PMO and includes members representing DAE and DOF. Meetings will be held quarterly.

209. **Joint Management Committee (JMC).** To operationalize participatory planning, implementation, and O&M, a JMC will be established in each Sub-project. It will have representatives from WMAs, LGIs, and sub district level-line department heads, and be initially chaired by the PD during the planning stage and by the superintending engineer of the BWDB sub zonal office after IWMP approval. The JMC will make Sub-project decisions, such as endorsing the IWMP, annual and periodic programs, implementation schedules, and O&M, based on which programs are delivered by the designated organizations under SMO management. Its subcommittees will be formed for preparing and implementing SIPs with the concerned line departments, LGIs and WMAs.

B. Institutional strengthening

210. **Project Management Systems.** To ensure the quality of its output, the Project will operate participatory management and quality control systems through the PMO and scheme-level SMOs, with the support of the ISPMC. To ensure participatory implementation and O&M sustainability, joint management committees (JMCs) will be set up following the NWP and BWDB Act 2000. The JMCs will comprise representatives of WMAs, Local Government Institutions (LGIs), BWDB, LGED, and line agencies, along with their subunit-level subcommittees. JMCs and their subcommittees will be trained to make Sub-project decisions at the scheme and the subunit levels, respectively, including project program delivery and annual O&M, based on which specific works will be undertaken by the responsible organizations, with monitoring by the WMAs. Within this framework, the Project's quality control system ensures (i) due recording and reporting at SMOs on institutional, physical, financial progress against the specified targets and schedules in IWMPs and SIPs; and (ii) regular SMO-PMO review meetings to be operated as part of the internal audit mechanism.

211. **Institutions Strengthened through Training and Advisory Support.** The Project will provide training to strengthen project institutions, including operating staff and trainers, with a distinct output target to create a pool of professional staff who institutionalize the participatory and integrated business processes embodied in the NWP and Rules of Participatory Water Management, with progressively reducing consultancy support that is provided with a clear exit

strategy and performance targets for relevant staff positions. Project training will enhance skills for participatory IWMP preparation; socially inclusive WMA development and management; management of diverse stakeholder interests; resettlement; design and construction management; environmental management; agriculture, fishery, and livelihood enhancement; sustainable O&M; and quality control.

212. Under the Participatory Water Management Rules (2014), the Office of Chief Water Management of BWDB will be responsible for registration and performance (technical, institutional, financial) auditing of WMOs. This is a new activity to BWDB and requires careful planning and implementation. The project will strengthen the department through training, planning support and logistic provisions.

213. **Institutional strengthening on Environmental Safeguards.** The PMO will lead the implementation of the EMP assisted by the consultants, with responsibility for such key tasks as ensuring project readiness; reviewing and approving designs and plans; ensuring that environmental information in bid documents and environmental clauses in construction contracts are on target; providing training on environmental mitigation measures; supervising and directing environmental monitoring; and providing guidance on environmental matters whenever needed. The work and leadership of the environmental consultants will strengthen environmental management and supervision capacity of the executing agency, Implementing agencys, PMO and contractors, and ensure the project's full compliance with the ADB's SPS.

214. In addition to the activity of the environmental consultants, the project's environmental management and supervision will be enhanced by engagement of a licensed laboratory to undertake quarterly site monitoring, including quantitative measurement of air quality and noise levels at all active construction sites; this importation of technical monitoring expertise will ensure adherence to DoE standards. Finally, all contractors will be required to hire an Environment, Health and Safety Officer (EHSO) for each site under their control and empower that officer to manage the implementation of an Environment, Health and Safety Management Plan (EHSMP) for the site. With the guidance, support and supervision of the environmental consultants, the EHSOs will play a key role in ensuring sound implementation of environmental mitigation measures prescribed by the EMP. It is believed that these institutional strengthening measures will enable competent and efficient environmental management of the project. The institutional strengthening plan is summarized in Table VI-1.

Table VI-1 Institutional Strengthening Measures

Target Agencies	Institutional strengthening measures	Timing
BWDB	Define institutional arrangements for environmental management, monitoring and supervision. Define positions and responsibilities	During project preparation
PMO	Recruit and contract one national environmental consultant for environmental management, environmental training, EMP compliance review, and reporting	At start of pre-construction phase
SMO	Recruit and contract licensed laboratory for quarterly environmental monitoring before and during construction phase	Prior to start of construction
Contractors	Hire Environment, Health and Safety Officers for each construction site	Prior to start of construction

Contractor / Workers	Work Health and Safety training on periodic basis	Before start of the construction and quarterly until end of construction

215. **Training.** Selected personnel of the BWDB and contractors will receive training in environmental management, environmental monitoring and supervision, mitigation planning, emergency response, public consultation and use of the GRM, occupational and community health and safety, and other environmental management topics. The topics, methods, and estimated costs of the training are outlined in Table VI-2. Training sessions will use a workshop format. Training will be developed and provided by the environmental consultants with support of other experts engaged under the ISPMC.

Table VI-2 Training requirements

Training target	Developed by	Delivered by	Timing	Estimated cost for this location
BWDB selected officials	Consultants	Consultants	Once before the commencement of the project	BDT 100,000
Contractor	Consultants	Consultants/EHSO	Once before start of construction, periodically during construction on quarterly basis	BDT 30,000 per session
Workers	Consultants	EHSO	Once before start of construction, periodically during construction on quarterly basis	BDT 30,000 per session

216. **Training Topics.** The following are trainings relevant on environment safeguards: (i) EMP Implementation: Roles and Responsibilities, Monitoring, Supervision and Reporting Procedures, (ii) Grievance Redress Mechanism: Roles and Responsibilities, Procedures, (iii) Occupational and Community Health and Safety, (iv) Emergency Preparedness and Response, (v) Pollution Control and Environmental Monitoring, (vi) Inspection and Reporting, (vii) Public Consultation, (viii) Contractor Engagement and Management including EMP Enforcement, and (ix) Operation-Phase Environmental Management and Monitoring.

VII. ASSESSMENT, REPORTING AND MONITORING PLAN

A. Reporting and mitigation plan

217. Environmental assessment documents prepared for Sub-projects should meet both ADB and government requirements to streamline environmental procedures.

218. In preparing IEEs, secondary data will be collected for Sub-project-influence sites. An assessment of civil work impacts and risks on biodiversity and natural resources will also be undertaken and incorporated with the IEEs. Issues regarding natural and critical habitats will be covered in the IEE report. In case of construction works located within buffer zone of protected areas, a review of management plans and consultation with concerned management staff of the protected area, local communities, and key stakeholders will be undertaken and reflected in the IEE report. Pollution prevention for conservation of resources, particularly technology for management of process wastes will be addressed in the IEE report. Occupational health safety and community health and safety will be properly addressed in the EMP section of the IEE report. In case Sub-projects are likely to have adverse impacts on physical cultural resources, appropriate mitigation measures will be planned and reflected in the IEE. The IEE will also reflect how meaningful consultation will be undertaken and disclosure procedures with a provision of grievance redress mechanism. Appendix 3 provides an outline of an IEE which contains the EMP.

219. EMPs will outline specific mitigation measures, environmental monitoring requirements, and related institutional arrangements, including budget requirements for implementation. Where impacts and risks cannot be avoided or prevented, mitigation measures and actions will be identified so that the Sub-project is designed, constructed, and operated in compliance with applicable laws and regulations and meets the requirements specified in this document. The Environmental Code of Practice (ECoP) will be integrated into the EMP, as applicable. Bidding documents will include ECoP. Appendix 4 shows an ECoP applicable to all civil works to be undertaken by the project.

220. All IEEs and EMPs will be prepared prior to the award of construction contracts. The bid documents will include the requirement to incorporate necessary resources to implement the EMP. The EMP will form part of the contract document, and if required, will need to be further updated during the construction phase of a Sub-project. Any changes or updates on the IEE will be subject to ADB's review and disclosure.

B. Environmental Monitoring and Reporting Plan

221. The environmental monitoring plan forms the basis for verifying the extent of compliance during the implementation stages of the project. The objectives of an environmental monitoring program are:

(i) to evaluate the performance of mitigation measures proposed in IEE;
(ii) to provide information which could be used to verify predicted impacts and thus validate impact prediction techniques;
(iii) to suggest improvement in environmental mitigation measures if required;
(iv) to provide information on unanticipated adverse impacts or sudden change in impact trends;
(v) Implementation of mitigation measures will be ensured through both routine and periodic monitoring. Monitoring activities for the project activities at the above two phases of implementation will be as follows (Table VII-1).

Table VII-1: Generalized Monitoring Plan during construction/renovation phase for the project.

Indicators	Method	Frequency	Responsibility
Construction/Renovation phase			
Drinking Water Quality at site and workers camp	Sampling, lab testing & Comparison with generic standard	3 times, once before begins, once in the middle of construction/renovation works, once after the end of the construction/renovation works	ISPMC, Contractor
Air quality at construction/renovation sites			
Surface water quality at construction/renovation sites			
Noise quality at construction/renovation sites			
Soil quality at construction/renovation sites			
Solid waste segregation Disposal	Direct observation	Every day, during construction/renovation works	ISPMC, Contractor
Occupational health and safety	Direct observation	Every day, during construction/renovation works	ISPMC, Contractor
Water logging, drainage congestion, vector Proliferation	Direct observation	Every day, during construction/renovation works	ISPMC, Contractor
Orientation training on Environmental awareness, health and safety	No. of training programs conducted	Biannually	ISPMC, Contractor
Monitoring Report	-	Monthly Semi annual	ISPMC, Contractor. PIU
Operation Phase			
Monitoring Report	-	Quarterly	PIU
Drinking water quality at BWDB facilities	Sampling, lab testing & Comparison with generic standard	Biannually	PIU
Solid waste management	Direct observation	Biannually	PIU

BWDB=Bangladesh Water Development Board, ISPMC= institutional strengthening and project management consultants, PIU=project implementation unit.

222. Each Directorate and the project implementation units may perform the responsibility of carrying out annual review to assess how effectively the environmental safeguard requirements have been followed. A sample format of the Semiannual monitoring report has been provided in Appendix 5.

C. EMP cost

223. EMP implementation costs will be specified in each site specific IEEs when prepared. The cost should be included as the fixed cost during bid documentation preparation. Contractors can claim the EMP costs fixated for the specific Sub-project only after submitting enough proof of implanting the EMP components as required by the relevant IEEs. An indicative EMP cost of the

project is given in Table VII-2 below. This cost needs to be modified for each and every intervention.

Table VII-2: Indicative EMP cost for the proposed project

Sl No.	Component	Item	Unit	Quantity	Rate (BDT)	Amount (BDT)
A. Project Planning Phase						
1	Technical support	Preparation of EIA and Intervention specific IEEs, DOE clerance	Included in the civil works budget			-
2	Land Acquisition and resettlement	Compensation against land acquisition	Included in the resettlement plan budget			-
3	Flora and fauna	Assessment of vegetation and wildlife	Included in the civil works budget			-
4	Air & Dust	Ambient air quality measurement	number	10	30,000	300,000
5	Noise Quality	Measuring noise level (decibel)	number	10	8000	80,000
6	Bed Materials	Quality measurement of dredged materials	number	10	20,000	200,000
7	Water Quality	Measurement of surface water quality	number	10	8000	80,000
		Measurement of ground water quality	number	8	12,500	100,000
Sub-total of the project planning phase						**760,000**
B. Construction Phase						
8	Drainage Congestion	Provision of adequate opening	Included in the civil works budget			-
9	Erosion and Siltation Control	Riverbank protection work	Included in the civil works budget			-
10	Air & Dust quality	Measuring ambient air & dust quality	number	10	30,000	300,000
11	Noise Quality	Measurement of Noise in decibels	number	10	8000	80,000
12	Water Quality	Surface water quality	number	10	8000	80,000
		Ground & drinking water quality	number	8	15000	120,000
13	Solid Waste	Disposal and management of solid waste	Included in the civil works budget			-
14	Occupational Health and Safety	PPE, ambulance, clinic, First Aid Box etc.	Included in the civil works budget			-
15	Traffic signs and Road Safety	Installation of traffic signs and ensure road safety	Included in the civil works budget			-
Sub-total of the construction phase						**580,000**
C. Operation Stage						
16	Tree Plantation	Tree plantation during monsoon period Maintenance	Following tree plantation plan			1,000,000
17	Air and Dust quality	Measuring ambient air & dust quality	number	10	30,000	300,000
18	Water quality	Surface water quality	number	10	8000	80,000
		Ground water quality	number	8	12,500	100,000
19	Functioning of WMOs		Included in the civil works budget			-
Sub-total of the operation stage						**1,480,000**
D. Capacity strengthening						
20	Training and awareness programme	EMP implementation training for BWDB officials, Contractors and workers; awareness programme throughout the project implementation cycle	LS			750,000
21	**Personnel cost:** Environmental Specialist	Preparation or Environmental due Diligence reports: IEE and monitoring reports as required, advice PMO on environmental issues	number	01 x 60 months	320,000	19,200,000

Sl No.	Component	Item	Unit	Quantity	Rate (BDT)	Amount (BDT)
22	**Personnel cost:** Junior Environmental Specialist	Support Environmental Specialist	number	01 x 60 months	100,000	6,000,000
Sub-total for capacity strengthening						**25,950,000**
GRAND TOTAL						**28,770,000**

VIII. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Consultation and Information Disclosure

224. Meaningful stakeholder consultation and participation is part of the project preparation and implementation strategy. Consultation and participation will ensure information is provided and feedback is obtained and considered on the implementation of Sub-projects. Affected persons will be consulted at various stages of Sub-project preparation to ensure: (i) incorporation of views/concerns of affected persons, particularly the vulnerable, on environmental impacts and mitigation measures; (ii) identification of any help required by affected persons (if any) during rehabilitation; and (iv) avoidance of potential conflicts for smooth project implementation.

225. It will also provide adequate opportunities for consultation/participation of all stakeholders and inclusion of the vulnerable in Sub-project process. Relevant information on any major changes to the Project or Sub-project scope will be shared with beneficiaries, affected persons, vulnerable groups, and other stakeholders.

226. At minimum, stakeholders will be consulted regarding the scope of an impact assessment before work is commenced and they will be informed of the likely impacts of the Sub-project and proposed mitigation once the draft IEE and EMP documents are prepared. The safeguards documents will record views of stakeholders and indicate how these have been taken into account in project development. Consultations will be held with a special focus on vulnerable groups.

227. The key stakeholders to be consulted during IEE preparation may include:

(i) Beneficiaries;
(ii) Elected representatives, community leaders, religious 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;
(v) Residents, shopkeepers, business-persons, and farmers who live and work alongside transport and education/district infrastructure which will be rehabilitated;
(vi) Executing agency, implementing agency, PMO/SPMO, staff and consultants; and
(vii) ADB and Government.

228. Information is disclosed through public consultation and making available relevant documents in public locations. The following documents will be submitted to ADB for disclosure on its website:

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

229. The PMO will send a written endorsement to ADB for disclosing these documents on the ADB website. The environmental safeguards persons at workplace and relevant authorities will provide relevant safeguards 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. Disclosure will follow ADB's Access to Information Policy, 2018.[15] To meet disclosure requirements of ADB, a one-page project brief (both in Bangla and English) will be posted on the website of BWDB and print-outs will be made available in the site offices of the SPMO to interested individuals. The project brief will include the details of the GRM and the contact details of the designated focal person.

B. Grievance Redress Mechanism

230. The objective of the grievance redress mechanism (GRM) is to resolve complaints as quickly as possible and at the local level through a process of conciliation; and, if that is not possible, to provide clear and transparent procedures for appeal. A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information campaign. The grievance redress process includes three levels:

231. **First level of GRM:** The first level and most accessible and immediate contact for the fastest resolve of grievances are the contractors, with assistance from ISPMC on site. Prior to construction of any works, the SMO will ensure local community meetings are held to notify residents and businesses of any temporary disturbances, and to inform them of the project and the GRM. If any complaints arise, the contractors, with assistance from ISPMC, can immediately resolve the complaint on site. The contractor's and ISPMC's office phone number will be posted in public areas within the Sub-project areas and construction sites. Any person with a grievance related to the project work can contact the project to file a complaint. The contractor may seek the assistance of the ISPMC safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The ISPMC safeguards (environment and resettlement) focal person will immediately address and resolve the issue with the contractor within 1–2 days, if the complaint remains unresolved at the field level. The SMO's safeguards focal person (s) will fully document the following information: (i) name of the person; (ii) the date on which the complaint was received; (iii) nature of complaint; (iv) location; and (v) how the complaint was resolved. The complainant will also have the option to file an anonymous complaint.

232. **Second level of GRM:** Should the grievance remain unresolved, the contractor with assistance from ISPMC will forward the complaint to the PMO safeguards focal person. The person filing the grievance will be notified by ISPMC safeguards focal person that the grievance was forwarded to the PMO safeguards focal person. The PMO will address the grievance. Grievances will be resolved through continuous interactions with affected persons, and the PMO will answer queries and resolve grievances regarding various issues including environmental or social impacts. Corrective measures will be undertaken at the field level by the PMO safeguards focal person within 7 days. He/she will fully document the following information: (i) name of the person; (ii) date the complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

233. **Third level of GRM:** Should the grievance remain unresolved, the PIU's focal person will activate the third level of the GRM by referring the issue (with written documentation) to a Grievance Redress Committee (GRC), which will, based on review of the grievances, address them in consultation with the PIU, contractor, ISPMC, and affected persons. The GRC will consist of project director, chairperson, executing agency/Implementing agency representative, camp-in-charge, and other relevant stakeholders. A meeting will be called with the GRC, if necessary,

[15] ADB. 2018. Access to Information Policy. Manila.

where the affected person can present his/her concern and issues. The process will promote conflict resolution through mediation. The GRC will meet as necessary when there are grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the GRC are as follows: (i) to provide support to affected persons on problems arising from environmental or social disruption, asset acquisition (where required), and eligibility for entitlements, compensation, and assistance; (ii) to record grievances of affected persons, categorize and prioritize them, and provide solutions within 15 days; and (iii) to report to the aggrieved parties' developments regarding their grievances and decisions of the GRC. The executing agency/Implementing agency safeguards focal person will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and the decisions carried out.

234. Safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second, and third levels), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as affected person, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e. open, closed, pending). All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the executing agency/Implementing agency.

235. **ADB's Accountability Mechanism.** Where an affected person is not satisfied with the outcomes of the 3 levels of the Project GRM, the affected person should make good faith efforts to resolve issues working with the South Asia Regional Department through ADB's Bangladesh Resident Mission. As a last resort, the affected person can access ADB's Accountability Mechanism (ADB's Office of Special Project Facility or Office of Compliance Review). ADB's Accountability Mechanism, including information on how to file a complaint, will also be explained to affected households.

236. **Court of Law.** 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.

237. The grievance redress mechanism and procedure are depicted in Figure V-1.

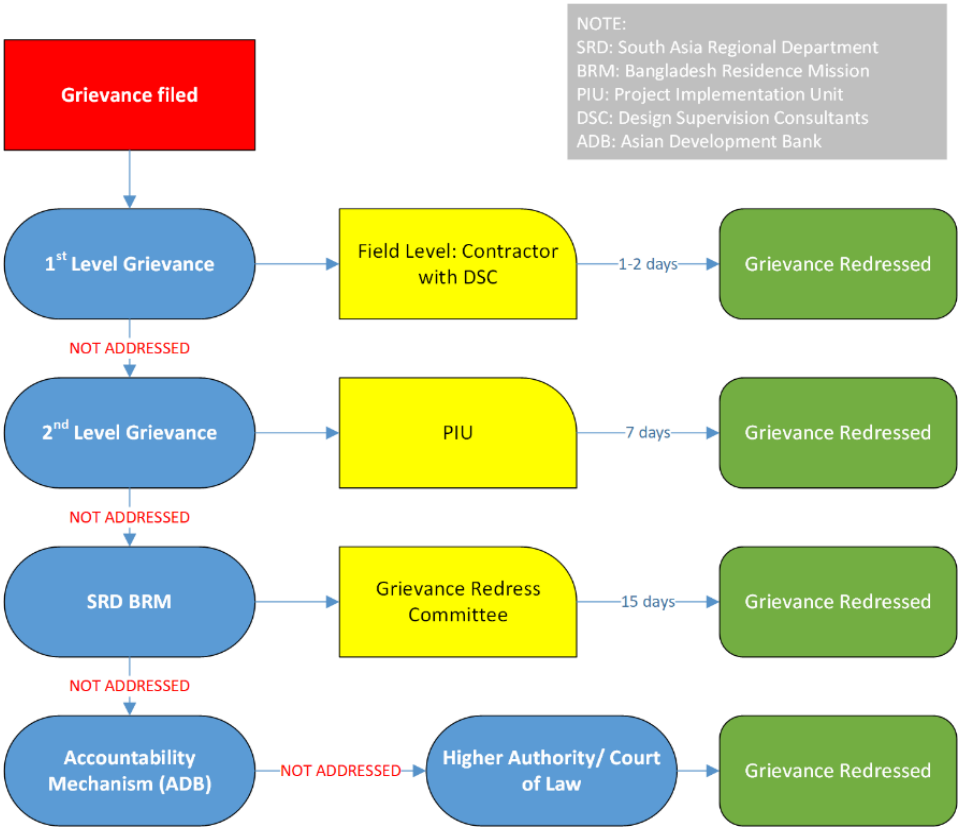

Figure V-1: Grievance Redress Mechanism (GRM) adopted for CRISP-WRM

IX. CONCLUSION AND RECOMMENDATION

238. This report assessed various existing environmental parameters in and around the the project selected training and, although adverse impacts to be generated during the project preparatory stage will be minor and insignificant, outlined the actions planned to minimize any significant negative impact. None of the proposed the project training sites is located in a sensitive ecosystem and is not significant from the historical and cultural perspective. the project will not cause any significant adverse environmental and social impacts during repair or renovation phase. Rather, the positive impacts due to the project operations will more than outweigh the insignificant negative impacts.

239. The limited and minor negative impacts due to the project are, over an insignificantly very short period, mainly associated with water logging, dust and noise pollution, occupational health hazards, risk from poor sanitation system, and management of labor at the sites. Moreover, most of the associated impacts are expected to be limited to the building repair/renovation phase and, will therefore, be absolutely temporary in nature. Adequate mitigation actions will be undertaken in line with management and monitoring of the set of recommended mitigation measures. Regular monitoring of the recommended mitigation measures shall also be carried out during the implementation phase of the project.

Appendix 1: ADB Prohibited Investment Activities List

The following do not qualify for Asian Development Bank financing:

(i) production or activities involving harmful or exploitative forms of forced labor[16] or child labor[17];
(ii) production of or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements or subject to international phaseouts or bans, such as (a) pharmaceuticals[18], pesticides, and herbicides[19], (b) ozone-depleting substances[20], (c) polychlorinated biphenyls6 and other hazardous chemicals[21], (d) wildlife or wildlife products regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora[22], and (e) transboundary trade in waste or waste products[23];
(iii) production of or trade in weapons and munitions, including paramilitary materials;
(iv) production of or trade in alcoholic beverages, excluding beer and wine[24];
(v) production of or trade in tobacco[25];
(vi) gambling, casinos, and equivalent enterprises[26];
(vii) production of or trade in radioactive materials, including nuclear reactors and components thereof;
(viii) production of, trade in, or use of unbonded asbestos fibers[27];
(ix) commercial logging operations or the purchase of logging equipment for use in primary tropical moist forests or old-growth forests; and
(x) marine and coastal fishing practices, such as large-scale pelagic drift net fishing and fine mesh net fishing, harmful to vulnerable and protected species in large numbers and damaging to marine biodiversity and habitats.

[16] Forced labor means all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty.
[17] Child labor means the employment of children whose age is below the host country's statutory minimum age of employment or employment of children in contravention of International Labor Organization Convention No. 138 "Minimum Age Convention" (www.ilo.org).
[18] A list of pharmaceutical products subject to phaseouts or bans is available at http://www.who.int
[19] A list of pesticides and herbicides subject to phaseouts or bans is available at http://www.pic.int
[20] A list of the chemical compounds that react with and deplete stratospheric ozone resulting in the widely publicized ozone holes is listed in the Montreal Protocol, together with target reduction and phaseout dates. Information is available at http://www.unep.org/ozone/montreal.shtml
[21] A group of highly toxic chemicals, polychlorinated biphenyls are likely to be found in oil-filled electrical transformers, capacitors, and switchgear dating from 1950 to 1985.
[22] A list of hazardous chemicals is available at http://www.pic.int
[23] A list is available at http://www.cites.org
[24] As defined by the Basel Convention; see http://www.basel.int
[25] This does not apply to project sponsors who are not substantially involved in these activities. Not substantially involved means that the activity concerned is ancillary to a project sponsor's primary operations.
[26] This does not apply to the purchase of medical equipment, quality control (measurement) equipment, and any equipment for which ADB considers the radioactive source to be trivial and adequately shielded.
[27] This does not apply to the purchase and use of bonded asbestos cement sheeting where the asbestos content is less than 20%.

Appendix 2: REA Checklist Rapid Environmental Assessment (REA) Checklist

Country/Project Title:

Sector Division:

Screening Questions	Yes	No	Remarks
A. Project Siting Is the Project area adjacent to or within any of the following environmentally sensitive areas?			
▪ Cultural heritage site			
▪ Legally protected Area (core zone or buffer zone)			
▪ Wetland			
▪ Mangrove			
▪ Estuarine			
▪ Special area for protecting biodiversity			
B. Potential Environmental Impacts Will the Project cause…			
▪ impairment of historical/cultural areas; disfiguration of landscape or potential loss/damage to physical cultural resources?			
▪ disturbance to precious ecology (e.g. sensitive or protected areas)?			
▪ alteration of surface water hydrology of waterways resulting in increased sediment in streams affected by increased soil erosion at construction site?			
▪ deterioration of surface water quality due to silt runoff and sanitary wastes from worker-based camps and chemicals used in construction?			
▪ increased air pollution due to project construction and operation?			
▪ noise and vibration due to project construction or operation?			
▪ involuntary resettlement of people? (physical displacement and/or economic displacement)			
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?			

Screening Questions	Yes	No	Remarks
▪ poor sanitation and solid waste disposal in construction camps and work sites, and possible transmission of communicable diseases (such as STIs and HIV/AIDS) from workers to local populations?			
▪ creation of temporary breeding habitats for diseases such as those transmitted by mosquitoes and rodents?			
▪ social conflicts if workers from other regions or countries are hired?			
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?			
▪ risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?			
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?			
▪ community safety risks due to both accidental and natural causes, especially where the structural elements or components of the project are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?			
▪ generation of solid waste and/or hazardous waste?			
▪ use of chemicals?			
▪ generation of wastewater during construction or operation?			

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: BAN: Climate Resilient Integrated Southwest Project – Water Resources Management

Sector:

Subsector:

Division/Department:

Screening Questions		Score	Remarks[28]
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?		
	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.)?		
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)?		
	Would weather, current, and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?		
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?		

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): Score 2 (medium Risk project)

Other Comments: _____
_____

Prepared by:

[28] 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 3: Outline of an Initial Environmental Examination (IEE) Report

This outline is part of the Safeguard Requirements. The substantive aspects of this outline will guide the preparation of an environmental assessment[29], although not necessarily in the order shown.

A. Executive Summary

This section describes concisely the critical facts, significant findings, and recommended actions.

B. Policy, Legal, and Administrative Framework

This section 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.

C. Description of the Project

This section 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 (for example, access roads, power plants, water supply, quarries and borrow pits, and spoil disposal). It normally includes drawings and maps showing the project's layout and components, the project site, and the project's area of influence.

D. Description of the Environment (Baseline Data)

This section 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.

E. Anticipated Environmental Impacts and Mitigation Measures

This section 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.

[29] An environmental assessment report is required for all environment category A and B projects. Its level of detail and comprehensiveness is commensurate with the significance of potential environmental impacts and risks. A typical environment impact assessment (EIA) report contains the following major elements, and an initial environment examination (IEE) may have a narrower scope depending on the nature of the project.

F. Analysis of Alternatives

This section examines alternatives to the proposed project site, technology, design, and operation—including the no project alternative—in terms of their potential environmental suitability under local conditions; and their institutional, training, and monitoring requirements. It also states the basis for selecting the particular project design proposed and, justifies recommended emission levels and approaches to pollution prevention and abatement.

G. Information Disclosure, Consultation, and Participation

This section:

(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.

H. Grievance Redress Mechanism

This section describes the grievance redress framework (both informal and formal channels), setting out the time frame and mechanisms for resolving complaints about environmental performance.

I. Environmental Management Plan

This section 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. It includes the following key components (with the level of detail commensurate with the project's impacts and risks):

(i) Mitigation:

a) identifies and summarizes anticipated significant adverse environmental impacts and risks;
b) describes each mitigation measure with technical details, including the type of impact to which it relates and the conditions under which it is required (for instance, continuously or in the event of contingencies), together with designs, equipment descriptions, and operating procedures, as appropriate; and
c) provides links to any other mitigation plans (for example, for involuntary resettlement, indigenous peoples, or emergency response) required for the project.

(ii) Monitoring:

a) describes monitoring measures with technical details, including parameters to be measured, methods to be used, sampling locations frequency of measurements,

detection limits and definition of thresholds that will signal the need for corrective actions; and

b) describes monitoring and reporting procedures to ensure early detection of conditions that necessitate particular mitigation measures and document the progress and results of mitigation.

(iii) Implementation arrangements:

a) specifies the implementation schedule showing phasing and coordination with overall project implementation;
b) describes institutional or organizational arrangements, namely, who is responsible for carrying out the mitigation and monitoring measures, which may include one or more of the following additional topics to strengthen environmental management capability: technical assistance programs, training programs, procurement of equipment and supplies related to environmental management and monitoring, and organizational changes; and
c) estimates capital and recurrent costs and describes sources of funds for implementing the environmental management plan.

(iv) Performance indicators: describes the desired outcomes as measurable events to the extent possible, such as performance indicators, targets, or acceptance criteria that can be tracked over defined time periods.

J. Conclusion and Recommendation

This section provides the conclusions drawn from the assessment and provides recommendations.

Appendix 4: Environmental Code of Practice (ECoP)

The Environmental Code of Practice (ECoP) will provide guidelines for environmental management of the project. The ECoP provides operating practices and environmental management measures to be followed by the contractor for sustainable management of all project related environmental issues and potential impacts. It promotes awareness and use of best practices in environmental management. The recommended ECoP developed for the project are:

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
ECoP 1: Waste Management		
General Waste	Soil, water and air pollution from the improper management of wastes and excess materials from the construction sites.	The Contractor should: • Ensure proper collection and disposal of solid wastes within the construction camps • Insist waste separation by source means organic wastes in one bin/pot and inorganic wastes in another bin/pot at household level. • Store inorganic wastes in one chamber and inorganic waste in other chamber of the covered three chambered small concrete pit in the suitable location of the construction camp. When fill the chamber, inorganic wastes can be sold to the vender and organic wastes can be covered with earth for converting fertilizer. The local farmers can use fertilizer for their agricultural lands free of cost. • Do not burn/throw in to the waterbodies any general wastes.
Construction Wastes	Construction waste and environmental impacts due to improper waste management practices	The Contractor shall: • Collect construction wastes (such as piece of rod, wood, bamboo, tin sheet, brick etc.) separately from the sources and store in a designated area in the construction camp for re use and avoiding potential environmental pollution. • Collect and store all hazardous wastes appropriately in container/bunded area and make available Material Safety Data Sheets (MSDS) for hazardous materials on-site during construction. Do not dispose hazardous liquid waste on soils. • Do not burn/throw in to the waterbodies any construction wastes.
ECoP 2: Surface/Ground/Drinking Water Management		
Drinking/Ground Water	Ground/Drinking water at shallow depths is contaminated with arsenic and other parameters and hence not suitable for drinking purposes. Pollution of ground/drinking water resources.	The Contractor Shall: • Select aquifers for drinking water free from arsenic and other contaminants. • Tube wells will be installed with due regard for the surface environment, protection of groundwater from surface contaminants, and protection of aquifer cross contamination. • According to BNBC, toilets should be min. 10m distance from the tube wells.
Discharge from construction sites	During construction both surface and ground water quality may be deteriorated due to construction	The Contractor shall:

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	activities, disposal of wastes into the nearby waterbodies (if any), connection of toilets with the water bodies and accidental spillage of liquid waste.	• Install temporary drainage works (drains) in areas required for around storage areas for construction materials. • Divert runoff from undisturbed areas around the construction site. • Stockpile materials away from drainage lines. • Prevent disposal of all solid and liquid wastes into the nearby waterbodies and on the areas other than designated waste dumping sites.
ECoP 3: Drainage Management		
Excavation and earth works, and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	The Contractor shall: • Prepare a program for prevent/avoid standing waters, which BTEB will verify in advance and confirm during implementation. • Rehabilitate internal road side drains immediately if damaged by any construction activities. • Construct wide drains instead of deep drains to avoid earth deposition in the drains that require frequent cleaning. • Protect natural slopes of drainage channels to ensure adequate storm water drains. • Regularly inspect and maintain all drains to assess and alleviate any drainage congestion problem.
Ponding of water	Health hazards due to mosquito breeding	• Do not allow ponding of water especially in the drains and in the construction camps. • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.
ECoP 4: Topsoil Management		
Land clearing and earth works	Loss of topsoil from excavation activities	The Contractor shall: • Strip the top soil to a depth of min 0.50m and stock piles of height not exceeding 2m. • Remove unwanted materials from top soil like grass, roots of trees and similar others. • Locate topsoil stockpiles in areas outside drainage lines and protect from erosion. • Construct silt fences around the topsoil stockpiles to prevent loss of topsoil. • Spread the topsoil to maintain the physico-chemical and biological activity of the soil. The stored top soil will be utilized for covering all disturbed area and along the proposed plantation sites. • Prior to the re-spreading of topsoil over the Sub-project filling areas, the ground surface will be ripped to assist the bonding of the soil layers, water penetration and re-vegetation.
ECoP 5: Dust/Air Quality Management		
Construction vehicles	Air quality can be affected by dust, generated due to movement of vehicles and combustion of fuels.	The Contractor shall: • Fit vehicles with appropriate exhaust systems and emission control devices. • Operate the vehicles in a fuel-efficient manner. • Cover haul vehicles carrying dusty materials moving outside the construction site.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Impose speed limits on all vehicle movement at the worksite to reduce dust emissions. • Control the movement of construction traffic. • Service all vehicles regularly to minimize emissions. • Watering filling sandy earth surface and cover asap by top soils.
Construction equipment	Air quality can be affected by emissions from equipment and combustion of fuels.	The Contractor shall: • Fit machinery with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition in accordance with the specifications defined by their manufacturers to maximize combustion efficiency and minimize the contaminant emissions. Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors. • Machinery causing excess pollution (e.g. visible smoke) will be banned immediately from construction sites. • Service all equipment regularly to minimize emissions.
Construction activities	Dust generation from construction sites, material stockpiles specially dredged material stockpiles and access roads is a nuisance in the environment and can be a health hazard.	• Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust. Increase the watering frequency during periods of high risk (e.g. Dry period and high winds). Stored materials such as sand shall be covered by vegetation/grass-turfing. • Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations.
ECoP 6: Noise Management		
Construction vehicles	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall: • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures. • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, use of cell phone during driving etc. • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site.
Construction equipment	Noise may have an impact on workers, local residents, wildlife, livestock etc.	The Contractor shall: • Appropriately site all noise generating activities to avoid noise pollution to local residents. • Use the quietest available plant and equipment. • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures. Equipment suppliers and contractors shall present proof of maintenance register of their equipment. • Install temporary noise barriers by screen, tin, wood around generators to reduce noise levels.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Avoid the unnecessary use of alarms, horns and sirens. • Use ear plugs in noisy areas of the construction activities.
Construction activities	Noise and vibration may have an impact on workers, local residents, wildlife, livestock	The Contractor shall: • Train the operators of construction equipment on potential noise problems. • Employ best available work practices on-site to minimize occupational noise levels. • Install temporary noise control barriers by tin sheets, screen etc. where appropriate. • Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.
ECoP 7: Topography		
Earthworks	Change in topography and local landscape and disturbance to the natural rainwater/flood water drainage	The Contractor shall: • Ensure the topography of the final surface of the all raised Sub-project land areas are conducive to enhance natural draining of rainwater/flood water. • Keep the finished surface of all the raised lands free from any kind of depression that insists water logging. • Undertake mitigation measures for prevention by grass-turfing and tree plantation, where there is a possibility of rain-cut that will change the shape of topography. • Cover immediately the uncovered open surface that has no use of construction activities with grass—cover and tree plantation to prevent soil erosion and bring improved landscaping.
ECoP 8: Protection of Flora		
Vegetation clearance	Increase in deforestation caused by land clearing for the construction of new Sub-projects	The Contractor shall: • Reduce disturbance to vegetation. • Use appropriate and minimum size of machine to avoid disturbance to adjacent vegetation's. • Clear only the vegetation that needs to be cleared in accordance with the plans. These measures are applicable to both the construction areas as well as to any associated activities such as sites for stockpiles, disposal of fill etc. • Do not burn off cleared vegetation — where feasible, chip or mulch and reuse it for the rehabilitation of affected areas, temporary access tracks or landscaping. • Return topsoil and mulched vegetation (in areas of native vegetation) to approximately the same area of the roadside it came from. • Ensure excavation works occur progressively and re—vegetation done at the earliest. • Provide adequate knowledge to the workers regarding nature protection and the need of avoid felling trees during construction.
ECoP 9: Construction Camp Management		

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Siting and Location of construction camps	Campsites for construction workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	The Contractor shall: • Locate the construction camp at areas which are acceptable from environmental, cultural or social point of view. • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities. • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction Camp Facilities	Lack of proper infrastructure facilities such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	Contractor shall provide the following facilities in the camp sites: • Adequate accommodation for all workers. • Safe and reliable water supply. Water supply from tube wells that meets the national standards. • Hygienic sanitary facilities for all labors. According to BNBC, the minimum number of toilet facilities required is one toilet for every ten persons.
Disposal of wastes	Management of wastes is crucial to minimize impacts on the environment	The Contractor should: • Ensure proper collection and disposal of solid wastes within the construction camps • Insist waste separation by source; organic wastes in one bin/pot and inorganic wastes in another bin/pot at household level. • Store inorganic wastes in one chamber and inorganic waste in other chamber of the covered three chambered small concrete pit in the suitable location of the construction camp. When fill the chamber, inorganic wastes can be sold to the vender and organic wastes can be covered with earth for converting fertilizer. The local can use fertilizer for their agricultural lands free of cost.
Health and safety	There will be a potential for diseases to be transmitted including measles, diphtheria, exacerbated by inadequate health and safety practices.	The Contractor shall: • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint designated first aider or nurse. • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies. Regular mosquito repellant sprays during monsoon. • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers.
ECoP 10: Sensitive/Cultural Issues		
Construction activities near sensitive/cultural sites (such as mosque,	Disturbance from construction works to the sensitive/cultural sites, and contractors lack of knowledge on cultural issues cause social disturbances.	The Contractor shall: • Communicate to the public through community consultation and announcement regarding the scope and schedule of construction, as well as certain construction activities causing disruptions.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
mandir, pagoda, madrasha, permanent water body, eidgah, garden etc.)		• Do not block access to sensitive/cultural sites, wherever possible. • Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious institute close to the construction sites and users make objections. • Take special care when working next to a sensitive/cultural institution. • Show appropriate behavior with all construction workers especially women and elderly people. • Resolve cultural issues in consultation with local leaders and BTEB • Establish a mechanism that allows local people to raise grievances arising from the construction process.
ECoP 11: Occupational Health and Safety		
Best practices	Construction works may pose health and safety risks to the construction workers to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, vector transmitted diseases etc.), (ii) risk factors resulting from human behavior and (iii) road accidents from construction traffic.	The Contractor shall: • Implement suitable safety standards for all workers and site visitors which should not be less than those laid down on the international standards (e.g. International Labor Office guideline on 'Safety and Health in Construction; World Bank Group's 'Environmental Health and Safety Guideline's) and contractor's own national standards or statutory regulations, in addition to complying with the national standards of the GOB (e.g. `The Bangladesh Labor Code, 2006'). • Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas. • Provide personal protection equipment (PPE) for workers, such as safety shoes, safety helmets, face masks, hand gloves, protective clothing, goggles, full—face eye shields, and ear plugs. Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones. • Safety procedures include provision of information, training on use of hazardous materials etc. • Appoint a health and safety manager from BTEB to look after the health and safety of the workers. • Inform the local authorities responsible for health, religious and security duly informed before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters.
	Child and pregnant women	The Contractor shall: • Not hire children of less than 14 years old and pregnant women in accordance with the Bangladesh Labour Code, 2006.
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	• Provide health care facilities and first aid facilities are readily available. • Document and report occupational accidents, diseases, and incidents.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. • Provide awareness to the construction drivers to strictly follow the driving rules. • Provide adequate lighting in the construction areas.
Construction Camps	Lack of proper infrastructure facilities, such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards.	The Contractor shall provide the following facilities in the campsites to improve health and hygienic conditions as mentioned in ECoP-9: Construction Camp Management. • Adequate ventilation facilities. • Safe and reliable water supply. Water supply from tube wells that meets the national standards. • Hygienic sanitary facilities and sewerage system. • Storm water drainage facilities. • Safe storage facilities for chemicals. • Solid waste collection and disposal system in accordance with ECOP1. • Arrangement for trainings. • Security fence at least 2 m height. • Sick bay and first aid facilities.
Water and sanitation facilities at the construction sites	Lack of water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene.	The contractor will follow ECOP-2 and 9.
Trainings	Lack of awareness and basic knowledge in health care among the construction workforce, make them susceptible to potential diseases.	The Contractor shall: • Train all construction workers in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of sexually transmitted infections (STI)). • Train all construction workers in general health and safety matters, and on the specific hazards of their work. Training should consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate.

Appendix 5: Environmental Monitoring Report Outline

The borrower/client is required to prepare semi-annual environmental monitoring reports that describe progress with implementation of the project EMP and compliance issues and corrective actions. A sample outline which can be adapted as necessary is provided below. Not all sections will be relevant in all cases.

Executive Summary

1. Introduction
   1.1. Background: project context setting, very brief
   1.2. The project: description of the project with outputs and outcomes, very brief
2. ADB and GoB categorization: Sub-project/component wise categorization as identified in IEE
3. Purpose of the environmental safeguards
4. Status of Ongoing Contract Packages
5. Environmental Status
   5.1. Status of environmental safeguards documents

Type of safeguards document	Agency	Package	Latest version	Coverage
Semi Annual Environmental Monitoring Report				
Infectious diseases exposure Prevention, Preparedness & Response Plan				
Site specific Environmental Management Plan (SEMP)				
Monthly environmental inspection report				
Complain and sick register report				
OHS Plan				
Monthly HSE meeting reports				
Overall monitoring checklist				
Environment test report				

   5.2. Environmental safeguards monitoring: description and explanation of the results of environmental monitoring at sites
   5.3. Construction period environmental quality monitoring: present test results and explain each parameter
6. Training, awareness and workshop: explain and report number of different level trainings/workshops arranged to aware the PMO staff and contractors and workers
7. Environmental issues of the current project: find out the major environmental issue prevailing at the site which should be attended and minimized
8. Performance of EMP implementation

Environmental issue	Mitigation measures suggested in EMP	Observation during monitoring period (with evidence/photos)	Recommendation/ comments
Topsoil			
Vegetation clearing			
Fauna			
Construction waste			
Drainage construction and flooding			
Noise			
Air quality and dust			

Environmental issue	Mitigation measures suggested in EMP	Observation during monitoring period (with evidence/photos)	Recommendation/ comments
Soil			
Traffic congestion			
Community Health and Safety (H&S)			
Occupational Health and Safety			

9. Grievance Redress Mechanism: report status of GRC, members and number of grievance filed and how they were dealt with.
10. Compliance with environmental related project covenants

10.1. National Covenant

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution	Compliance status

10.2. ADB Safeguards Policy Statement (2009) compliance status

	Contract Package Status				
	Package 1	Package 2	Package 3	Package 4	Package 5
(i) Environmental Assessment (Category B: Requires IEE) done and disclosed	Complied	Complied	Complied	Complied	Complied
	explanation sample: IEE done for all packages, available at: website				
(ii) Environmental Management Plan drafted					
(iii) Information disclosed					
(iv) Consultation and participation have been done and public opinion has been used in project design phase.					
(v) Establishment of GRC and notes of grievances					
(vi) Monitoring and reporting: client will document regular monitoring results, in case of adverse significant affects external NGO will be involved as third party monitoring					
(vii) Unanticipated environmental impacts					
(viii) **Biodiversity Conservation and Sustainable Natural Resource Management:** The borrower/client will assess the significance of project impacts and risks on biodiversity and natural					

	Contract Package Status				
	Package 1	**Package 2**	**Package 3**	**Package 4**	**Package 5**
resources as an integral part of the environmental assessment process					
(ix) **Pollution presentation:** 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.					
(x) **Health and safety:** The borrower/client will provide workers with a safe and healthy working environment, taking into account risks inherent to the particular sector and specific classes of hazards in the borrower's/client's work areas, including physical, chemical, biological, and radiological hazards.					
(xi) **Physical and cultural resources:** The borrower/client is responsible for siting and designing the project to avoid significant damage to physical cultural resources					

10.3. Compliance with loan Covenants

From the loan agreement prepare the following table:

Covenant	**Reference in the Grant Agreement**	**Compliance Status**
Environment		
	Schedule xx, Para. xx	Complied/non complied/partially complied Sample wording: All requirements addressed in preparation and design stages including contract documentation.

Safeguards – Related Provisions in Bidding Documents and Works Contracts		
Safeguards Monitoring and Reporting		

11. Performance Indicators

11.1. Overall performances

No.	Aspects of Environmental issues	Compliance Status			Remarks
		FC	PC	NC	
A.	**General**				
1.	Legal working hours approval				
2.	Employment Record keeping arrangement				
3.	Payment Record keeping arrangement				
4.	Environment, Health and Safety Officer designated				
5.	Provision for monthly meeting for inspection of site activities				
B.	**Health and Sanitation**				
Occupational Health					
1.	First-Aid Box availability at work sites				
2.	Provision of personal protection equipment's (PPEs)				
3.	Handling of cement and other hazardous materials by workers				
4.	Workers' complains taken care of by the supervisor				
5.	Children below 18 employment				
C.	**Environmental Pollution**				
Dust and emission control					
1.	Construction vehicles and machineries maintained properly to reduce emissions				
2.	Proper storage of materials and regular watering.				
Noise Pollution					
1.	Movement of vehicles at desired hours				
2.	Noise control measures at sites				
Water Pollution					
1.	Land filling				
2.	Wastes, cement, effluents and junks not disposed in water				
Flora and Fauna					
1.	Trees and bushes outside the construction area preserved from damages				
2.	Disturbance to terrestrial fauna minimized				
Waste Management					
1.	Construction wastes are removed off site regularly				
2.	Chemical wastes, if any, collected and disposed of properly				
D.	**Environmental documents at Field Office and Project sites**				
1.	Field Office possesses copies of EMP, contract document and Technical Specifications				
2.	Heavy equipment maintenance records				
TOTAL					

11.2. Health and Safety performance

Environmental Safeguards Questions	Package 1	Package 2	Package 3	Package 4	Package 5
1. Sensitive receptors adjacent to the site? (i.e. residential, schools/learning center, health care center, daycare...)					
2. Are the workers aware of the EMP?					
3. Occupational Health and Safety: 3.1 Is there a designated person responsible for ensuring safe working practices? Are the workers aware?					
3.2 Have the workers received appropriate OHS training to perform their jobs? How often are they briefed on OHS requirements? *					
3.3 Do the workers use personal protective equipment (PPE - hats, glasses, boots etc.)? **					
3.4 Are working areas clear of slipping and tripping hazards?					
3.5 Are health and safety warning and information signs visible and understandable to workers?					
3.6 Are there any hazardous materials? Are they stored and handled appropriately?					
3.7 Are workers exposed to risks from working at height? If yes, are the workers using harnesses (fall protection equipment)?					
3.8 Are workers exposed to risk from confined spaces? (i.e. storage areas for hazardous materials)					
3.9 Is there a record of occupational injuries and diseases?					
3.10 Do workers receive health checks?					
3.11 What medical facilities are made available for the workers?					
Labor Camps: 3.12 What toilet and washing facilities are provided?					
3.13 Do workers have access to clean drinking water?					
3.14 Is the workers accommodation provided by the contractor?					
Emergency Procedures: 3.15 Are any procedures in place in case of an injury on site?					
3.16 Is there a first aid kit available on site?					
3.17 Are any procedures in place for chlorine leak, oil spills?					
3.18 Is firefighting equipment available on site? Is servicing up to date?					
4. Grievance Redress Mechanism {GRM): 4.1 Are the names and contact information posted for possible complaints?					
4.2 Is there a log book available on site?					
5. House Keeping: 5.1 Did you observe examples of poor housekeeping? (i.e. empty containers scattered, stagnation of water from improper disposal of solid waste?)					

12. Concluding Observations and Corrective Action plan (CAP): Summary of observation and time bound CAP

Appendix 6: Outline of Environmental Screening Format

Issues	Answer			Is YES, it will trigger ADB SPS 2009	If yes, relevant documents shall be provided
	Yes	No	Remarks		
Will the Sub-project cause significant negative environmental impact? Are these impacts sensitive, diverse or unprecedented? Please provide a brief description in the remarks section:					
Is the impact beyond the project area? Is the impact of project implementation beyond the scope of planning? Are these major negative environmental impacts irreversible? Please provide a brief description in the remarks section:					
Will the project endanger material and cultural resources (cultural relics protection units above the county level)? Please provide a brief description in the remarks section:					
Will the project endanger cultural resources that are meaningful to the local community or town (such as the temple of the god of earth in the village)? Please provide a brief description					
Does the project involve changes or degradation of non-critical natural habitats? Please provide a brief description:					
Does the project involve significant changes or degradation of critical natural habitats?					
Does the project make the quality of surrounding surface water worse?					
Does the Sub-project involve involuntary land acquisition, property loss or loss of sources of income and livelihood? Please provide a brief description.					