Initial Environmental Examination

Project No. 49329-006
September 2021

Bangladesh: Second City Region Development Project

Drainage Improvement in Chalna Pourashava

Package No. CRDP-II/LGED/CHALNA/NCB/2021/W-01

Prepared by Local Government Engineering Department (LGED), Government of Bangladesh for the Asian Development Bank.

ABBREVIATION

ADB	-	Asian Development Bank
BDT	-	Bangladesh Taka
BOQ	-	Bill of Quantities
CRDP	-	City Region Development Project
DOE	-	Department of Environment
EARF	-	Environmental Assessment and Review Framework
ECR	-	Environmental Conservation Rules
EIA	-	environmental impact assessment
EMP	-	environmental management plan
GRC	-	Grievance Redress Committee
GRM	-	grievance redress mechanism
IEE	-	initial environmental examination
LGED	-	Local Government Engineering Department
PDSC	-	Preparation, Design and Supervision Consultant
NGO	-	Nongovernment organization
NOC	-	No objection certificate
O&M	-	Operations and maintenance
PIU	-	Project Implementation Unit
PMCU	-	Project Management and Coordination Unit
REA	-	Rapid Environmental Assessment
ROW	-	Right of Way
SPS	-	Safeguard Policy Statement

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Executive Summary

The Second City Region Development Project (Second CRDP) was envisaged from the achievements of the first City Region Development Project (CRDP). Similar to CRDP, Second CRDP aims to promote inclusive and environmentally sustainable economic growth in Dhaka and Khulna city regions and will be implemented over a four-year period. Second CRDP will support improving the (i) transportation and/or road network within Dhaka region; (ii) solid waste management of Khulna City; and (iii) coordination mechanisms of various agencies involved in delivering climate- and disaster-resilient, inclusive, and environmentally sensitive infrastructure and basic services in these two city regions.

Subproject Scope. This initial environmental examination (IEE) report has been prepared for one of the subprojects of Second CRDP that is covered by Package Number CRDP-II/LGED/CHALNA POURASHAVA/NCB/2021/W-01 This package includes combination of construction and rehabilitation of roadway and/or drain for the following road alignments or components in the Chalna Pourashava in Dhaka region: (i) Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m); (ii) Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m); (iii) Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m); (iv) Re-excavation of P Pond including slope protection, walkway and landscaping; (v) Re-excavation of Family Planning Pond including slope protection, walkway and landscaping; (vi) Rehabilitation of sluice gate over Chalna Khal near Bowmer Gachtola; (vii) Construction of 14m bridge on Chalna Khal infornt of Govt. Primary School; (viii) Construction of 24m bridge at Ch. 675m on Chalna Khal; (ix) Construction of 10m bridge at Ch. 300m on Achava Khal; (x) Construction of 11m bridge at Ch. 600m on Achava Khal; (xi) Construction of 14m bridge at Ch. 450m on Boro Kholisha Khal; (xii) Construction of 12m bridge at Ch. 575m on Gour Khati Khal; and (xiii) Construction of 8m bridge at Ch. 560m on Choto Chalna khal.

Categorization. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB Safeguard Policy Statement (SPS), 2009. Using ADB Rapid Environmental Assessment Checklist (**Appendix 1**), the subproject is classified as Environmental Category B as per the ADB SPS, 2009 as no significant impacts are envisaged. Accordingly, this IEE has been undertaken, which assesses in more detail the likely environmental impacts of the subproject and provides an environmental management plan (EMP) specifying the required mitigation and monitoring measures to ensure that these impacts are managed to acceptable levels. This IEE also emphasizes the need to incorporate pollution prevention and control technologies during the design, construction, and operation of the subproject and adhere to internationally recognized standards such as the World Bank Group's Environment, Health and Safety Guidelines.

Environmental Management. The potential impacts and mitigation measures have been identified through review of the subproject designs, discussion with the designers, and stakeholder consultation. An environmental management plan (EMP) is included as part of this IEE, which discusses the following:

(i) Mitigation measures for environmental impacts during implementation; and
(ii) An environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting

The total length of the subproject roads is 3.815 km and of drains is 2.95 km. The subproject road alignments pass more or less through built-up areas of small and medium enterprises,

markets or bazars, open fields, sporadically scattered human settlements and various ponds, ditches and low-lying areas on both sides; and traverse along and/or cross some canals. These subproject roads are expected to establish more efficient connectivity within the Khulna region. The subproject road alignments are not within or located near any ecologically critical areas, and further development interventions to these roads will not have any significant impact on the physical, biological and social environment. This IEE has been conducted to evaluate any potential environmental impacts of the subproject and propose measures to mitigate these impacts, including monitoring.

The subproject does not involve any special considerations regarding location since the roads occupy existing right-of-ways (ROWs). There will be no road widening beyond these ROWs, and therefore no land acquisition is required. No private property will be affected and the methods to be used for site preparation, construction and commissioning, as well as associated arrangements to ensure sound environmental management and safety at all times, are to be defined by the Contractor in a Site-specific Environmental Management Plan (SEMP) based on the EMP of this IEE. Contractor will submit its SEMP for approval to the project implementation unit (PIU). These will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practice: (i) impedance of traffic, (ii) noise pollution and vibration, (iii) waste generation (iv) release of silt from excavations, (v) water pollution, (vi) air and dust pollution, (vii) community health and safety risks, and (viii) occupational health and safety.

Grievance Redress Mechanism (GRM). Second CRDP will adopt the grievance redress mechanism (GRM) outline of CRDP. The GRM shall be set up to register grievances of the people regarding technical, social and environmental aspects. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process.

Implementation Arrangement. The executing and implementing agency is the Local Government and Engineering Department (LGED) of the Government of Bangladesh. LGED will establish a Project Management and Coordination Unit (PMCU) comprising officials including an Environmental Safeguard Officer who is a permanent employee of LGED. The PMCU will be strengthened with external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. PIUs will be established at the Upazila or local level where Second CRDP subprojects are located. In this subproject, Chalna Upazila will serve as the PIU. The PMCU and Chalna PIU will have responsibility for overseeing subproject management, including overseeing EMP implementation.

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

Monitoring and Reporting. EMP compliance monitoring will be undertaken by the PMCU and PIU, with support of external experts or consultants. Contractors will submit monthly reports to PIU, while PIU submits quarterly reports to the PMCU. Consistent with reporting requirements set out in the Project Administration Manual, PMCU will prepare and submit reports to ADB on a semi-annual basis. The submission of semi-annual environmental monitoring reports to ADB will continue until ADB issues a Project Completion Report for Second CRDP.

Conclusion. The overall finding of this IEE is that the subproject will result in significant environmental benefits because the current conditions of roads will be improved and will be much better for local residents. Severe traffic congestion will be lessened and thereby reducing vehicle noise (honking of horns) and air pollution (idling vehicles) in the subproject areas. Ultimately, the subproject will result in significant economic benefit because the road network could cater to more inclusive and environmentally sustainable economic growth in the Dhaka region. The subproject will not have significant adverse environmental impacts and the potential adverse impacts identified are associated with the construction phase, which can be managed through effective implementation of the EMP. No further environmental assessment is therefore required and the classification of Category B per ADB SPS is confirmed.

This IEE has been prepared based on final designs of the subproject. The PMCU shall submit this draft IEE based on final detailed design to ADB for review and disclosure. After receiving the concurrence from ADB, this IEE shall be treated as the final IEE, and shall be attached in the bid and contract documents. No works can commence until (i) the final IEE approved by ADB is provided to the Contractor, and (ii) the SEMP prepared by the Contractor is approved by Chalna PIU. If circumstances would require, the IEE will be further updated for ADB's review during the implementation period. In the event of unanticipated impact and/or any design change and/or non-compliance during subproject implementation period, the IEE shall be updated to include (i) assessment of the unanticipated impact and corresponding mitigation measures, and/or (ii) information on the design change and assessment of associated environmental impacts, if any, and/or (iii) corrective actions, associated cost and schedule; respectively.

I. INTRODUCTION

A. Background

1. The Second City Region Development Project (Second CRDP) was envisaged from the achievements of the first City Region Development Project(CRDP). Similar to CRDP, Second CRDP aims to promote inclusive and environmentally sustainable economic growth in Dhaka and Khulna city regions, the two city regions within one of the promising corridors of Bangladesh -- named as Southwest Economic Corridor.[1] Recognizing the economic potential of this corridor, the Government of Bangladesh has given high priority to develop and emphasize economic growth in the said two city regions. Second CRDP will help in fulfilling this priority objective by supporting infrastructure development and regional urban planning to stimulate urban development in Dhaka and Khulna city regions. Specifically, Second CRDP will support improving the (i) transportation and/or road network within Dhaka region; (ii) solid waste management of Khulna City; and (iii) coordination mechanisms of various agencies involved in delivering climate- and disaster-resilient, inclusive, and environmentally sensitive infrastructure and basic services in these two city regions.[2]

2. Second CRDP will be implemented over a four-year period (2020 – 2022). The indicative list of subprojects is summarized in the environmental assessment and review framework drafted for Second CRDP. The subprojects are largely built around 'integrated area planning' which seeks to enhance economic activity in the city region and provides opportunities for investment, including (i) transport infrastructure upgrading, and (ii) solid waste management.

3. Second CRDP has been classified as environmental category B per ADB SPS.[3] A project preparatory technical assistance (PPTA 49329-BAN) was approved by ADB to assist Government of Bangladesh prepare Second CRDP for ADB financing. Part of this PPTA is the preparation of environmental assessment and review framework (EARF) and initial environmental examination (IEE) reports in accordance with the requirements of ADB Safeguard Policy Statement (SPS), 2009. Further support was provided by ADB in preparing the EARF and IEE reports to meet the requirements for projects proposed under a sector loan modality.

This initial environmental examination (IEE) report has been prepared for the subproject covered by Package Number Second CRDP-II/LGED/CHALNA/NCB/2021/ W-01, which includes combination of construction and rehabilitation of roadway and/or bridge/drain for the following road alignments or components in the Chalna Pourashava of Khulna region: (i) Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m); (ii) Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m); (iii) Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m); (iv) Re-excavation of P Pond including slope protection, walkway and landscaping; (v) Re-excavation of Family Planning Pond including slope protection, walkway and landscaping; (vi) Rehabilitation of sluice gate over Chalna Khal near Bowmer Gachtola; (vii) Construction of 14m bridge on Chalna Khal infornt of Govt. Primary School; (viii) Construction of 24m bridge at Ch. 675m on Chalna Khal; (ix)

[1] ADB. 2015. Comprehensive Integrated Multimodal Economic Corridor Network (CIMECON): Bangladesh. Manila.

[2] https://www.adb.org/projects/49329-006/main#project-pds

[3] A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories: (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.

Construction of 10m bridge at Ch. 300m on Achava Khal; (x) Construction of 11m bridge at Ch. 600m on Achava Khal; (xi) Construction of 14m bridge at Ch. 450m on Boro Kholisha Khal; (xii) Construction of 12m bridge at Ch. 575m on Gour Khati Khal; and (xiii) Construction of 8m bridge at Ch. 560m on Choto Chalna khal.

B. Purpose of the IEE

4. The purpose of this IEE is to describe the assessment of environmental impacts due to the proposed subproject based on the detailed design produced under the Second CRDP, and to specify measures to address impacts. This IEE is based on engineering design information, a field visit, and secondary data to characterize the environment. It contains the results of interviews and consultations with stakeholders. This IEE includes an environmental management plan (EMP) outlining mitigation measures and monitoring requirements, and environmental specifications to be appended to contract documents.

5. Screening using ADB's Rapid Environmental Assessment Checklist for Road (**Appendix 1**) was initially conducted, and results of the rapid assessment show that the project is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB Safeguard Policy Statement (SPS). Thus, this initial environmental examination (IEE) has been prepared in accordance with ADB SPS requirements for environment category B projects. The location of the subproject is shown in **Figure 1** and the **Figure 2** exhibits the location of the subproject on the Google Earth.

C. Extent of the Study

6. This IEE has been carried out based on most up-to-date subproject details and concept designs provided by the design team during the preparation of this report. Minor changes may occur in the structural component of the sub-projects at the detailed designing stage. The scope of the IEE study has been confined to project related activities associated with design, construction (e.g. site clearing, earth borrowing, quarrying, material transportation, paving, camping) and operation stages.

D. Approach and Methodology

7. The approach in preparing the IEE has been followed the sequence of steps outlined in the EARF. Apart from following standard environmental impact assessment practices and procedures, methodologies have deployed the technologies, techniques and tools to the extent these are applicable and relevant to this project. The methodology followed in preparing this IEE consists of the following steps:

- Review of available details of the subproject, and to take into accounts various parameters of the environment - including topography, physiography, soils, hydrology and drainage, meteorology, qualities of ambient air and noise, surface water, groundwater, biodiversity, socio-economic aspects including physical and cultural resources;

- Review of the policy and regulatory requirements; and EARF;

- Reconnaissance field visit and initial scoping and screening of the identified proposed investment sites to determine the key environmental parameters and aspects that are likely to be impacted by the project activities. The purpose of such screening is to get a preliminary idea about the degree and extent of potential environmental impacts of a

particular sub-project, which would subsequently be used to assess the need for and the scope of further detailed environmental assessment;

- Field investigations to collect baseline data using structured questionnaires, and sampling and analysis for air, water and noise;
- Collection of baseline data for environmental attributes from primary and secondary sources: a) primary sources includes site visits and visual inspection, and b) secondary sources include the reports, books, maps and documents from various government and non-government organizations on subject matter;
- Assessment of potential impacts of the Project activities at stages of design, construction and operation;
- Develop Environmental Management Plan to mitigate the adverse impacts and to enhance the quality of environmental traits;
- Consultations/meeting/discussions with various stakeholders including local communities;

Figure 1 : Location Map of Subproject (Red Lines for Roads and Violet Lines for Drains)

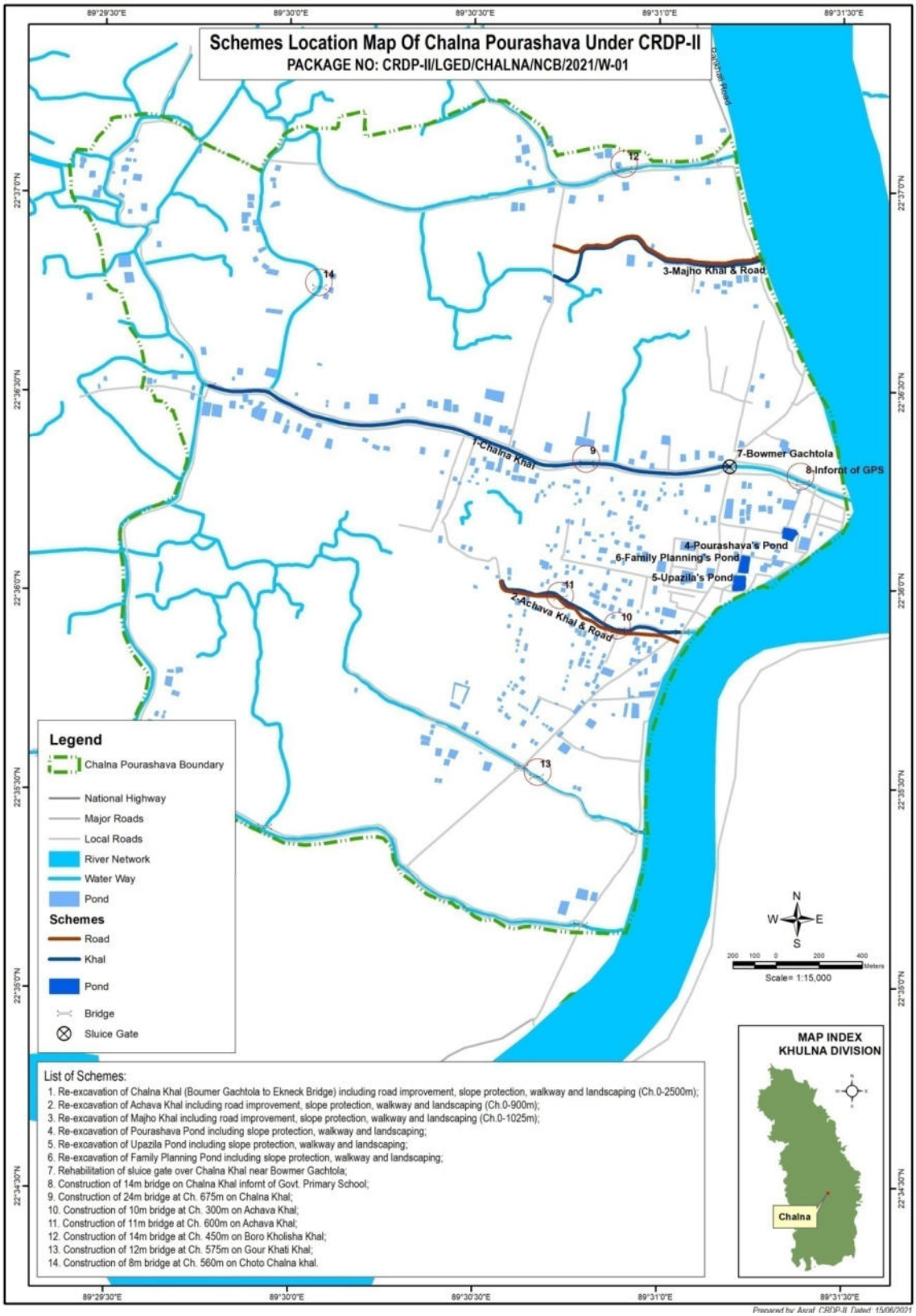


Figure 2 : Subproject Location Map on Google Earth (Red Lines for Roads and Violet Lines for Drains)

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

8. ADB will not finance any project if it does not comply with ADB SPS nor will it finance any project if it does not comply with its host country's environmental and social safeguard laws. Where discrepancy between ADB and Government of Bangladesh policies exist, ADB's policy will prevail. Moreover, ADB SPS applies to all ADB-financed and/or ADB-administered sovereign projects, and their components regardless of the source of financing, including investment projects funded by a loan; and/or a grant; and/or other means.

A. ADB Safeguard Policy Statement

9. ADB SPS requires borrowers to meet a set of requirements (Safeguards Requirements 1) when delivering environmental safeguards for projects supported by ADB. The objectives are to ensure the environmental soundness and sustainability of projects, and to support the integration of environmental considerations into the project decision-making process. Hence, CRDP2 is required to comply with these requirements. Summary of the step by step process is discussed below in this section. Detailed discussions are provided in the ADB SPS[4].

10. **Screening and Categorization.** Subprojects are to be screened for their expected environmental impacts, and are assigned to a specific category (footnote 3). Categorization is to be based on the most environmental sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, PMCU shall examine alternatives to the subproject's location, design, technology, and components that would avoid, and, if avoidance is not possible, minimize adverse environmental impacts and risks, and to meet Category B categorization. The rationale for selecting the subproject location, design, technology, and components will be properly documented, including, cost-benefit analysis, taking environmental costs and benefits of the various alternatives considered into account. The "no action" alternative will be also considered. In general, criteria that can trigger subproject's 'Category A' are discussed in Section II of the EARF.

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

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

13. **Public Disclosure**. LGED, through PMCU, shall submit to ADB for disclosure on ADB website so affected people, other stakeholders, and the public can provide meaningful inputs into the subproject design and implementation: [5]

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

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

(iii) environmental monitoring reports submitted during subproject implementation upon receipt.

14. **Consultation and Participation.** PMCU and Chalna PIU shall carry out meaningful consultation[6] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are to be documented and reflected in the environmental assessment report.

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

16. **Monitoring and Reporting.** PMCU shall monitor measure and document the progress of implementation of the EMP. If necessary, PMCU will identify the necessary corrective actions, and reflect them in a corrective action plan. PMCU will prepare and submit to ADB semi-annual environmental monitoring reports that describe progress with implementation of the EMP and compliance issues and corrective actions, if any. For subprojects likely to have significant adverse environmental impacts during operation, reporting will continue until ADB issues a project completion report.

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

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

19. **Occupational Health and Safety.** PMCU[7] shall ensure that workers[8]are provided with a safe and healthy working environment, considering risks inherent to the sector and specific classes of hazards in the subproject work areas, including physical, chemical, biological, and radiological hazards. PMCU shall ensure to take steps to prevent accidents, injury, and disease arising from, associated with, or occurring during the course of work by (i) identifying and minimizing, so far as reasonably practicable, the causes of potential hazards to workers; (ii)

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

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

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

providing preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; (iii) providing appropriate equipment to minimize risks and requiring and enforcing its use; (iv) training workers and providing them with appropriate incentives to use and comply with health and safety procedures and protective equipment; (v) documenting and reporting occupational accidents, diseases, and incidents; and (vi) having emergency prevention, preparedness, and response arrangements in place.

20. PMCU shall ensure to apply preventive and protective measures consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines.[9]

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

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

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

24. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by Chalna PIU. The PMCU and Chalna PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[10] and (ii) to submit to Chalna PIU, for review and approval, a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per SEMP; and (iv) budget for SEMP implementation, among others as may be required. No works can commence prior to approval of SEMP. A copy of the EMP and/or approved SEMP will be kept on site during the construction period at all times. Non-compliance with, or any deviation from, the conditions set out in the EMP and/or SEMP constitutes a failure in compliance and shall require corrective actions.

25. **Conditions for Award of Contract and Commencement of Work.** PMCU shall not award any Works contract under the subproject until (i) relevant provisions from the EMP are incorporated into the Works contract; (ii) this IEE is updated to reflect subproject's detailed design

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

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

and PMCU has obtained ADB's clearance of such updated IEE; and (iii) DOE-approved IEE (i.e. IEE in compliance with ECR, 1997) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMCU shall ensure no works for a subproject which involves environmental impacts shall commence until (i) relevant provisions from the EMP are incorporated into the Works contract; and (ii) this IEE is updated to reflect subproject's detailed design and PMCU has obtained ADB's clearance for such updated IEE.

B. National Environmental Impact Assessment Law

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

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

Table 1: Summary Environmental Clearance Application Requirements Per Category [a]

Category	Requirements
Green	(i) Completed Application for Environmental Clearance Certificate (ECC); (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); and (v) No objection certificate from the local authority.
Orange-A	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); (v) No objection certificate from the local authority; (vi) Prior issued location clearance certificate (LCC) from DOE; (vii) Process flow diagram; (viii) Layout plan (showing location of Effluent Treatment Plant (ETP); (ix) Effluent discharge arrangement; and (x) Outlines of the plan for relocation and rehabilitation (if applicable).
Orange-B	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) Report on the feasibility of the project (if still being proposed); (iv) Report on the initial environmental examination (IEE) of the project, including process flow diagram, layout plan (showing ETP), design of ETP of the project (if still being proposed); (v) Report on the EMP; (vi) No objection certificate from the local authority; (vii) Prior issued LCC from DOE; (viii) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution;

Category	Requirements
	(ix) Outline of the relocation and rehabilitation plan (where applicable); and (x) Other necessary information as may be required.
Red	(i) Completed Application for ECC; (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) Report on the feasibility of the project (if still being proposed); (iv) Report on the IEE of the project and the terms of reference (TOR) for environmental impact assessment of the project; or EIA report on the basis of the TOR previously approved by DOE, including process flow diagram, layout plan (showing ETP), design of ETP of the project (if still being proposed); (v) Report on the EMP; (vi) No objection certificate from the local authority; (vii) Prior issued LCC from DOE; (viii) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; (ix) Outline of the relocation and rehabilitation plan (where applicable); and (x) Other necessary information as may be required.

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

28. Schedule 1 of ECR, 1997 provides the classification for industrial projects and types of development that are common in Bangladesh. **Table 2** indicates the subproject's category and its likely classifications based on this schedule.

Table 2: Government of Bangladesh Classification of the Subproject

	Subproject	Component	Equivalent in Schedule I of ECR	DOE Classification
1.	Roads	Roads	Construction, re-construction and extension of road (feeder road, local road)	Orange – B
		Bridges and culverts	Construction, re-construction and extension of bridge/culvert (length below 100 meters)	Orange – B

C. Application for Environmental Clearance

29. The application and requirement for issuance of ECC are described in the ECR, 1997 and summarized in **Table 1*:* .** This involves the completion and submission of an application using a form available from the DOE website,[11]which is revised from time to time. See **Appendix 2** for template being used of this date. The accomplished application form is submitted to DOE together with requirements as enumerated in **Table 1*:*** . The proponent is also required to pay equivalent application fee prescribed in Schedule 13 of ECR, 1997.

30. For the purpose of obtaining the environmental clearance certificate (ECC) from DOE for the Second CRDP, an application was filed by PMCU vide LGED memo 46.02.000.913.99.001. 1-07; dated 30/08/2020 and 27/12/2020. Accordingly DOE issued an Environmental Clearance Certificate for Second CRDP subprojects (up through Orange B) involving construction and rehabilitation of roads and associated drainage subprojects in Dhaka region by means of a letter

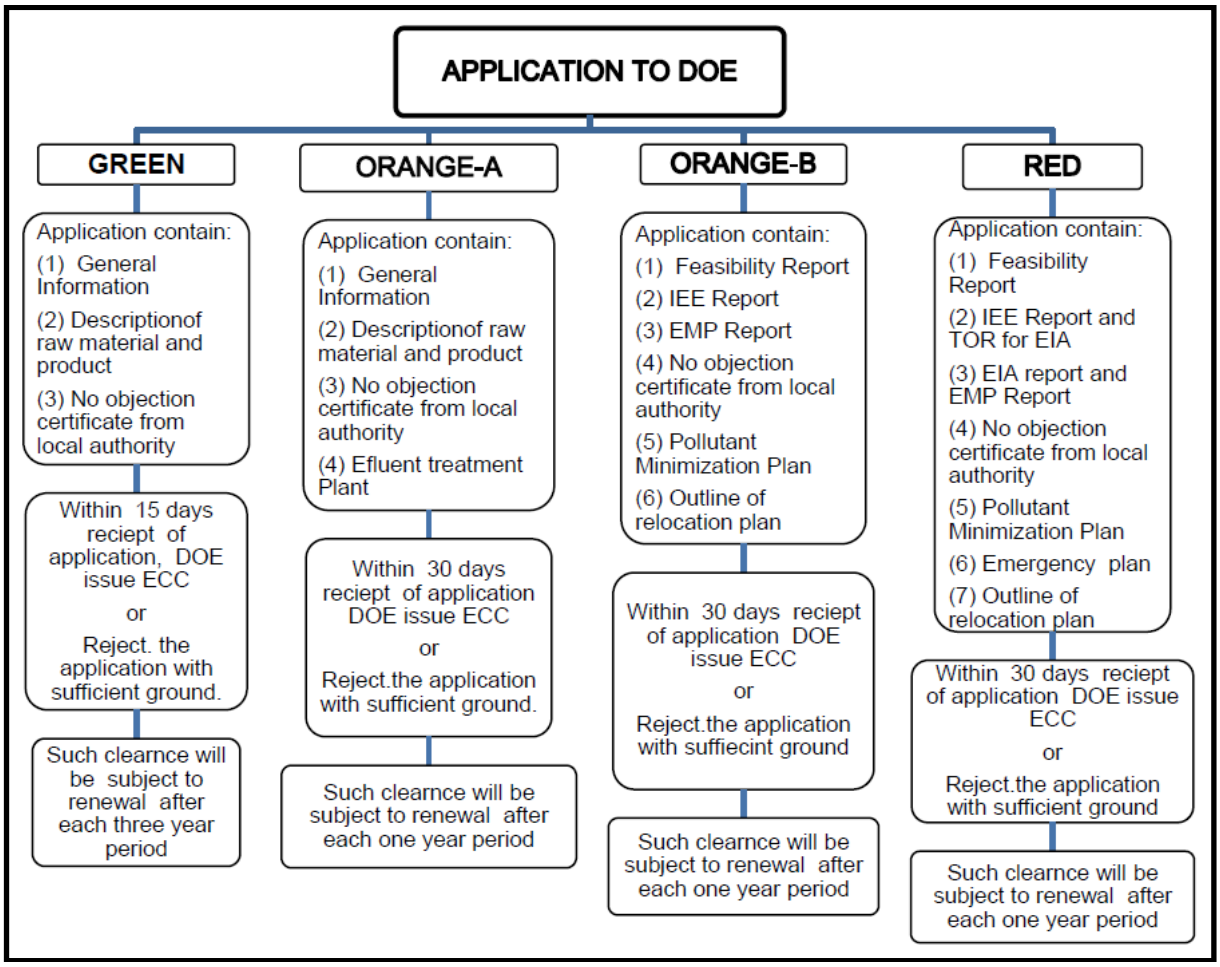
[11] www.doe-bd.org

No. DOE/ Clearance/5194/2013/ (clearance Certificate Number 53)/ issue Date 10/02/2019 (**Appendix 17**). Construction and Rehabilitation of Roads and associated drainage improvements of Chalna Package W-01 subprojects are categorized as Orange B category projects, and are exempt from further review requirements under DOE rules.[12] As the validity of the issued ECC (Ref . Letter No. DoE/ Clearance/5194/2013; clearance Certificate Number 53)/ issue Date 10/02/2019) has been expired, an application of renewal was filed by the PMCU vide LGED memo 46.02.0000.913.99.001.18-1006, dated 07/12/2020. Accordingly, DoE has renewed the subject ECC, and this renewal is valid up to February 9, 2022. (Ref: Memo No. DoE/clearance/5194/2013/61; dated 24/03/2021) (**Appendix 18**).

Figure 3 shows the summary of review process and timelines set under ECR, 1997, leading to the issuance of environmental clearance certificate (ECC) by DOE.

[12]By PMCU, the required fee for ECC application and other necessary documents was submitted to DOE on 30 August, 2020.

Figure 3 : Government Environmental Clearance Process



D. Applicable Environmental Standards

31. The ECR, 1997 also provides the environmental standards applicable to Second CRDP. Schedule 2 of the ECR presents the national standards for ambient air quality and Schedule 4 of the ECR presents the national standards for ambient noise. Following requirements of ADB SPS, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in EHS Guidelines. When the Government of Bangladesh regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS. In view of this, **Table 3** & **Table 4** show the ambient air quality standards and noise level standards to be followed by the subproject.

***Table 3*: National Ambient Air Quality Standards**
(Bangladesh Ambient Air Quality Standard as adopted in 2005)

Pollutant	Objective	Average
CO	10 mg/m^3 (9 ppm)	8 hours(a)
	40 mg/m^3 (35 ppm)	1 hour(a)
Pb	0.5 µg/m^3	Annual
NO^3	100 µg/m^3 (0.053 ppm)	Annual
PM_{10}	50 µg/m^3	Annual (b)
	150 µg/m^3	24 hours (c)
$PM_{2.5}$	15 µg/m^3	Annual
	65 µg/m^3	24 hours
O_3	235 µg/m^3 (0.02 ppm)	1 hour (d)
	157 µg/m^3 (0.08 ppm)	8 hours
SO_2	80 µg/m^3 (0.03 ppm)	Annual
	365 µg/m^3 (0.14 ppm)	24 hours (a)

Notes:
(a) Not to be exceeded more than once per year
(b) The objective is attained when the annual arithmetic mean is less than or equal to 50ug/m^3
(c) The objective is attained when the expected number of days per calendar year with a 24-hour average of 150 µg/m^3 is equal to or less than 1
(d) The objective is attained when the expected number of days per calendar year with the maximum hourly average of 0.12 ppm is equal to or less than 1 (Source: AQMP, DOE)

Ambient air quality standards for Bangladesh and WHO Guideline

Pollutant	Bangladesh standard	WHO Guideline	Averaging time
Carbon Monoxide (CO) (mg/m^3)	10 (9 ppm)	10	8 hour(a)
	40 mg m^3/ (35 ppm)	30	1 hour(a)
Oxides of Nitrogen (NOx) (µg/ m^3)	100 µg/ m^3 (0.053 ppm)		Annual
Particulates (PM10) (µg/ m^3)	50 µg/ m^3	15	Annual(b)
	150 µg/ m^3	50	24 hours(c)
Fine Particulates (PM2.5) (µg/ m^3)	15 µg/ m^3	10	Annual
	65 µg/ m^3	25	24 hours
Ozone (O_3) (µg/ m^3)	235 µg m^3/ (0.12 ppm)	-	1 hour(d)
	157 µg/ m^3 (0.08 ppm)	100	8 hours
Sulfur dioxide (SO_2) (µg/ m^3)	80 µg/ m^3 (0.03 ppm)	-	Annual
	365 µg/ m^3 (0.14 ppm)	20	24 hours(a)

Notes:
(a) Not to be exceeded more than once per year.
(b) The objective is attained when the annual arithmetic mean is less than or equal to 50 ug/ m^3.
(c) The objective is attained when the expected number of days per calendar year with a 24- hour average of15 µg/ m^3 is equal to or less than 1.
(d) The objective is attained when the expected number of days per calendar year with the maximum hourly average of 0.12 ppm is equal to or less than

Table 4*:* Ambient Noise Quality Standards
(According to the Bangladesh Noise Pollution (Regulation and Control) Rules, 2006)

Receptor/ Source	***Bangladesh Noise Pollution (Regulation and Control) Rules, 2006***[a] (dBA)	**WHO Guidelines Value For Noise Levels Measured Out of Doors**[b] (One Hour LA_q in dBA)	**Applicable Per ADB SPS**[c] **(dBA)**

	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial area	70	60	70	70	70	60
Mixed Area	60	50	55	45	55	45
Residential Area	55 *(6 am to 9 pm)*	45 *(9 pm to 6 pm)*	55	45	50	40
Quiet Zone	50	40	55	45	45	35

[a] Bangladesh Noise Pollution standard

[b] Guidelines for Community Noise, WHO, 1999**(**WB Environmental, Health and Safety General Guidelines, 2007)

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

Surface Water quality Standards

Standard	pH	Ec µS/cm	DO mg/l	BOD^{5d} mg/l	COD (mg/l)	TSS mg/L	TDS mg/L	Fe mg/l	Mn mg/l	As ppb	Turbi-dity NTU	NO3-N mg/l	Cl- mg/l	Tota Coliform cfu/100ml
Standard per ECR,1997 (Schedule 3A)	**6.5-8.5**		**5 0r abo ve**	**6 or less**	**NYS**			**NYS**	**NYS**	**NYS**		**NYS**	**NYS**	**5000 or less**
Standard per ECR,1997 (Schedule 10)	**6-9**		**4.5-8**	**50**	**200**			**2**	**5**	**20**		**10**	**600**	**NYS**

Ground Water quality Standards

Standard	pH	DO (mg/l)	BOD^{5d} (mg/l)	COD (mg/l)	EC (µs/Cm)	Fe (mg/l)	Mn (mg/l)	As (ppb)	NO3-N (mg/l)	Chlo-ride (mg/l)	TSS (mg/l)	TDS (mg/l)
Standard per ECR,1997 (Schedule 3B)	**6.5-8.5**	**6.0 or above**	**0.2**	**4.0**	**NYS**	**0.3-1.0**	**0.1**	**50.0**	**10.0**	**150-600**		**1000**

E. Other Relevant National Laws

32. The implementation of subprojects proposed under Second CRDP will be governed by Government of Bangladesh (the Government) Environmental Acts, Rules, Policies, and Regulations. **Table 5** summarizes the applicable national and local laws, regulations, and standards for environmental assessment and management, including applicable international environmental agreements.

Table 5: Summary of Relevant Government Laws, Regulations, & Environmental Standards

Laws, Regulations, and Standards	Details	Relevance/Applicability
National Environmental Policy 2018	The National Environmental Policy 2018 has been adopted in order to ensure sustainable development in the face of various environmental disasters, the effects of climate change and the limitation of natural	This Policy is applicable to CRDP-2 as the proposed interventions are required to comply with all the policy/directives

Laws, Regulations, and Standards	Details	Relevance/Applicability
	resources. The main focus of this policy is to protecting the environment, controlling pollution, conserving biodiversity and tackling the adverse effects of climate change.	stressing particularly on reducing adverse environmental impacts.
National 3R Strategy for Waste Management, 2010	The 3Rs are meant to a hierarchy, in order of importance – 'reduce' followed by 'reuse' and then 'recycle', which classify waste management strategies according to their desirability. The National 3R goal for waste management is to achieve complete elimination of waste disposal on open dumps, rivers and floodplains by 2015 and promote recycling of waste through mandatory segregation of waste at source as well as create a market for recycled products and provide incentives for recycling of waste.	CRDP-2 is relevant to the National 3R Strategy for Waste Management and will contribute to achieve complete elimination of waste disposal on open dumps, rivers and floodplains
The Draft Solid Waste Management Handling Rules, 2020	The Draft Solid Waste Management (SWM) Rules, 2020 shall apply to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solid wastes. Every municipal authority shall, within the territorial area of the municipality be responsible for the implementation of the provisions of these rules.	The SWM Rules 2020 is applicable to CRDP-2 as the rule narrates on necessary details from collection of wastes to its final disposal
Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009	The BCCSAP is built on six pillars: (i) food security, social safety and health; (ii) comprehensive disaster management; (iii) infrastructure; (iv) research and knowledge management; (v) mitigation and low carbon development; and (vi) capacity building. Five programs have been suggested related to improvement of the water management infrastructures in coastal areas of Bangladesh under pillar 3 (Infrastructure) of BCCSAP, including Planning, design and implementation of resuscitation of the network of rivers and *khals* through dredging and de-siltation work.	CRDP-2 is relevant to the BCCSAP's programs and will contribute towards achieving the objective of restoration of the network of rivers and *khals* through dredging and de-siltation work
The Embankment and Drainage Act (1952)	This Act describes the protection of embankments and drainage facilities	The Embankment and Drainage Act (1952) is applicable to CRDP-2 as the project will support drainage improvement of Pourashavas

Laws, Regulations, and Standards	Details	Relevance/Applicability
Wetland Protection Act 2000	The Bangladesh Water Development Board Act, 2000 was enacted for the development and efficient management of water resources. The Water Development Board is established under the Act, with the power to control the flow of water in all rivers, channels and underground aquifers.	CRDP-2 is relevant to the Wetland Protection Act 2000 as the project will involve in maintaining the flow of water in subproject khals /canals
National Disaster Management Act 2012	The Disaster Management Act 2012 recognized the impacts of climate change and provided guidance for setting up an institutional mechanism for disaster management, reducing vulnerabilities, rehabilitation, and providing humanitarian assistance to the victims of both disasters and climate change impacts.	The National disaster Management Act 2012 is relevant to CRDP-2 as it shall promote disaster-resilient infrastructures
National Land Transport Policy 2004	The National Land Transport Policy, adopted in 2004, which stated that services and infrastructure in the water sector will be studied so that an analysis can be made of potential opportunities for integration, and competition where appropriate. Transports including land and water, sector can also play a vital role to promote the low carbon climate resilient development in Bangladesh.	This policy is applicable to CRDP-2 as it is designed to support improving the transportation and/or road network
Environmental Court Act, 2000	Enacted to establish environment courts and make rules for protection of environmental pollution. Environment Courts are situated at the District level but Government may by notification in the official Gazette, establish such courts outside the districts. Environment Courts were given power to directly take into cognizance of any offence relating to environmental pollution. Proceeding of this Court will be similar to criminal courts. One important feature of this Act is that it has been given retrospective effect of any crime committed under environment laws and thus any crime previously committed but is not taken before any court can be taken before the Environment Court or any special Magistrate.	CRDP-2 is relevant to the Environmental Court Act, 2000 as the court has jurisdiction over any subproject-related environmental cases or litigations or complaints elevated to it.
The Pourashava (Municipality) Ordinance of 1977, the City Corporation Ordinances of 1983 and the recently revised unified ordinance for all City Corporations of 14 May 2008	These ordinances have clearly assigned responsibilities to the LGIs to ensure the provision of a wide range of primary and public health services including primary health care, sanitation, water supply,	The subproject aims to help Chalna Pourashava (as the LGI) achieve or fulfill these mandates.

Laws, Regulations, and Standards	Details	Relevance/Applicability
(Local Government Ordinances 16, and 17 of 2008); City Corporation Act 2009, 15 Oct 2009, and; Pourashava Act 2009, 6 Oct 2009.	drainage, food and drink, birth and death registration, vector and infectious disease control, etc. for the residents. LGIs have the authority to address all related issues within their legal and administrative mandate.	
National Forestry Policy, 2016	s policy specifically states the following relevant objectives (among many other objectives): (i)to arrest deforestation, and degradation of forest resources, enrich and extend areas under tree cover, through appropriate programmes and projects, to ensure that at least 20% of the country comes under tree cover by 2035, with at least a canopy density of 50%; and (ii) to significantly increase tree cover outside state forest, through appropriate mechanisms, in both public and private land including urban areas.	CRDP-2 is relevant to the National Forestry Policy, 2016 as the development of subproject roads and drainage will have potential tree cutting. However, the subproject EMP will ensure to implement measures to comply with and support the policy objectives.
Bangladesh Labor Act, 2006	e Bangladesh Labor Act, 2006 provides the guidance of employer's extent of responsibility and workmen's extent of right to get compensation in case of injury by accident while working.	CRDP-2 is relevant to Bangladesh Labor Act, 2006 as this act provides security and safety of work force during construction period. Compliance with this law will be included in the responsibility of the Contractor.

CRDP = City Region Development Project, DOE = Department of Environment, ECC = Environmental Clearance Certificate, EMP = environmental management plan, IEE = initial environmental examination, LGI = local government institutions

F. International Environmental Agreements

33. **Table 6** below lists the relevant international environmental agreements that Government of Bangladesh is party to, and their relevance to the subproject.

Table 6: International Environmental Agreements Relevant to Second CRDP

International Environmental Agreement	Year Ratified	Details	Relevance
United Nations Framework Convention on Climate Change (UNFCCC)	1997	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The subproject is subject to impact of climate change. Engineering designs of the subproject consider climate change impacts, such as flooding and river water level rise. A climate change vulnerability assessment has been conducted for the geographic coverage of the entire Second CRDP, which

International Environmental Agreement	Year Ratified	Details	Relevance
			covers the location of the subproject.
Paris Convention on Protection of the World Cultural and Natural Heritage, 1972	1983	Parties to ensure the protection and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to, the State	The road and drainage works may impact undiscovered cultural and natural heritage relics during construction phase. The subproject EMP ensures measures for chance finds.
Ramsar Convention on Wetlands of International Importance, 1971	1992	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world	Road and drainage construction works may impact wetlands. The subproject EMP ensures measures are in place to protect significant wetland and prevent draining or filling into the wetlands during construction.
Convention on Biological Diversity, 1992	1997	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	Biodiversity sites and species not previously identified might be discovered during construction works along the alignments. The subproject EMP ensures measures to protect biodiversity, if any, during construction and post-construction activities.

III. DESCRIPTION OF THE SUBPROJECT

A. Subproject Scope and Components

34. The proposed subproject is a combination of construction and rehabilitation of roadway and/or drain for the following road alignments or components in the Chalna Pourashava of khulna region: (i) Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m); (ii) Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m); (iii) Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m); (iv) Re-excavation of P Pond including slope protection, walkway and landscaping; (v) Re-excavation of Family Planning Pond including slope protection, walkway and landscaping; (vi) Rehabilitation of sluice gate over Chalna Khal near Bowmer Gachtola; (vii) Construction of 14m bridge on Chalna Khal infornt of Govt. Primary School; (viii) Construction of 24m bridge at Ch. 675m on Chalna Khal; (ix) Construction of 10m bridge at Ch. 300m on Achava Khal; (x) Construction of 11m bridge at Ch. 600m on Achava Khal; (xi) Construction of 14m bridge at Ch. 450m on Boro Kholisha Khal; (xii) Construction of 12m bridge at Ch. 575m on Gour Khati Khal; and (xiii) Construction of 8m bridge at Ch. 560m on Choto Chalna khal. These subproject roads are located within the Chalna Pourashava. Description of road and drain works is presented in **Table 7**. All construction works and improvements will be conducted within existing right-of-ways (ROWs).The road widths along the alignments will be varied at different chainage depending on the

available space within the existing ROWs to ensure that no encroachment to private properties.

Table 7: Roadway and/or Bridge, Khal and Walkway Improvement Components

Sl. No.	Scheme no. (Road/Drain/Khal/Pond)	Description	Subproject component	Length, (km/m)	Existing Carriageway Width, (m)	Existing Vacant Road Width, (m)
1	Scheme no. 1 (Khal-1) + Road-1	Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m)	Khal	2.500km	Details of the proposed khal re-excavation are in the following text (para 35, 36, 68 & 69)	
		Improvement of road alongside the Chalna Khal (Ch.1060-2500m)	Roadway	1.440km	3.00	5.15 ~ 6.10
2	Scheme no. 2 (Khal-2) + (Road-2)	Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m)	Khal	0.900km	Details of the proposed khal re-excavation are in the following text (para 43, 44, 72 & 73)	
		Improvement of road alongside the Achava Khal	Roadway	0.900km	3.00	5.20 ~ 5.46
3	Scheme no. 3 (Khal-3) + (Road-3)	Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m)	Khal	1.025km	Details of the proposed khal re-excavation are in the following text (para 49, 50, 76 &77)	
		Improvement of Road alongside the Majho Khal. ((Ch.0-1025m)	Roadway	1.025km	2.50	5.29 ~ 6.30
4	Scheme no. 4 (Pourashava Pond)	Re-excavation of Pourashava Pond including slope protection, walkway and landscaping;	Pond m^3 Walkway	2306.65 m^3 107m	Details of the proposed pond re-excavation are in the following text (para 57, 58 & 80)	
5	Scheme no. 5 (Family Planning Pond)	Re-excavation of Family Planning Pond including slope protection, walkway and landscaping;	Pond	Not known	Details of the proposed pond re-construction are in the following text (para 58, 59 & 81)	
6	Scheme no. 6 (Sluice gate)	Rehabilitation of sluice gate over Chalna Khal near Bowmer Gachtola;	Sluice gate	Not known	Details of the proposed sluice gate rehabilitation are in the following text (para 60)	
7.	Scheme no. 7 (Bridge-1)	Construction of 14m bridge on Chalna Khal infornt of Govt. Primary School;	Bridge	14m span	Details of the proposed construction of 14m bridge are in the following text (para 61)	
8	Scheme no. 8 (Bridge-2)	Construction of 24m bridge at Ch. 675m on Chalna Khal	Bridge	24m span	Details of the proposed construction of 24m bridge are in the following text (para 62)	
9	Scheme no. 9 (Bridge-3)	Construction of 10m bridge at Ch. 300m on Achava Khal;	Bridge	10m span	Details of the proposed construction of 10m bridge are in the following text (para 63)	
10	Scheme no. 10 (Bridge-4)	Construction of 11m bridge at Ch. 600m on Achava Khal;	Bridge	11m span	Details of the proposed construction of 11m bridge are in the following text (para 64)	
11	Scheme no. 11 (Bridge-5)	Construction of 14m bridge at Ch. 450m on Boro Kholisha Khal;	Bridge	14m span	Details of the proposed construction of 14m bridge are in the following text (para 65 & 82)	

Sl. No.	Scheme no. (Road/Drain/Khal/Pond)	Description	Subproject component	Length, (km/m)	Existing Carriageway Width, (m)	Existing Vacant Road Width, (m)
1	Scheme no. 1 (Khal-1) + Road-1	Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m)	Khal	2.500km	Details of the proposed khal re-excavation are in the following text (para 35, 36, 68 & 69)	
		Improvement of road alongside the Chalna Khal (Ch.1060-2500m)	Roadway	1.440km	3.00	5.15 ~ 6.10
2	Scheme no. 2 (Khal-2) +	Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m)	Khal	0.900km	Details of the proposed khal re-excavation are in the following text (para 43, 44, 72 & 73)	
12	Scheme no. 12 (Bridge-6)	Construction of 12m bridge at Ch. 575m on Gour Khati Khal;	Bridge	12m span	Details of the proposed construction of 12m bridge are in the following text (para 66 & 83)	
13	Scheme no. 13 (Bridge-7)	Construction of 8m bridge at Ch. 560m on Choto Chalna khal.	Bridge	8m span	Details of the proposed construction of 8m bridge are in the following text (para 67 & 84)	

B. Existing Condition of Subproject Components

1. Scheme 1 (Khal-1): Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m)

35. **Khal Location:** The Chalna Khal scheme (from Ch. 0-2500m) starts at coordinates N 22° 36' 18.590" and E 89° 31' 11.685") and ends at coordinates N 22° 36' 30.749"and E 89° 29' 46.830".

36. **Khal Condition**: As the drainage and water containing capacity of the Chalna khal has drastically been reduced due to siltation of the khal bed, there has been environmental pollution as consequence. Presently, there is no walkway provision alongside this canal bank, and thus it has become inaccessible to the community people. It has been planned for this subproject scheme to re-excavate and to provide slope protection, walkway, footbridge and landscaping by the sides of the khal bank; and all these will be done within the available existing vacant width of the khal. The existing condition of the khal is displayed below in **Figure 4.**

Figure 4 : Photograph of existing condition of re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m)

Existing condition of canal at chainage 560

2. Scheme 1 (Road-1): Improvement of road alongside the Chalna Khal (Ch.1060-2500m)

37. **Road Location:** This subproject scheme is 1.440km long, one of the 1st priority readiness road subproject of selected Link Roads, start from a bridge point (N 22° 36' 30.749" and E 89° 29' 46.830") and ends at Eknece bridge (N 22° 36' 21.671" and E 89° 30' 35.670"). This road passes through markets/bazaars, open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies along the road - minimum is 5.15m at chainage 2365m and maximum is 6.10m at chainage 2300m. Existing carriageway width of the main road is 3.0m all throughout the road alignment. Distance between the Road and Chalna Khal varies between 1m to 3m.

38. **Road Condition***:* This road contains carriageway of width 3.7m all throughout the road alignment. The existing road surface is made of cement concrete (CC) all throughout. Major part of the road has suffered wear and tear with cracks, potholes, broken edges and depressions. The distressed condition of the road is mainly due to improper drainage facilities and movement of

heavy vehicular traffic for a long time without any proper maintenance work. There are several sub-standard horizontal curves.

Figure 5 : Photographs of alignment of the road along Chalna Khal

	
Photograph of road at chainage 50	**Photograph of road at chainage 1075**

39. **Drain: T**here is no functional roadside drain along the alignment of this road. Currently, rain water during monsoon season flows toward the sides of the road which have lower elevation and then flows to nearby canals or ponds.

40. **Structure:** There is no structure in the form of a cross-drain for cross drainage purpose.

41. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 5.15m~6.10m and includes carriageway of width 3.0m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

42. **Strip Map**. The strip map showing no locations of the physical cultural structures, particularly religious structures along this alignment (**Appendix 3)**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

3. Scheme 2 (Khal-2): Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m)

43. **Khal Location:** The Achava Khal scheme (from Ch. 0-900m) starts at coordinates N 22° 35' 52.205" and E 89° 31' 3.241" and ends at coordinates N 22° 36' 1.236" and E 89° 30' 34.400".

44. **Khal Condition**: As the drainage and water containing capacity of the Achava khal has drastically been reduced due to siltation of the khal bed, there has been environmental pollution as consequence. Presently, there is no walkway provision alongside this canal bank, and thus it has become inaccessible to the community people. It has been planned for this subproject scheme to re-excavate and to provide slope protection, walkway, footbridge and landscaping by the sides of the khal bank; and all these will be done within the available existing vacant width of the khal. The existing condition of the khal is displayed below in **Figure 6.**

Figure 6 : Photograph of existing condition of re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m)

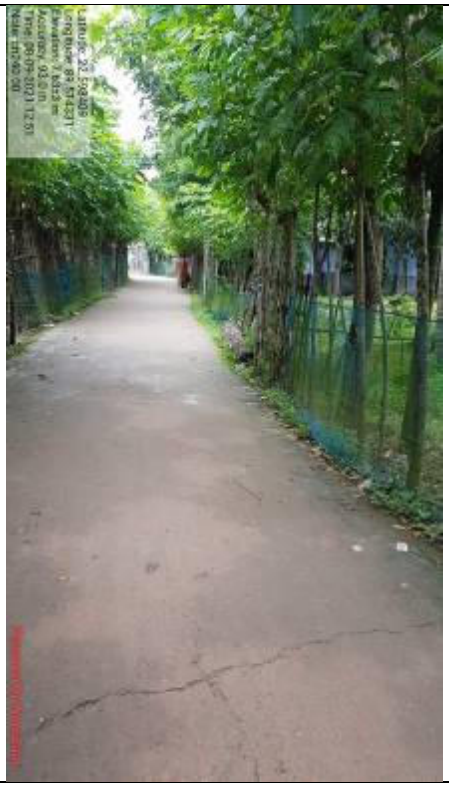
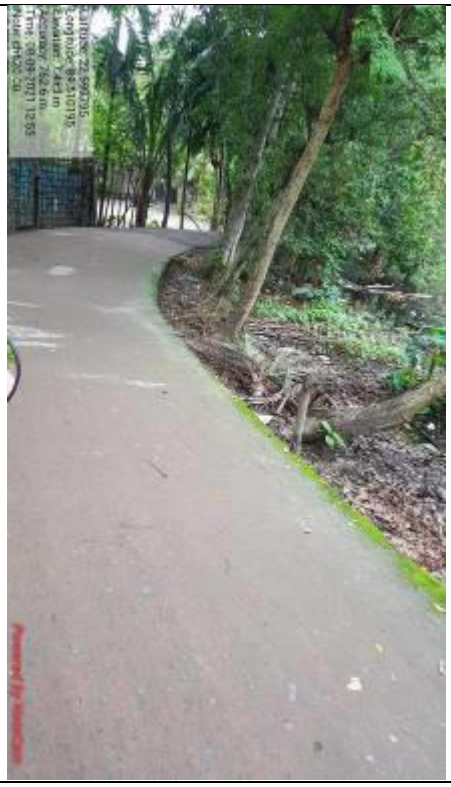
Existing condition of the Achava khal at chainage 300

1. **Scheme 2 (Road-2): Improvement of road alongside the Achava Khal (Ch.00-900m)**

45. **Road Location:** This subproject scheme is 0.900km long, one of the 1st priority readiness road subproject of selected Link Roads, start from near Achava Bazar (N 22° 35' 52.205" and E 89° 31' 3.241") and ends at Chalna (N 22° 36' 1.236" and E 89° 30' 34.400"). This road passes through markets/bazaars, open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies along the road - minimum is 5.20m at chainage 300m and maximum is 5.46m at chainage 750m. Existing carriageway width of the main road is 3.0m all throughout the road alignment. Distance between the Road and Achava Khal varies between 2.5 m to 4m.

46. **Road Condition***:* This road contains carriageway of width 3.7m all throughout the road alignment. The existing road surface is made of cement concrete (CC) all throughout. Major part of the road has suffered wear and tear with cracks, potholes, broken edges and depressions. The distressed condition of the road is mainly due to improper drainage facilities and movement of heavy vehicular traffic for a long time without any proper maintenance work. There are several sub-standard horizontal curves.

Figure 7 : Photographs of alignment of the road along Achava Khal

	
Photograph of road at chainage 325	**Photograph of road at chainage 800**

47. **Drain: T**here is no functional roadside drain along the alignment of this road. Currently, rain water during monsoon season flows toward the sides of the road which have lower elevation and then flows to nearby canals or ponds.

48. **Structure:** There is no structure in the form of a cross-drain for cross drainage purpose.

49. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 5.20m~5.446m and includes carriageway of width 3.0m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

50. **Strip Map**. The strip map showing no locations of the physical cultural structures, particularly religious structures along this alignment (**Appendix 4)**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

5. Scheme 3 (Khal-3): Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m)

51. **Khal Location:** The Majho Khal scheme (from Ch. 0-1025m) starts from Pussur river bank at coordinates N 22° 36' 50.205" and E 89° 31' 16.000" and ends at road to ferry ghat at coordinates N 22° 36' 47.611" and E 89° 30' 42.754". The distance between the road and Majho Khal varies between 0.5m to 2m.

52. **Khal Condition**: As the drainage and water containing capacity of the Majho khal has drastically been reduced due to siltation of the khal bed and unwanted growth of weeds and wild plants, there has been environmental pollution as consequence. Presently, there is no walkway provision alongside this canal bank, and thus it has become inaccessible to the community people. It has been planned for this subproject scheme to re-excavate and to provide slope protection, walkway, footbridge and landscaping by the sides of the khal bank; and all these will be done

within the available existing vacant width of the khal. The Khal re-excavation will improve urban drainage and facilitate irrigation to nearby agricultural land. The existing condition of the khal is displayed below in **Figure 8.**

Figure 8 : Photograph of re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m)

Existing condition of the canal at chainage 275

6. Scheme 3 (Road-3): Improvement of Road alongside the Majho Khal (Ch.0-1025m)

53. **Road Location:** This subproject scheme is 1.025km long, one of the 1st priority readiness road subproject of selected Link Roads, start from near Passur river bank at cordinates N 22° 36' 50.205" and E 89° 31' 16.000" and ends at road to ferry ghat at coordinates N 22° 36' 47.611" and E 89° 30' 42.754". This road passes through markets/bazaars, open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies along the road - minimum is 5.29m at chainage 355m and maximum is 6.30m at chainage 150m. Existing carriageway width of the main road is 2.50m all throughout the road alignment.

54. **Road Condition***:* This road contains carriageway of width 2.5m all throughout the road alignment. The existing road surface is made of cement concrete (CC) all throughout. Major part of the road has suffered wear and tear with cracks, potholes, broken edges and depressions. The distressed condition of the road is mainly due to improper drainage facilities and movement of heavy vehicular traffic for a long time without any proper maintenance work. There are several sub-standard horizontal curves.

Figure 9 : Photographs of alignment of the road along Majho Khal

	
Photograph of road at chainage 350	**Photograph of road at chainage 850**

55. **Drain: T**here is no functional roadside drain along the alignment of this road. Currently, rain water during monsoon season flows toward the sides of the road which have lower elevation and then flows to nearby canals or ponds.

56. **Structure:** There is no structure in the form of a cross-drain for cross drainage purpose.

57. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 5.29m~6.30m and includes carriageway of width 2.50m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

58. **Strip Map**. The strip map showing no locations of the physical cultural structures, particularly religious structures along this alignment (**Appendix 5)**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected.

7. Scheme 4 (Pourashava Pond): Re-excavation of Pourashava Pond including slope protection, walkway and landscaping

59. Under this scheme, the Pourashava Pond will be re-excavated, walkway construction and landscaping will be done on the banks of the pond. All development will be constructed within the available vacant land alongside the pond. The existing condition of the pond is displayed below in **Figure 10.**

60. The sweet water pond is being used by the local residents for washing. Re-excavation will improve its water containing capacity and the bank protection works will maintain the quality of water of this pond. Walkway construction and landscaping on the bank of the bank will improve accessibility to the pond and create recreational facilities for the local residents.

Figure 10: Existing condition of re-excavation of Pourashava Pond including slope protection, walkway and landscaping

Existing condition of the Pourashava Pond seen from east bank

8. Scheme 5 (Family Planning Pond); Re-excavation of Family Planning Pond including slope protection, walkway and landscaping

61. Under this scheme, the Family Planning Pond will be re-excavated, walkway construction and landscaping will be done on the banks of the pond. All development will be constructed within the available vacant land alongside the pond. The existing condition of the pond is displayed below in **Figure 11.**

62. The sweet water pond is being used by the local residents for washing. Re-excavation will improve its water containing capacity and the bank protection works will maintain the quality of water of this pond. Walkway construction and landscaping on the bank of the bank will improve accessibility to the pond and create recreational facilities for the local residents.

Figure 11: Photograph of re-excavation of Family Planning Pond including slope protection, walkway and landscaping

Existing condition of the pond seen from north bank

9. Scheme 6 (sluice gate): Rehabilitation of sluice gate over Chalna Khal near Bowmer Gachtola

63. Under this scheme, a sluice gate over Chalna khal near Bowmer Gachtola will be rehabilitated in order to control the drainage water flow (in and out) as per need through this khal. All development will be constructed as per standard within the available vacant land alongside the khal.. Thus rehabilitation of the sluicegate will improve the water containing as well as drainage capacity of the khal, and as per need, the regulated water flow can be maintained through this Chalna khal. The existing condition of the pond is displayed below in **Figure 7.**

10. Scheme 7 (Bridge-1): Construction of 14m bridge on Chalna Khal infornt of Govt. Primary School

64. Under this scheme, a 14m long RCC bridge will be constructed on Chalna khal in front of Govt. Primary school. The bridge will be constructed within the available vacant land within the canal bank. There is no bridge over the canal at present causing inconvenience to the traffic and adjacent residents.

11. Scheme 8 (Bridge-2): Construction of 24m bridge at Ch. 675m on Chalna Khal

65. Under this scheme, a 24m long RCC bridge will be constructed on Chalna khal at Ch. 675. The bridge will be constructed within the available vacant land within the canal bank. There is no bridge over the canal at present causing inconvenience to the traffic and adjacent residents.

12. Scheme 9 (Bridge-3): Construction of 10m bridge at Ch. 300m on Achava Khal

66. Under this scheme, a 10m long RCC bridge will be constructed on Chalna khal at Ch. 300m. The Bridge will be constructed within the available vacant land within the canal bank. There is no bridge over the canal at present, and thus causing inconvenience to the traffic and adjacent community people.

13. Scheme 10 (Bridge-4): Construction of 11m bridge at Ch. 600m on Achava Khal

67. Under this scheme, a 11m long RCC bridge will be constructed on Chalna khal at Ch. 600m. The Bridge will be constructed within the available vacant land within the canal bank. There is no bridge over the canal at present, and thus causing inconvenience to the traffic and adjacent community people.

14. Scheme 11 (Bridge-5): Construction of 14m bridge at Ch. 450m on Bro Kholisha khal

68. Under this scheme, a 14m long RCC bridge will be constructed on Boro Kholisha khal at Ch. 450m. The Bridge will be constructed within the available vacant land within the canal bank. There is no bridge over the canal at present, and thus causing inconvenience to the traffic and adjacent community people. The existing condition of bridge construction site is shown in **Figure 12.**

Figure 12 : Photograph Construction of 14m bridge at Ch. 450m on Boro Kholisha Khal

Existing condition of the bridge construction location

15. Scheme 12 (Bridge-6): Construction of 12m bridge at Ch. 575m on Gour Khati Khal

69. Under this scheme, a 12m long RCC bridge will be constructed at Chainage 575 of Gour Khati Khal. The bridge will be constructed within the available vacant land within the canal bank. There is a bamboo bridge over the canal at present which is in dilapidated causing water inconvenience to the traffic and adjacent community people.. The existing condition of bridge construction site is shown in **Figure 13.**

Figure 13: Photograph of Construction of 12m bridge at Ch. 575m on Gour Khati Khal

Existing condition of the bridge construction location

16. Scheme 13 (Bridge-7): Construction of 8m bridge at Ch. 560m on Choto Chalna Khal

70. Under this scheme, a 8m long RCC bridge will be constructed at Chainage 560 of Choto Chalna Khal. The bridge will be constructed within the available vacant land within the canal bank. There is a bamboo bridge over the canal at present which is in dilapidated causing inconvenience to the traffic and adjacent community people. The existing condition of bridge construction site is shown in **Figure 14**.

Figure 14: Photograph of Construction of 8m bridge at Ch. 560m on Choto Chalna khal.

Existing condition of the bridge construction location

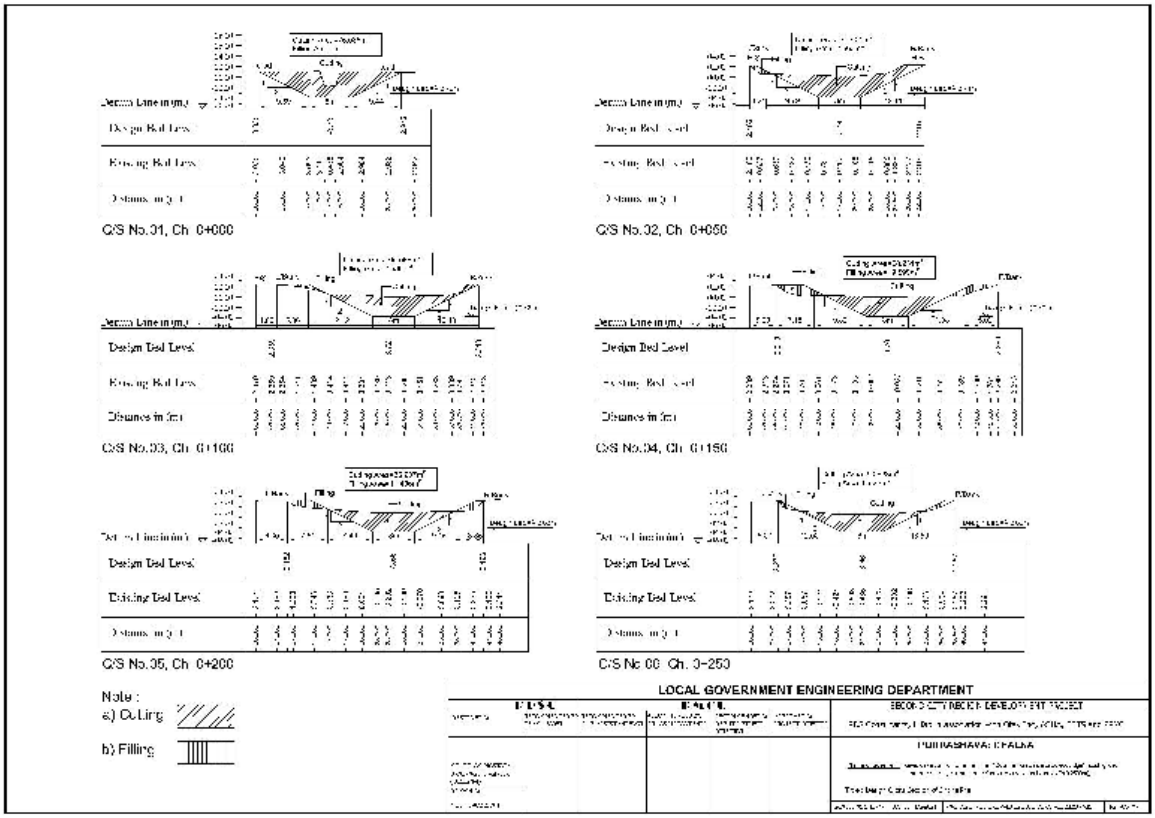
C. Proposed Interventions or Development

1. Scheme 1 (Khal-1): Re-excavation of Chalna Khal (Boumer Gachtola to Ekneck Bridge) including road improvement, slope protection, walkway and landscaping (Ch.0-2500m)

71. The khal will be re-excavated, existing road beside the canal will be improved, slope protection works will be done and walkways will be constructed at the banks along the existing canal alignment and within available vacant width of the canal.

72. The canal will be re-excavated and the slope protection works will be done by earth back fill in such a way that the existing vegetation of the upper part of the canal will be retained as it is. The existing vegetation is acting as natural slope protector, biodiversity habitat and enhancing aesthetic quality. This will act as a nature based solution. There will be CC block walkways on the both banks of the canal. The width of the canal is variable and all construction works will be done along the existing canal alignment and within its vacant width according to the design. A cross section of the canal according to the preliminary design is displayed in **Figure 15**.

Figure 15: A Cross section of Re-excavation of Chalna Khal (Ch.0-2500m) including slope protection, walkway and landscaping.



2. Scheme 1 (Road-1): Improvement of road alongside the Chalna Khal (Ch.1060-2500m)

73. Proposed interventions planned for the existing road alongside the Chalna khal (Ch.1060-2500m) are as follows:

(i) The existing road is to be improved within the existing alignment/RoW and within the vacant road width;
(ii) Construction of Uni-block carriageways of width 3.0m according to design, the side/s of the carriageway will have soft shoulders depending on the availability of vacant road width;
(iii) Pavement works comprising construction of 250mm ISG; 200mm AS and 220x110x80mm Uni-block over 200 mm WBM;
(iv) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards.

74. The existing status with the proposed development interventions of the subproject scheme road is summarized in **Table 8.**

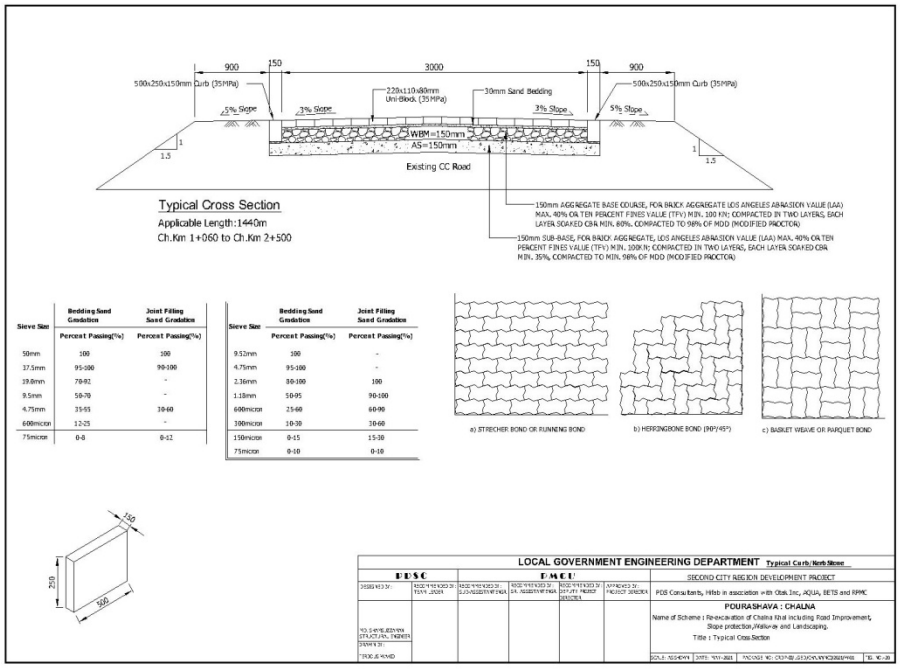
Table 8: Summary of Proposed Improvement Works of Road alongside the

Chalna Khal (Ch.1060-2500m)

Scheme Name of Subproject	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Scheme 1 (Road-1): Improvement of road alongside the Chalna Khal (Ch.1060-2500m)	1.4440 km	Uni Block Road	**Road:** 3m carriageway Uni Block Road from Ch. 1060-2500m	**Road:** 3m carriageway CC Road from Ch. 1060-2500m .

However, the typical section for the roadways and drainage design with their cross-sections are exhibited in **Figure 16**

Figure 16: Typical section (Ch. 1+060 – 2+500 km)

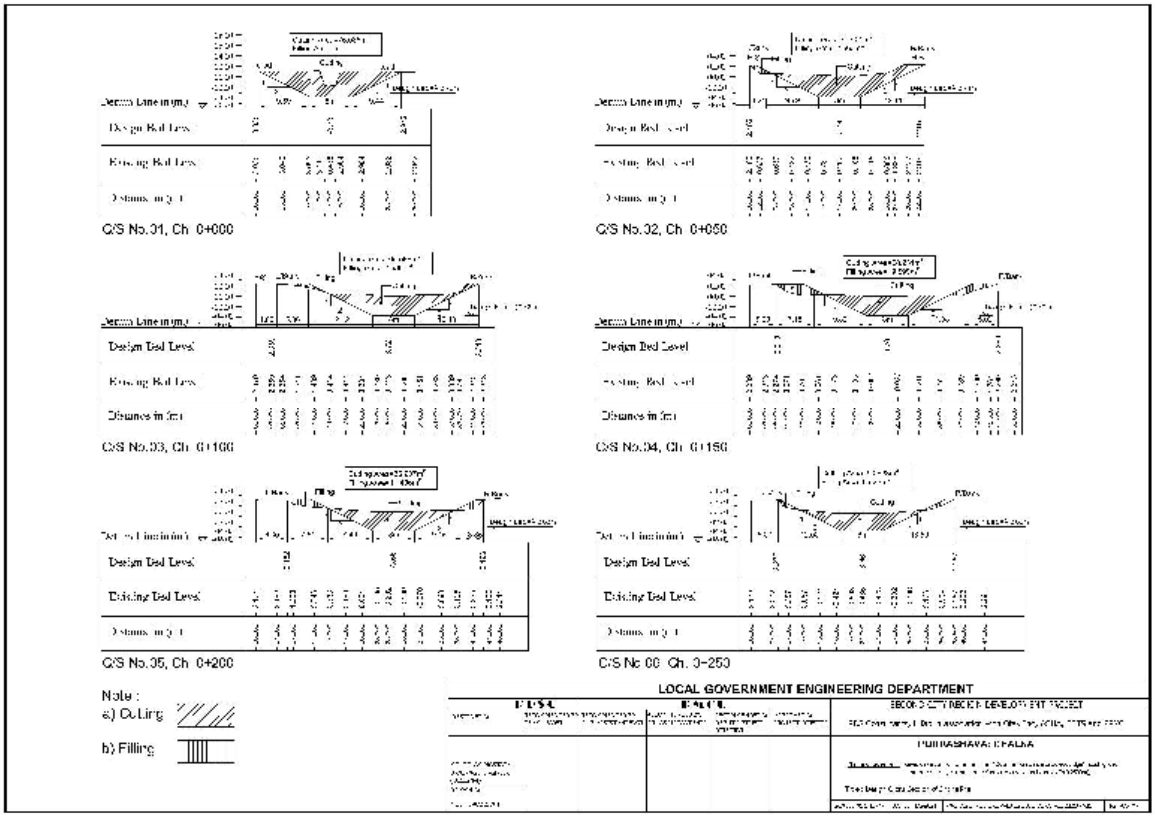


3. Scheme 2 (Khal-2): **Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m)**

75. The canal will be re-excavated, existing road beside the canal will be improved, slope protection works will be done and walkways will be constructed at the banks along the existing canal alignment and within available vacant width of the canal.

76. The canal will be re-excavated and the slope protection works will be done by earth back fill in such a way that the existing vegetation of the upper part of the canal will be retained as it is. The existing vegetation is acting as natural slope protector, biodiversity habitat and enhancing aesthetic quality. This will act as a nature based solution. There will be CC block walkways on the both banks of the canal. The width of the canal is variable and all construction works will be done along the existing canal alignment and within its vacant width according to the design. A cross section of the canal according to the preliminary design is displayed in **Figure 17**.

Figure 17: A Cross section of Re-excavation of Achava Khal (Ch.0-900m) including slope protection, walkway and landscaping.



4. Scheme 2 (Road-2): Improvement of road alongside the Achava Khal (Ch.0-900m)

77. Proposed interventions planned for the existing road alongside the Achava khal (Ch.0-900m) are as follows:

(i) The existing road is to be improved within the existing alignment/RoW and within the vacant road width;
(ii) Construction of Uni-block carriageways of width 3.0m according to design, the side/s of the carriageway will have soft shoulders depending on the availability of vacant road width;
(iii) Pavement works comprising construction of 250mm ISG; 200mm AS and 220x110x80mm Uni-block over 200 mm WBM;
(iv) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards.

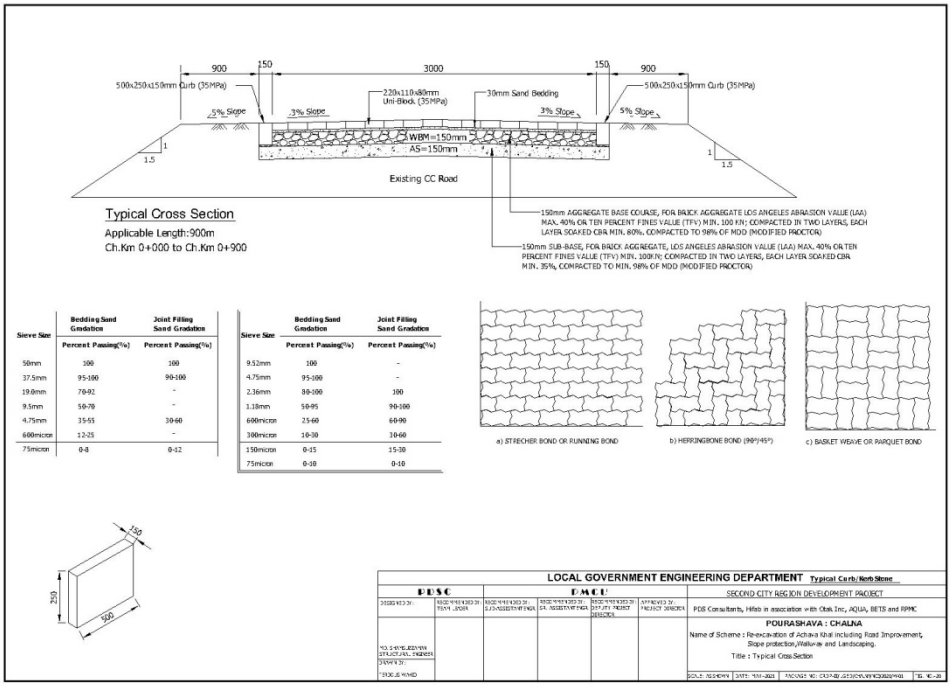
78. The existing status with the proposed development interventions of the subproject scheme road is summarized in **Table 9.**

Table 9: Summary of Proposed Improvement Works of Road alongside the Achava Khal (Ch.0-900m)

Scheme Name of Subproject	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Scheme 2 (Road-2): Improvement of road alongside the Achava Khal (Ch.0-900m)	0.900 km	Uni Block pavement Road and RCC Slab Bridge	**Road:** 3m carriageway Uni Block Road from Ch. 1060-2500m **Bridge:** 10m RCC slab Bridge on Achava khal at Ch. 300m	**Road:** 3m carriageway CC Road from Ch. 0-900m .

However, the typical section for the roadways and drainage design with their cross-sections are exhibited in **Figure 18.**

Figure 18: Typical section (Ch. 0+000-0+900 km)

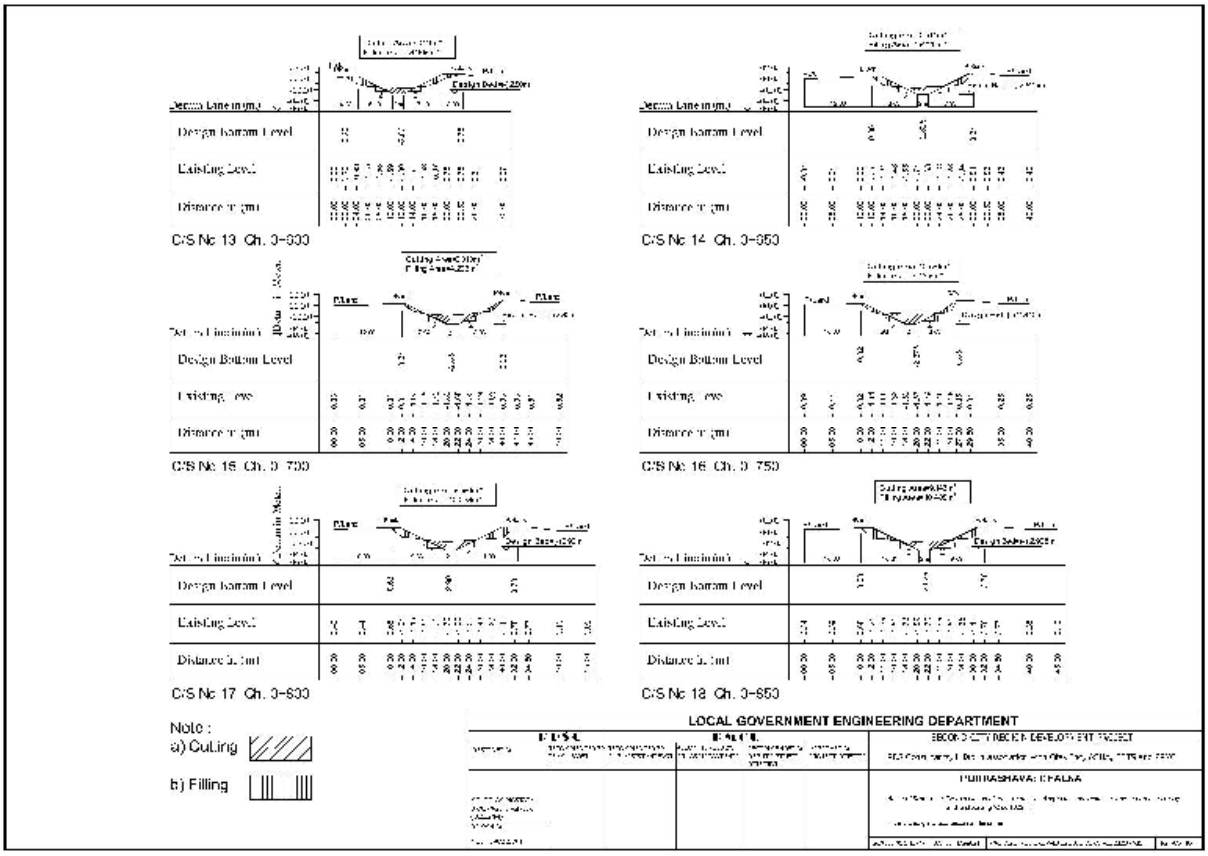


5. Scheme 3 (Khal-3): **Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m)**

79. The canal will be re-excavated, existing road beside the canal will be improved, slope protection works will be done and walkways will be constructed at the banks along the existing canal alignment and within available vacant width of the canal.

80. The canal will be re-excavated and the slope protection works will be done by earth back fill in such a way that the existing vegetation of the upper part of the canal will be retained as it is. The existing vegetation is acting as natural slope protector, biodiversity habitat and enhancing aesthetic quality. This will act as a nature based solution. There will be CC block walkways on the both banks of the canal. The width of the canal is variable and all construction works will be done along the existing canal alignment and within its vacant width according to the design. A cross section of the canal according to the preliminary design is displayed in **Figure 19**.

Figure 19: A Cross section of Re-excavation of Majho Khal (Ch.0-1025m) including slope protection, walkway and landscaping.



6. Scheme 3 (Road-3): Improvement of road alongside the Majho Khal (Ch.0-1025m)

81. Proposed interventions planned for the existing road alongside the Majho khal (Ch.0-1025m) are as follows:

(i) The existing road is to be improved within the existing alignment/RoW and within the vacant road width;
(ii) Construction of Uni-block carriageways of width 3.0m according to design, the side/s of the carriageway will have soft shoulders depending on the availability of vacant road width;
(iii) Pavement works comprising construction of 250mm ISG; 200mm AS and 220x110x80mm Uni-block over 200 mm WBM;
(iv) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards.

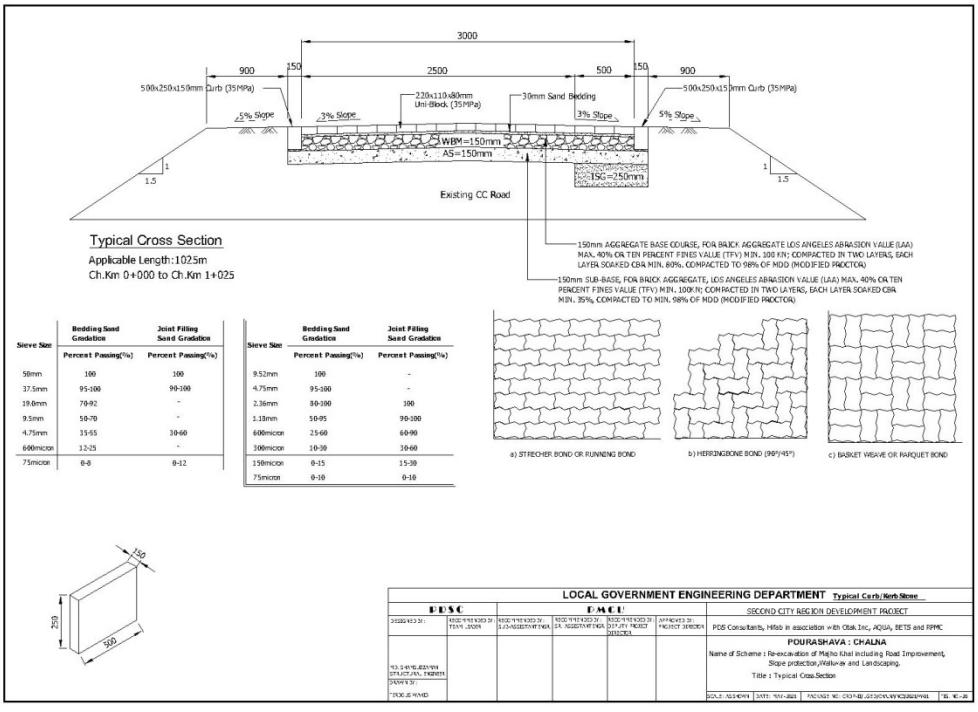
82. The existing status with the proposed development interventions of the subproject scheme road is summarized in **Table 10.**

Table 10: Summary of Proposed Improvement Works of Road alongside the Majho Khal (Ch.0-1025m)

Scheme Name of Subproject	Length / Area	Subproject Components	Details of Proposed Works	Existing condition
Scheme 3 (Road-3): Improvement of road alongside the Majho Khal (Ch.0-1025m)	1.025 km	Uni Block Road	**Road:** 3m carriageway Uni Block Road from Ch. 0-1025m	**Road:** 2.5m carriageway CC Road from Ch. 0-900m .

However, the typical section for the roadways and drainage design with their cross-sections are exhibited in **Figure 20.**

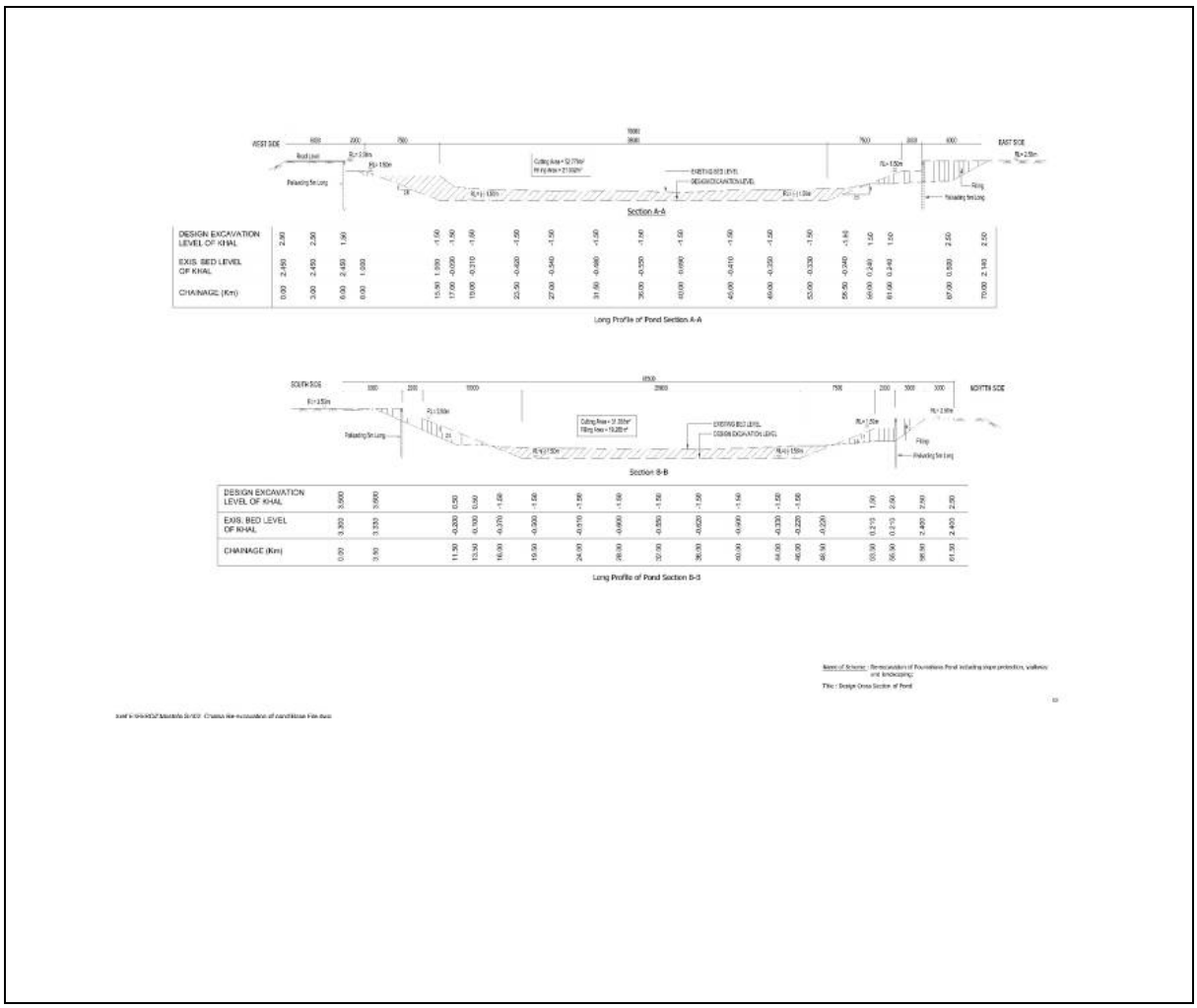
Figure 20: Typical section (Ch. 0+000-1+025 km)



7. Scheme 4 (Pourashava Pond): Re-excavation of Pourashava Pond including slope protection, walkway and landscaping

83. The pond will be re-excavated and the slope will be protected with palisading works. The walkway construction and landscaping works will be done within available vacant pond area and within the existing walkway alignment. A cross section of the walkway according to the preliminary design is displayed in **Figure** 21. There will be 107m long cement concrete block (Uni Block) walkway according to the design.

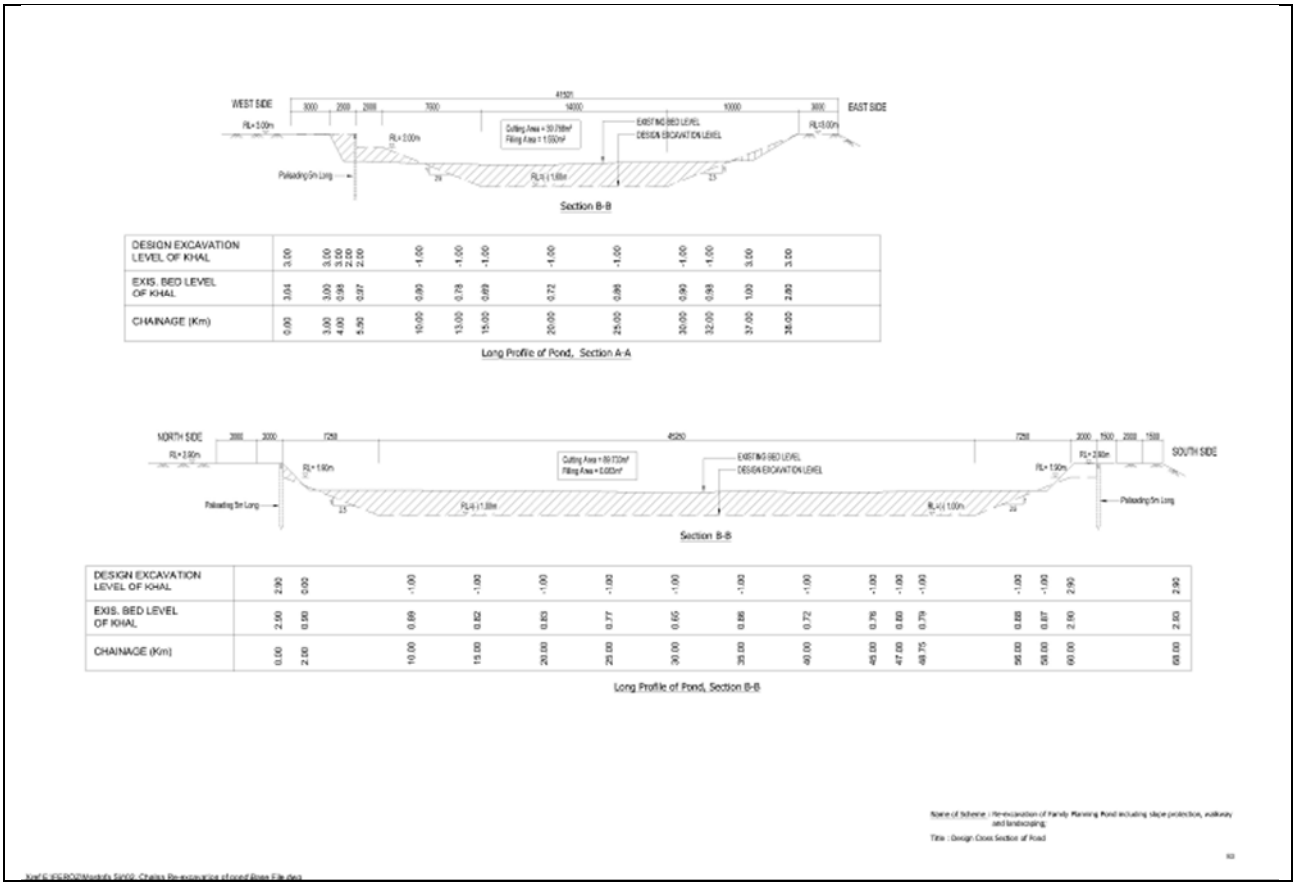
Figure 21: Re-excavation of Pourashava Pond including slope protection, walkway and landscaping



8. Scheme 5 (Family Planning Pond); Re-excavation of Family Planning Pond including slope protection, walkway and landscaping

84. The pond will be re-excavated and the slope will be protected with palisading works. The walkway construction and landscaping works will be done within available vacant pond area and within the existing walkway alignment. A cross section of the walkway according to the preliminary design is displayed in **Figure 22**. There will be ------m long cement concrete block (Uni Block) walkway according to the design.

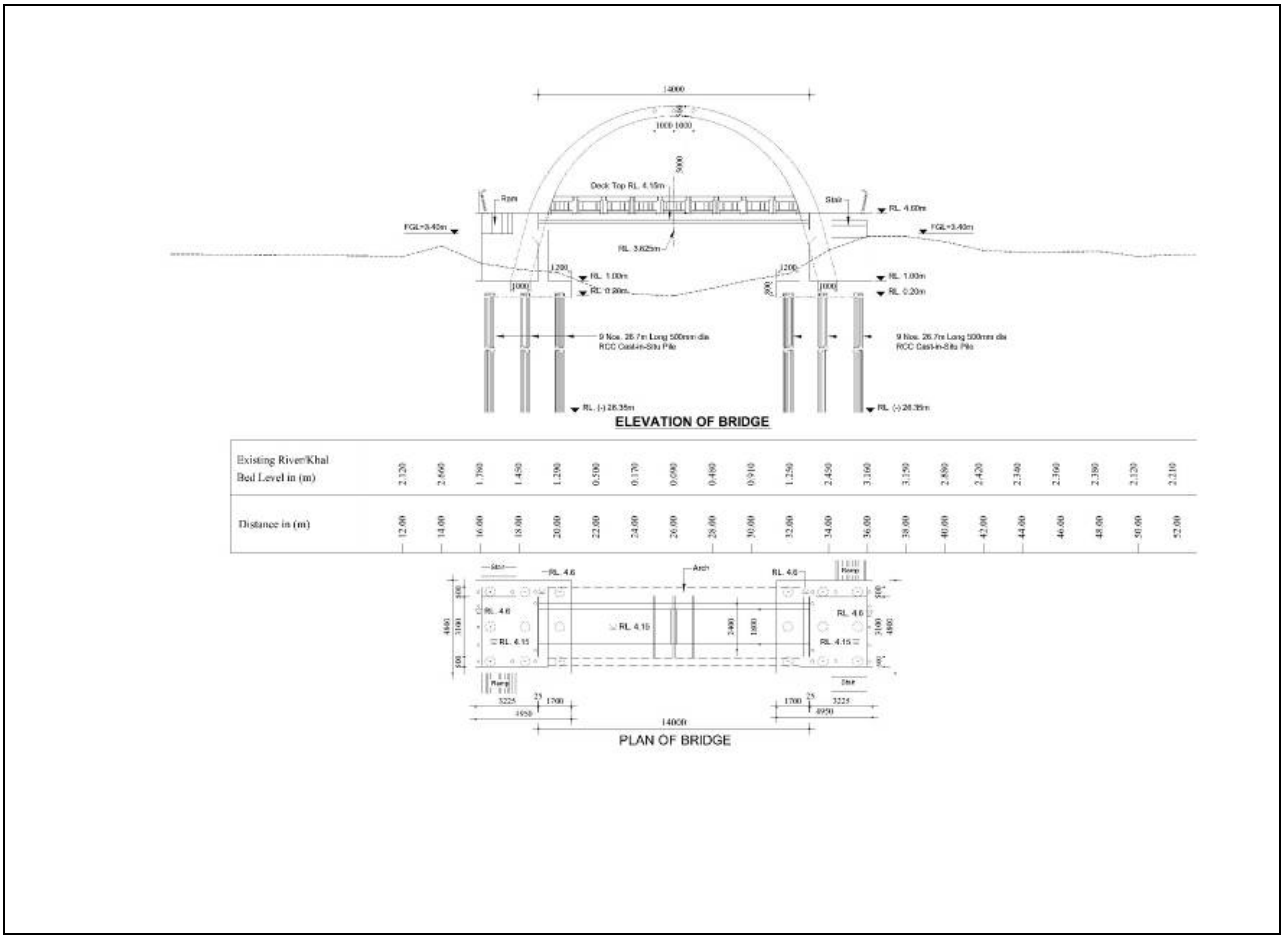
Figure 22: Re-excavation of Pourashava Pond including slope protection, walkway and landscaping



9. Scheme 11 (Bridge-5): Construction of 14m bridge at Ch. 450m on Boro Kholisha khal

85. A 14m long RCC bridge will be constructed at Chainage 450 over this canal. The bridge will be constructed within the available vacant land within the canal bank. A drawing (plan and elevation) of the bridge according to the preliminary design is displayed in **Figure 23**. RCC bridge will be constructed according to the design.

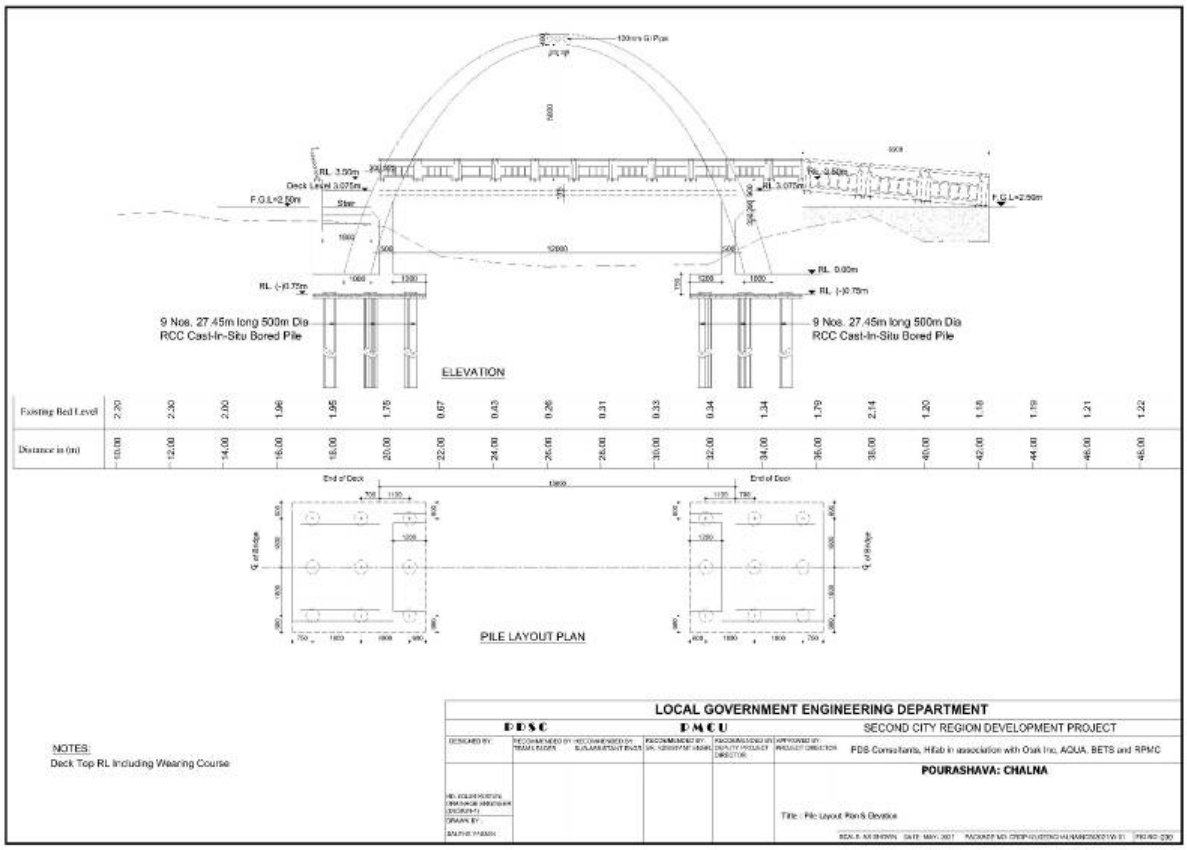
Figure 23: Scheme 11 (Bridge-5): Construction of 14m bridge at Ch. 450m on Boro Kholisha khal



10. Scheme 12 (Bridge-6): Construction of 12m bridge at Ch. 575m on Gour Khati khal

86. A 12m long RCC bridge will be constructed at Chainage 575 over Gour Khati khal. The bridge will be constructed within the available vacant land within the canal bank. A drawing (plan and elevation) of the bridge according to the preliminary design is displayed in **Figure 24**. A RCC bridge will be constructed according to the design.

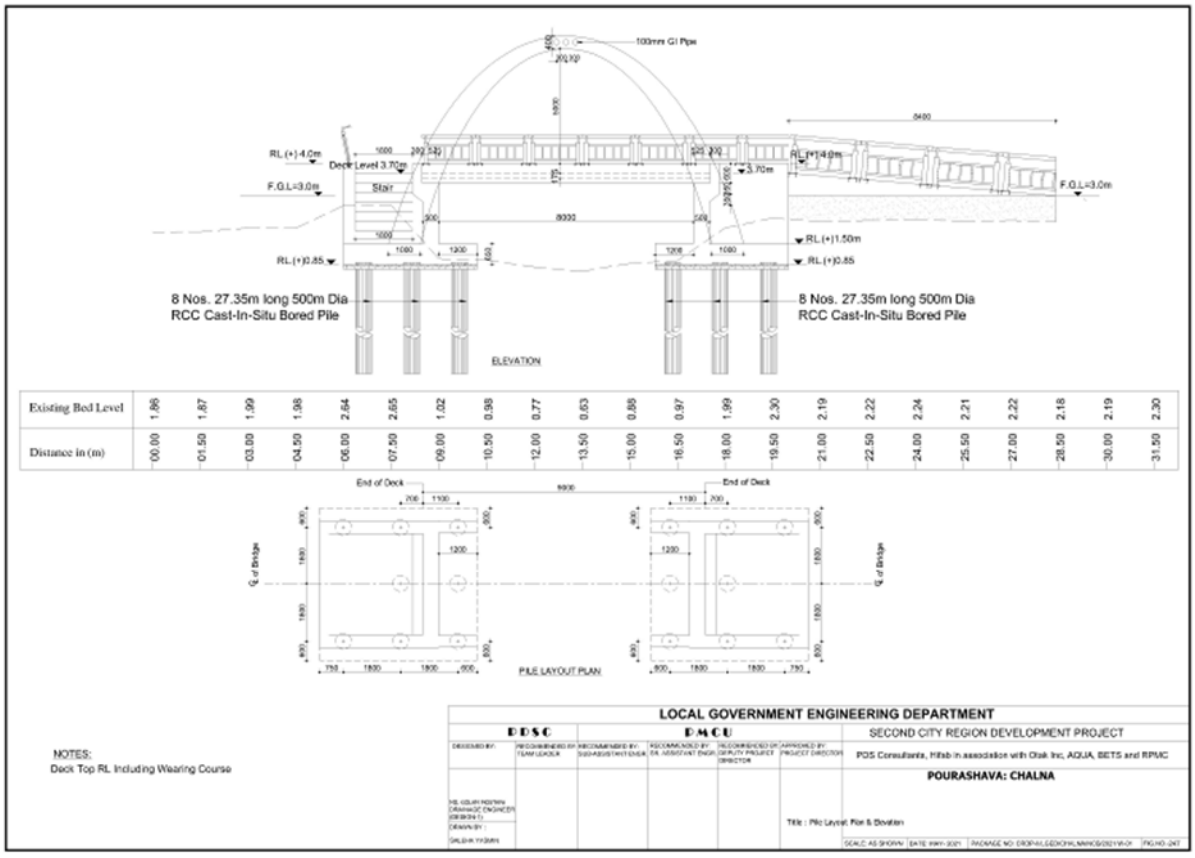
Figure 24: Scheme 11 (Bridge-5): Construction of 14m bridge at Ch. 450m on Boro Kholisha khal



11. Scheme 13 (Bridge-7): Construction of 8m bridge at Ch. 560m on Choto Chalna khal

87. A 8m long RCC bridge will be constructed at Chainage 560 over this canal. The bridge will be constructed within the available vacant land within the canal bank. A drawing (plan and elevation) of the bridge according to the preliminary design is displayed in **Figure 25**. A RCC bridge will be constructed according to the design.

Figure 25: Scheme 13 (Bridge-7): Construction of 8m bridge at Ch. 560m on Choto Chalna khal



IV. DESCRIPTION OF THEENVIRONMENT

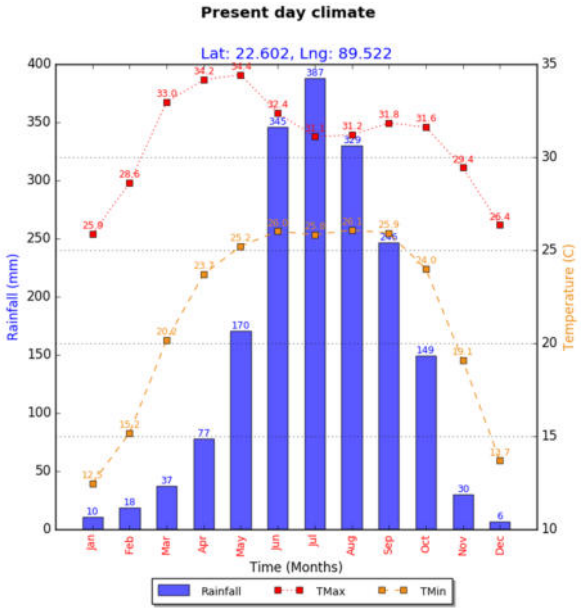
A. Physical Resources

88. **Location and Extent:** The proposed subproject is located in Chalna Pourashava of Dakope Upazila. It is located at the intersection of three rivers - Passur river on the east, JhapJhapia river on the north and Chunkuri river on the south (Lat. 22.601 and Ln 89.522). It's total area is 9.49 sq km.

89.

90. **Topography, Soil and Geology:** The subproject area has an almost flat topography and characterized by a fairly plain land except the water bodies such as rivers, ponds, depressions and beels etc. The surface geology of the area is comprised of deltaic sediments from the Holocene age. The deltaic sediments are the sediments that are deposited on the active delta. The change in elevation of most of the Municipality area is gradual. The land elevation of the Municipality effectively ranges between 0.64 mPWD and 3.19 mPWD (The subsurface geology in Dakope Upazila characterized by a thick clayey layer. The clayey layer occurs below depths of 200 to 400 ft. Soils are somewhat porous allowing for some seepage of surface water into the soil, but in general the area is subject to seasonal flooding. Channelized drainage covers most of the land , in which slowly draining streams will transport surface runoff to local rivers. Conversely, those rivers are part of the regional network that, once flooded, will cause flooding locally and prevent drainage. The ground level of the Pourashava surrounding areas is around 1.5 m above the HFL (highest flood level. Main drainage channels of the area are Passur, Jhapjhapia and Chunkuri rivers. These rivers surrounding the Municipality are tidal in nature (***Source****:Land Resources Appraisal of Bangladesh for Agricultural Development Report 2: Agro-ecological Regions of Bangladesh, FAO/UNDP, 1988; "Storm water management for urban areas of bangladesh by analytical & modelling approach: a case study of chalna municipality- (ICCESD-2014), 14~16 February 2014, KUET, Khulna, Bangladesh*).

91. **Climate:** As per figure below (from Marksim Weather Generator), present day climate data exhibits that **t**he temperature maximum (Tmax) at Chalna Municipality ranges from 25.9^0 C (in January) to 34.4^0 C (in May), and temperature minimum (Tmin) ranges from 12.5^0 C (in January) to 26.1^0 C (in August), and annual rainfall is1,804mm. Data, generated from World Bank Climate Portal, also shows that the monthly Min temperature (Tmin) ranges from 19.6^0 C (in January) to 29.7^0 C (in May) for period 1991-2020, and temperature maximum (Tmax) ranges from 26.0^0 C (in January) to 34.1^0 C (in April) The annual rainfall is 1,783.7mm.



92. **Surface Water:** The Pussur, Jhapjhapia and Chunkuri are the three main rivers passes through the surrounding Chalna area. Besides, there are few canals and river channels, large numbers of ponds, ditches, low-lying lands as low pockets, and few notable beels and baor; and

these water bodies act as retention basin to hold monsoon floodwater. The major drainage Channels of the subproject region are rivers Pussur, Jhapjhapia and Chunkuri. The baseline surface water quality of the subproject canals will be tested before the commencement of the work, and the test results will be documented in the relevant SEMR.

93. **Groundwater.** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The water table at Chalna Upazila is shallow. However, the main aquifer, which is the source of water supply, is found at a depth of greater than 50 m. Arsenic contamination is generally not present in the subproject area.

94. **Hydrology:** The Pourashava stands on the right bank of Passur and Chunkuri rivers. The river Jhapjhapia runs on the north to west off the Pourashava. The Passur and Chunkuri run on the east of Pourashava. These rivers surrounding the Pourashava are tidal in nature. The khal system of the Pourashava is virtually non-tidal being subjected to the overall management of the Polder 31. Titaparakhal, Baraikali to Satghoria Khal,Chalna Khal, Chotochalna Khal, kholisha gate khal, Kadomtola Khal, Achavuakhal, Garkhati Khal, Katakhali Khal, Barowkhal, BoroKalsha Khal, Garkhati Khal, Zairbunerkhal, Annandanagor Khal and Captain Road side khal are the natural khals of the Pourashava.

95. **Flooding:** The Pourashava lies in the tidal basin of Passur-Sibsa river system. The nearest water level gauging is available at Chalna (243) on Passur River which is fairly calibrated by the regional model. The average year flood level for the Pourashava is estimated to 1.13 mPWD. The major parts of the Pourashava lie in the Polder 31 which is subjected to internal rain fed flood and the flood level inside the Polder is assessed to same as that of external average flood level. Some settlements of core area are relatively high and lie outside the Polder, and above the high tides. It is assessed that 66% of the area of Pourashava is above the average flood level while the rest of the land is subjected to shallow depth of flooding.

96. **Waterlogging:** Inundation occurs in some localized places of the Pourashava after heavy rainfall in absence of appropriate drains and routes. Presently mentionable water logging is observed following moderate to heavy rainfall in and in the vicinity of ward 4, 5, 6 & 8. The depth and duration of inundation vary from place to place. Such areas free from inundation by the process of evaporation and infiltration. The reasons for inundation/water logging are technical, social and institutional.

97. **Drainage Pattern:** There exist few lined and unlined drains within the Pourashava. These can drain some local areas of the Pourashava. The capacity and outfalls of existing drainage system is not planned with well-defined consideration of drainage areas/zones for the whole Pourashava. Many of the drains randomly fall into relatively low-lying areas. Such arrangement has allowed drainage relief for some local areas and for the time being only. Most of these outfalls will not be available in course of future development at the location of such outfalls without considering planned drainage zones and routes. In absence of planned and adequate drainage system, the Pourashava in some places suffer from drainage congestion and water logging after heavy rainfall. The urban area is increasing and the degree of drainage concern is also increasing. The runoff resulting from rainfall fails to reach the eventual outfall due to lack of planned and systematic drainage network system.

Following the field visits and engineering survey, the main concerns for drainage issues of the Pourashava can be summarized as:

i) Undersized drains,
ii) Obstructions in the drainage system to outfall,
iii) Damages of drains,

iv) Inappropriate/ temporary location of outfalls, and
v) Absence of planned and systematic drainage network system.

The following are the reasons for water logging:

- Absence of planned drainage system;
- Absence of integrated network of secondary drains and road side drains;
- Blocking in the existing drains with small discharge capacity;
- Lack of timely operation and maintenance system;
- Uncontrolled and haphazard disposal solid waste into drainage system; and
- Construction of houses/infrastructures under the flood level.

The acute problems which have been identified by Ward Commissioners and Pourashava are poor drainage. It may be mentioned that number of drains in the urbanized areas within the Pourashava is found to be inadequate. As such, localized flooding occurs during and after heavy rainfalls, causing inconvenience to Pourashava residents and spreading water borne diseases.

98. **Air Quality:** No information is available on local air quality. Population density within the subproject area is high and there are many motor vehicles operating on the subproject roads and other roads within the upazila. It is expected that the subproject will not cause significant deterioration of air quality in the area. Close vegetation is observed in and around the project area. Prior to construction activities, subproject contractors will conduct air quality measurements as baseline. During construction, contractors will be required to conduct air quality measurements and ensure that the subproject does not cause deterioration of ambient air quality. This is included in the environmental management plan.

99. **Acoustic environment: :** Subproject components are in the built-up part of Pourashava with residential, commercial, and institutional establishments. The volume of traffic that passes through these sections is not significant and traffic jams are not frequent. However, vehicular movement can be considered as major cause of noise pollution. The baseline noise level will be measured by the subproject contractors prior to commencement of work. During construction, contractors will be required to conduct noise level measurements and ensure that the subproject does not cause deterioration of ambient noise quality. This is included in the environmental management plan.

B. Ecological Resources

1. Terrestrial Ecosystem

100. **Terrestrial Flora.** The ecological setting is mostly settled countryside with typical homestead and roadside vegetation. A characteristic feature of the landscape is the presence of variety of plant and fruit trees. There are no extensive forested areas in the near vicinity, yet tree cover from cultivated species is noticeable in some areas. There is no natural forest located alongside any of the subproject road. No rare and endangered /protected species of flora are found in the Pourashava or its immediate surroundings. Only roadside trees are found which are largely maintained by the community or social forestry program. A list of terrestrial flora found along the drainage khal including IUCN conservation status is displayed in **Appendix 18**.

101. **Terrestrial Fauna.** The diversified habitat and ecosystem in the proposed area support various types of local birds and animals. Magpie Robin, the national bird of Bangladesh which is commonly known as “Doyel” is frequently found in the subproject area. The wildlife like frogs, toad,

snakes, lizards, tortoise, jackals, rats, shrew, squirrel and bats are common in Chalna area. No rare and endangered/protected species of flora have been reported in the subproject. No wild animals inhabit the area.

2. Aquatic Ecology

102. **Aquatic Flora.** In the shallow water of the floodplains, ponds and swamps of the subproject area, various hydrophytes and floating ferns grow in abundance. Tall grasses present a picturesque site near the bank of khal and the marshes. Different types of aquatic flora species were recorded in the study areas. The most abundant hydrophytes in the project area are Kochuripana *(Eichhornia crassipes),* Topapana *(Pistia stratiotes),* Khudipana *(Lemna minor)* Pata Jhajii *(Vallisneria spiralis),* Shapla *(Nymphaea sp.),* Kolmi *(Ipomoea aquatica),* Helenchaa *(Enhydra fluctuant),* and Duckweed *(Spiredella* sp.). Numerous algae (e.g. *Spirogyra* and *Scytonema)* and amphibian plant, Dhol kolmi(Ipomoea *fistulosa)* are also found in the road side water bodies.

103. **Aquatic Fauna.** The temporary aquatic habitat of the khals and beels have usual aquatic plants and weeds and the fauna include fishes and crustaceans. The common fish species includes carps (*rui, katla, mrigal, silver carp, grass carp, karpio etc.), barbs (putis), Chitol, Folai, catfish (Tengra, Singi, Magur, Boal, Pungus,* Snakehead (*Shol, Taki*), bele, etc. and varieties of prawn (*chingri*). The fisheries in the proposed project area comprises of ponds, beels, rivers, flood lands, borrow pits, and canals. A list of fishes identified in the drainage khal including IUCN conservation status is displayed in **Appendix 19**.

104. **Protected areas:** There are no protected forests, wetlands, mangroves, or estuaries in or near the subproject area.

C. Economic Development

104. **Land Use.** As per information collected from Chalna Pourashava, the total area of Pourashava/municipality is 9.49 sq.km.. Of the total 3559 holdings, 3527 is non-government and 32 is government. Total land area of the Pourashava is 1258ha. Cultivable is 772ha and non-cultivable land is 42ha. Of the total cultivable land, 39ha is double cropped land, 12ha is triple cropped land and 721ha is single cropped land. The use of present Municipality's area can be broadly divided into lands for agricultural (76%) and non-agricultural (24%). (***Source****: Local information and Land use map of Chalna Municipality; Chalna Pourashava – at a glance).*

105. **Industry and Agriculture**. As per Chalna Pourashava statistics, there are a mix of small and medium industries of different types (namely Fish processing factory, rice mill, salt production centre.etc.) and cottage industries (Goldsmith, blacksmith, potteries, bamboo work, cane work etc.) in operation in the Upazila area. Besides there is a gas company which is known as BM Gas Company in the Municipality area. As observed from field visit at proposed subproject site, no industries were found to encroach the ROW for the proposed development. Main crops grown in the area are Paddy, potato, pumpkin, vegetables. Extinct or nearly extinct crops are Jute, sesame, aus and boro paddy.

106. **Infrastructure, Transport and Communications.** As per the information collected from Chalna Municipality, existing infrastructure in Chalna includes many roads that are poorly maintained, degraded in condition and often impassable except at very slow speeds. Itemized these include about Pucca road 15.5 km, RC road 3.75 km, CC road 18.2 km, BFS road 12.5 km, mud road 6.5 km; RCC bridge 6 nos., wooden bridge 3 nos. and culverts 25 nos. Chalna Pourashava has 1 Launch Ghat and 3 Boat landing ghat. Regular bus services are available to

travel other areas of Bangladesh. Internal movement is met by rickshaw, auto-rickshaw, easybike, rickshaw van etc.

D. Social and Cultural Resources

107. **Demography:** According to the 2011 Bangladesh census, Chalna Pourashava had a population of 30,250 of which male population is 16,782 (48.9%) and female population 17,502 (51.1%). Muslim constitutes 94% of the population, Hindus 5%, Christian and others are 1%. Density of population of the Pourashava is 3191 person per km^2. The main sources of income of the residents of the Upazila are agriculture 66.07%, non-agricultural labourer 4.85%, commerce 12.86%, transport and communication 1.72%, service 4.10%, construction 0.93%, religious service 0.24%, rent and remittance 0.05% and others 9.18%.The Chalna Pourashava has an average literacy rate of 63%, against the national average of 32.4% (*Population Census Wing, BBS 2006*).

108. **Local Market and Bazar:** Chalna Pourashava contains 1 Poura Market and 9 smaller bazars are there inside the Pourashava area.

109. **Health and Educational Facilities:** As regards the *Health Facilities* in Chalna Pourashava, there are 1 Govt. Hospital, 1 Clinic, 1 Private Clinics and 1 Animal Hospital. . With regard to *Educational Facilities* in Chalna Pourashava, there are 7 Primary Schools , 4 High Schools, 3 Colleges (Ref. *Chalna Pourashava at a Glance, 2020*).

110. **Water Supply and Sanitation.** *Sources of water supply:* Piped waterline, shallow and deep tube wells are the main source of water supply in the pourashava area. There are Pourashava-owned 10 mini water treatment plants, 1 privately owned and 1 NGO-owned mini water treatmentplant. *Sanitation:* 12 Public toilets under construction, and all the dwelling houses have their own sanitary latrine facilities. There are no organized municipal waste collection and disposal arrangements in the Pourashava. There are 14 Permanent Dustbins are under construction (Ref. *Chalna Pourashava at a Glance, 2020*).

111. **Access to electricity.** All the wards and unions of the Pourashava are under rural electrification net-work. However there are a total of 550 electric poles to support the said net-work (Ref. *Chalna Pourashava at a Glance, 2020*).

112. **Pollution and Road Safety.** People are concerned about increasing pollution in the subproject area as well as safety of people while crossing the roads. No industry within the subproject area found discharging the untreated effluent to local drains, canals and water courses which may result in the contamination of the land area and water bodies.

E. History, Culture and Tourism

113. *Marks of the War of Liberation:* In the Upazila, there is a one Mass killing site (Bajua High School premises) and one memorial monument 1 (Smriti Amlan *Religious institutions:* Mosque 14, temple 14, church 3 and 1 Christian Missionary. . None of these are located near or along the alignments of the subproject and will not be affected by the proposed roadway and drainage improvements works. Based on actual field visits by PMCU in 2017 and 2020, no physical cultural resources are found in the corridor of impacts. **Figure 26** below shows the nearest physical cultural resources are more than 300 m away from the road alignment

Figure 26: Aerial Map Showing the Locations of Cultural Heritage Sites Relative to the Subproject Alignments

F. Socio-economic benefits from the Road Improvement Schemes

114. **Expected outcomes after implementation of the schemes will be:**

- Increased property values and revenue income of the Upazila;
- Improved environmental conditions and reduced environmental pollution risk;
- Improved tourist potential, providing an enhanced business environment for local businesses and investment;
- Increased job opportunities in small industries due to expansion of trade and commerce;
- Increased economic and financial opportunities;
- Creation of short-term employment opportunities in construction work during the period of implementation;
- Improved traffic management, public transport and sustainable environmental conditions; and
- Generation of employment opportunities.

115. **Summary of Environmental Features around the Road Alignments.** To understand the effect of the proposed of the subproject to receptors, information on some important environmental key features for all the two subproject roads have been collected and analyzed. From analysis, these roads reveal more or less similar pattern of environmental features around them. **Table 11** summarizes these environmental features.

Table 11: Summary of environmental features around road alignments

Sl. No.	Environmental Features	Within 100 m from centerline of road	Within 7 km from centerline of road
1	Ecological		
a)	Presence of Wildlife Sanctuary/ National Park	No	No
b)	Reserved Forests	No	No
c)	Wetland/water bodies	Small ponds/ditches. None is protected	1 river (Bhairab) /ponds and ditches, but none is protected
d)	Migratory route for wild animals	No	No
e)	Migratory routes for birds	No	No
f)	Migratory routes for fishes	No	Yes (during rainy season)
g)	Presence of Dolphin	No	No
h)	Tree/vegetation cover	Yes. Moderate trees and vegetation. No threatened or endemic tree.species	Yes. Moderate trees and vegetation. No threatened or endemic tree.
i)	Birds Nesting	No	No
2.	Archaeological Monuments	No	No
3.	Groundwater	Available at low depth, drinking water at about 50 m below ground.	Available at low depth, drinking water at about 50 m below ground.
4.	Land Use	Agricultural, Rural Settlement, Urban Settlement, Commercial, Industrial	Agricultural, Rural Settlement, Urban Settlement, Commercial, Industrial, Some Rural Community Forests (not protected forests).
5.	Physical Cultural structures and social	No religious structures and/ or graveyard are located near the road alignments	No religious structures and/ or graveyard located near the road alignments.

Source: PMCU/LGED field surveys conducted in 2017 and 2020.

G. Baseline and Projected Climate

116. For roads, the critical climate parameter is precipitation in terms of volume and intensity, and their impact on occurrences of flooding depending on location. In combination with geology and geography, a related variable is soil moisture as it affects road foundation stability.

117. Hot days temperature is also an important road design consideration, particularly for asphalt roads, due to its effect on stiffness of the pavement. The stiffness modulus of asphalt is affected by temperature. Migration/bleeding of liquid asphalt is a concern at sustained air temperatures above32°C.For concrete roads, the range of temperature variation determines the proper width of joints, including the composition of the joint sealants.

118. For bridges, the critical design parameter derived from precipitation and catchment characteristics is flood level, which determines the required vertical clearance of the bridge deck.

119. Using gridded climate data from World Bank Climate Change Portal, the following are the baseline (1986-2005) climate features for the subproject area. Also shown are the projections for 2020-2039 (close to the mid-century) derived from World Bank Climate Change Portal high-resolution climate change modelling under a scenario in which atmospheric CO_2 concentration doubles by end-century with reference to mid-1800s (roughly equivalent to RCP 6.0).[13] The Figures here below exhibit the historical observed monthly temperature and precipitation for Bangladesh at Chalna region (89.51, 22.61) (Figs. A & C) and their projected changes (Figs. B & D) compared to the reference period (1986-2005). From analysis with the use of World Bank Climate Portal, it can be noted that a) Mean annual temperature will rise by 0.69^0 C (-0.036°C to 1.36°C) in 2020-2039 (RCP 6.0, Ensemble) and b) Annual precipitation will rise by 14.29mm (-324.85mm to 355.39mm) in 2020-2039 (RCP 6.0, Ensemble). It is to mention that the changes, in projected monthly temperature and precipitation, when presented in comparison to the historical mean, will help the engineers, planners and designers to design projects more effectively with precision.

a) Mean annual temperature will rise by 0.69^0 C (-0.036°C to 1.36°C) in 2020-2039 (RCP 6.0, Ensemble) for Bangladesh at Chalna region (89.51,22.61)	**b) Annual precipitation will rise by 14.29mm (-324.85mm to 355.39mm) in 2020-2039 (RCP 6.0, Ensemble) for Bangladesh at Chalna region (89.51,22.61)**

[13] https://climateknowledgeportal.worldbank.org/

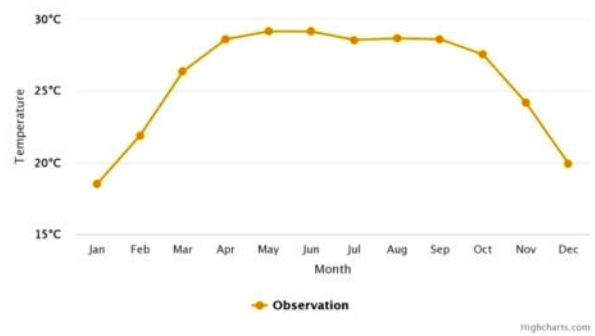


Fig. A

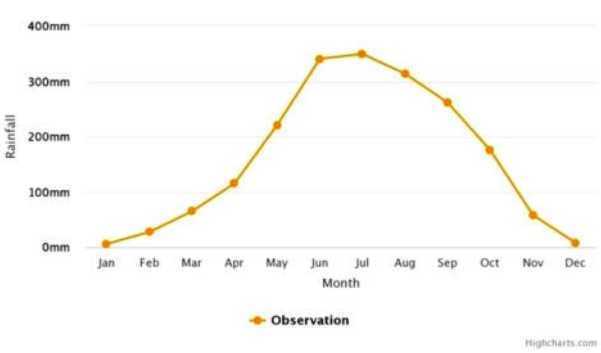


Fig. C

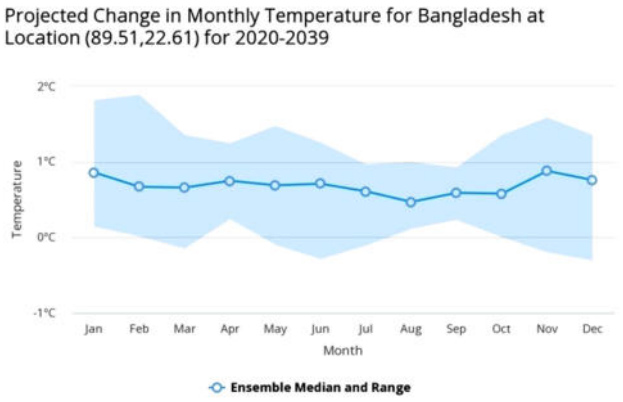


Fig. B

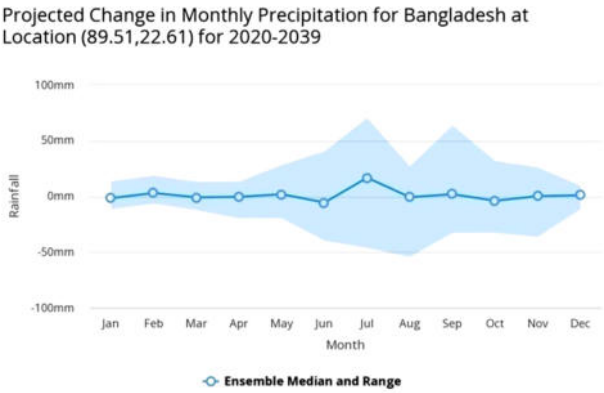


Fig. D

V. ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Compliance with subproject selection criteria

120. The subproject was selected based on the selection criteria in the environmental assessment and review framework (EARF) of Second CRDP. **Table 12** below is a summary of the assessment of compliance with the subproject selection criteria under Second CRDP.

Table 12: Compliance matrix with subproject selection criteria

Criteria	Remarks
1) Complies with all requirements of relevant national, state and local laws, rules and regulations.	Being complied on ongoing basis.
2) Complies with all requirements of ADB Safeguards Policy Statement (SPS) 2009, and follow procedures set down in the EARF.	Being complied on ongoing basis.
3) Does not trigger environmental category A per ADB SPS. In particular, does not encroach any sensitive areas and/or critical habitats per definition of ADB SPS, and does not cause significant adverse environmental impacts that are irreversible, diverse, or unprecedented, which may affect an area larger than the sites or facilities subject to physical works.	Complied.
4) Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List (Appendix 5 of ADB SPS). These activities do not qualify for ADB's financing.	Complied.
5) Avoids any work in or near environmentally sensitive locations, including sites with national or international designation for nature conservation, cultural heritage, or any other reason.	Complied.
6) Does not result in destruction of or encroachment onto physical cultural resources such as archaeological monuments; heritage sites; and 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.	Complied.
7) Alignments or project locations avoid or minimize, when avoidance is not possible, the cutting of trees. Include provisions for compensatory plantation at ten trees per every tree to be cut.	Complied. Included in the EMP.
8) Reflects inputs from public consultation and disclosure for site selection.	Complied. Also, to be complied in future consultations. The IEE provides for this criterion.
9) All the road works shall be designed to blend in with the environment.	Complied.
10) Does not lead to alteration of surface water hydrology of streams/waterways that may result in increased sediment load due to erosion from construction sites.	Complied. Included in the EMP.
11) Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially sensitive receptors as schools/hospitals along the roads.	Complied. Included in the EMP.
12) Ensure requirements for drainage maintenance measures are incorporated into the operations and maintenance manual and suitable budget allowed for to ensure ongoing performance of measures.	Complied. Included in the EMP.
13) For subproject components that may affect natural streams or rivers, all comments and advice received from PMCU, PIU, design engineers, and appropriate departments are incorporated into the planning, design and construction of the subprojects as far as practicable.	Being complied on ongoing basis.
14) Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially sensitive receptors as schools/hospitals along the roads.	Complied. Included in the EMP.
15) Ensure requirements for drainage maintenance measures are incorporated into the operations and maintenance manual and suitable budget allowed for to ensure ongoing performance of measures.	Complied. Included in the EMP.

Criteria	Remarks
16) Ensures detailed designs and environmental safeguards conditions are included in the planning.	Complied. Included in the EMP.
17) Provides for (i) capacity building of PIU staff composting plant operation and maintenance, and (ii) market study on the users of compost to assess sustainability of the demand for such compost.	Complied. Included in the EMP.

B. Assessment of Environmental Impacts and Mitigation Measures – Planning, Location and Design

121. **Impacts due to location.** These The subproject does not involve any special considerations regarding planning and location, since all of the components involve khal and pond re-excavation and rehabilitation of sluice gate within the existing khal section, slope protection, walkway construction and landscaping. These improvement will take effect within the existing right of way that is generally clear, and for which no acquisition or easement for land is required. There is a high degree of certainty that the improvements can be made without affecting permanent structures.

122. In this drainage subproject, there are minor impacts that result from the planning, design or location, because:

(i) The khal and drain improvements are confined within the existing khal boundary;
(ii) No additional acquisition of land will be required;
(iii) If cutting of trees will be needed, compensatory plantation for trees lost will be implemented;
(iv) There is no impact on permanent and temporary structures. Concrete bridges and their foundations will not be touched during the construction and rehabilitation works for the khal;
(v) Khal alignment is neither passing through nor near any ecological sensitive area like forests, reserve forest, National Park or wildlife sanctuary;
(vi) There is no negative impact on water body;
(vii) There is no negative impact on any water supply source like tube wells/hand pumps, wells, etc.;
(viii) There is no negative impact on any community structure;
(ix) There is no negative impact on irrigation structures;
(x) There is no negative impact on religious structures;
(xi) There are no historical/archaeological sites along the khal alignment;
(xii) The subproject involves straightforward construction and rehabilitation activities, so impacts will be mainly localized and not significant; and
(xiii) Construction and rehabilitation activities will be undertaken within public rights-of-way, and no land acquisition and encroachment on private property will arise.

123. **Impacts due to Climate Change.** The impact of climate change is significant for the drainage subproject. The design of the drainage and other associated infrastructures should consider future changes in climate patterns such as flooding due to extended monsoon seasons and increased level of precipitation, droughts, and increased global temperature, among others. More particularly for the subproject, the planning and design of the subprojects should consider the following:

(i) Likely changes in the climatic conditions with respect to temperature, flooding, and rainwater salinity and acidity; and
(ii) Likely impacts on the drainage system climate change-induced heavier and more erratic rainfall.

124. According to the 4th Intergovernmental Panel on Climate Change Assessment Report,[16] continued greenhouse gas (GHG) emission at or above current rates would cause further warming and induce many significant changes in the values of global climatic parameters, mainly temperature, rainfall and mean sea level rise which should strictly be translated and addressed in the planning and design of the subproject.

125. Mitigation Measures. The impacts of climate change will be mitigated upfront during the design and planning stage for the infrastructures. Among these measures are the following:

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

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

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

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

[16] IPCC. 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.

126. Apart from the above climate change considerations in the design of the subproject, the other impacts, issues, concerns and mitigation measures during the design phase are illustrated in Table 13 below.

Table 13: Issues, Concerns and Mitigation Measures During Design Phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed design			
Consideration of sloped areas in subproject design	Soil erosion and slope instability	Incorporate measures and sites for handling excessive spoil materials	PMCU and PDSC
Community canal outlets along the Chalna Khal	Not properly designed outlets will wash down silts and solid wastes, from community canals straight to the Chalna Khal. This will cause heavy accumulation of silts and solid wastes in the Chalna Khal in the medium to long term. Not properly monitored household connections to the community drains may cause direct discharge of domestic wastewater and septic effluent to these canals and lead to the Chalna Khal. This will eventually pollute the Passur River.	Integrate in the design provision for sedimentation or siltation chamber (or similar structure) at each outlet of community canals along the Chalna Khal. Ensure that the design will provide space for maintaining these chambers during the operation and maintenance (O&M) phase. Ensure that appropriate ordinances are in place and implemented that prohibit the discharge of domestic wastewater and septic tank effluents to the community canals.	PMCU, PDSC, Chalna Pourashava
Incorporation of community health and safety measures in the design	Impacts to community health and safety, including incidents of accidental fall of people or vehicles into the canal	Incorporate in the design safety protection along the drainage canals, especially at sections located in the town center and residential or commercial areas. Ensure to include in the design the following: (i) signages in critical areas of the drainage canal; (ii) Barricades or similar structures in accident-prone areas; and (iii) railings, among others.	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Location of trees, utilities and other infrastructures before construction.	Disruption of utility services; False claims from people; Water quality changes due to construction. Interference with other utilities and other infrastructures, including heritage areas, if any, during construction	Design the drainage canal wall and embankment protection works to not cut any trees. In any concreting works around a grown tree, include provision of space around the basal portion of the tree to avoid cracking of the concrete protection in the future as the tree grows. Innovate and design footpaths that will avoid cutting of trees. All utilities such as electric poles, etc. should not be dislocated or moved. If transfer of utilities is necessary, coordinate with the appropriate authorities. Provide budget for restoration/replacement of damaged utilities Provide budget for tree planting as replacement activity for cut trees, if any. Photograph all sites within subproject areas to enable before and after comparison (note: all roads or footpaths are to be reinstated to original character). If deemed required, consult structural engineers to determine the impact of vibration to all kinds of infrastructures adjacent the drainage alignment.	PMCU, PDSC
Construction in the vicinity of residential areas	Nuisance to nearby receptors. Impacts to qualities of ambient air, surface water, groundwater, and land. Impacts to health and safety of community and workers.	Ensure compliance with national or international standards on noise, ambient air and effluent, whichever are more stringent. Ensure all bid and contract documents prepared and finalized have copy of the initial environmental examination (IEE) as attachment.	PMCU, PDSC
O&M Manual preparation	Impacts to health and safety of community.	Prepare a comprehensive O&M manual to include periodic inspection and maintenance of the drainage canal, conduct of repairs, etc.	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Site selection of sources of construction materials such as sand and gravels.	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion; Disturbance in natural drainage patterns, ponding and water logging, and water pollution.	Procure construction materials such as sand, gravels, or aggregates from government-authorized dealers only. If quarrying is to be the source, ensure to conduct at sites authorized by the government such as the Bangladesh Water Resources Development Board for sand quarrying.	PMCU, PDSC
Spoil management and disposal	Inappropriate disposal of spoils will cause nuisances to affected properties, including siltation of canals.	Identify designated disposal sites approved by the Pourashava. A spoil management plan will be developed.	PMCU, PDSC
Construction camps	Inappropriate location for construction camps will impact the general welfare and health and safety of the workers.	Identify construction camp sites that are strategically located relative to the work sites. Ensure these camp sites can be easily provided with the basic amenities for the workers.	PMCU, PDSC

IEE = initial environmental examination, O&M = operation and maintenance, PDSC = preparation, design and supervision consultant, PMCU = Project management and coordination unit, PIU = project implementation unit.

C. Assessment of Environmental Impacts and Mitigation Measures – Construction Phase

127. In the case of this subproject, environmental impacts during construction phase will not be severe because: (i) most of the component works are relatively small and involve straight forward construction, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because of the invasive nature of excavation activities and earth movements; and (iii) being located in the built-up area of the rural and urban areas, will not cause direct impact on biodiversity values.

Construction Method

128. The civil works for drainage construction and/or rehabilitation include earth work excavation. Earth work excavation will be undertaken using various heavy equipment such as bulldozers, backhoes, dump trucks, compactors, etc. Excavation and construction activities will be done through a segmentation or chainage-wise planning with around 100m – 200m per segment or stretch along the drainage alignment. This will ensure that impacts can be easily managed by the contractor. The contractor will provide detail information for labour requirement, construction materials, construction equipment and implementation schedule before commencement of the work.

129. **Non-Compliance with Environmental Legislation.** This issue will arise when there is a lack of awareness among subproject staff and management of environmental safeguard requirements, compliance with the requirements, conditions specified in the IEE report, approval status, and consent.

130. Mitigation measures include (i) capacity strengthening of the PMCU Environmental Officer and the counterpart PIU focal persons on environmental safeguards; and (ii) ensuring that necessary permits are obtained.

Impact on Physical Resources

131. **Topography, Soils & Geology**. The subproject area is a plain land, so there will be no impact on topography. The interventions for the subproject construction activities is on the shallow layer of earth surface and there is no requirement pumping water from deep soil, so there will be no impact on geology.

132. **Sources of Materials**. Significant amount of gravel, sand and aggregate, will be required for this subproject. The contractor will be required to:

(i) Prepare Aggregates Management Plan as part of the SEMP;
(ii) Source aggregates only from entities with environmental clearances and license;.
(iii) Use quarry sites and sources permitted by relevant government agencies only, such as the Bangladesh Water Resources Development Board for sand quarrying;
(iv) No new quarry sites shall be used for the subproject;
(v) Verify suitability of all material sources and obtain approval of implementing agency; and
(vi) Document all sources of materials and include in the monthly reporting to the PIU.

133. **Surface Water Quality.** The civil works will have direct impact to surface water quality of nearby Channel/river connected to subproject khal/s. The construction works will expose the adjacent Pussur river to risks of pollution caused by: (i) poorly managed construction sediments, and waste materials; (ii) poor sanitation practices of construction workers; and (iii) improper storage of petroleum products or chemicals used during construction such as fuel, oil and lubricants. Although construction works will be scheduled during dry season, any unavoidable excavation or construction works during monsoon season will wash down these pollutants to the nearby channel/river.

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

(i) follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;[17]
(ii) dispose excess spoils per the Spoil Management Plan
(iii) locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water);
(iv) shield temporary storage areas with sandbags;
(v) provide adequate water supply and sanitation facilities at work sites;
(vi) provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants;
(vii) provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean-up of equipment, and response measures in case spills or emergencies using a well prepared emergency response plan; and
(viii) ensure no refueling within 100 m from surface water.

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

(i) follow World Bank's EHS Guidelines on Construction and Decommissioning activities (footnote 17)
(ii) collection of recyclable solid wastes and supply to scrap vendors;
(iii) ensure all the camp wastes and construction wastes are placed in the designated waste collection pits (lined to ensure no seepage of leachate) away from receiving water;
(iv) establishment of separate bunded and lined areas with 110% volume for the

storage of all the toxic material wastes, including batteries, oil filters, mobil, burnt oils, etc. at the construction site; and

(v) consultation with PIU on the proper disposal of all residual wastes

135. **Groundwater**. Subproject activities do not interfere with groundwater regime. No groundwater abstraction is proposed and all activities are limited on land surface activities. Groundwater quality may not be impacted by the subproject.

136. However, as a precautionary measure, the mitigation measures for avoiding seepage of pollutants to the groundwater will be in place. Contractors will be required to:

(i) follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17);

(ii) provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality. Contractors will provide construction camps with portable toilets for use of the workers and will ensure that handling of the septic wastes generated will be done by authorized handlers and transporters only; and

(iii) no toilets shall be put up within 500 m from groundwater wells, if any.

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

137. **Air Quality**. While most construction works will be conducted during the dry season, there is potential for creating dust from (i) excavation of dry soil and backfilling, (ii) transport, loading and unloading of natural aggregates; (iii) movement of construction-associated vehicles; (iv) on-site rock crushing and concrete mixing; (v) emissions from construction vehicles, equipment, and machinery used for excavation and construction, which may contain pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons, and (vi) burning of firewood for cooking and heating in work and labor camps.

138. To mitigate the impacts, contractors will be required to:

(i) follow World Bank's EHS Guidelines on Construction and Decommissioning activities (footnote 17)

(ii) confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
(iii) consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials;
(iv) bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites;
(v) damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
(vi) if re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces;
(vii) during demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
(viii) place signage at active work sites in populated areas;
(ix) require trucks delivering aggregates and cement to have tarpaulin cover;
(x) clean wheels and undercarriage of vehicles prior to leaving construction sites;
(xi) limit speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
(xii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
(xiii) use vehicles that have government-issued permits and registrations; and
(xiv) prohibit open burning of solid waste.

139. **Noise Levels.** Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site.[14] The comparative illustration of national standards versus WHO guidelines is in Table 4 of section II.

140. To mitigate the impacts, contractors will be required to:

(i) follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17);
(ii) if applicable to subproject alignment, prepare and implement a noise and

[14] https://www.ifc.org/wps/wcm/connect/06e3b50048865838b4c6f66a6515bb18/1-%2BNoise.pdf?MOD=AJPERES

vibrationmanagement plan that should be part of the SEMP;
(iii) provide prior information to the local public, including institutions such as schoolsand hospitals, about the work schedule;
(iv) use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical;
(v) restrict noisy activities to day time;
(vi) avoid use of noisy equipment or doing noisy works at night time;
(vii) limit engine idling to a maximum of one minute;
(viii) spread out the schedule of material, spoil and waste transport;
(ix) minimize drop heights when loading and unloading coarse aggregates; and
(x) not use horns unless it is necessary to warn other road users or animals of a vehicle's approach

141. **Landscape and Aesthetics**. The construction work is likely to generate considerable quantities of waste soil. Indiscriminate disposal of the soil and waste, excess construction material, concrete, packing materials, containers, lubricants and oils may affect the landscape and aesthetics of local environment.

142. These impacts are negative but short-term and reversible by mitigation measures. As mitigation measures, contractors will be required to:

(i) dispose excess spoils per the Spoil Management Plan attached in **Appendix 6**;
(ii) avoid stockpiling of excess excavated soils as far as possible;
(iii) avoid disposal of any debris and waste soils in or near water bodies/rivers;
(iv) coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;
(v) recover used oil and lubricants and reuse or remove from the sites;
(vi) manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and
(vii) remove all wreckage, rubbish, or temporary structures which are no longer required;

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

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

144. For the disposal of subproject excavated spoils, the contractor shall submit the Spoil management plan showing disposal site before commencing of the work. It is to point out that as per estimation, 97775.96 cum excavated spoil will generate from the excavation of subproject khals and ponds. Of which, 47956.22 cum will be re-used in slope protection of subproject khals and ponds. The cost for disposing surplus excavated soils (49819.74 cum) has been included in the BoQ (Road Item No. 21 and Bridge Item No. 22).

Impact on Ecological Resources

145. Subproject sites are located within the town area. While various flora and fauna resources are found in the municipality, there are no biodiversity sites, protected forests, natural or critical habitats per ADB SPS definitions are found in the area. As such, no impacts on sensitive ecological resources is envisaged.

146. **Impacts on Terrestrial Ecology.** Haphazard site clearing, parking, and movement of construction vehicles and equipment stockpiling, will result in disturbance to the land in the subproject area. However, the subproject area does not include any forest, so the impacts to flora and fauna will be minimal. For trees found along the alignments that will be used for footpaths or drains, the design will ensure that these trees will not be cut.

147. To mitigate these impacts, contractors will be required to:

(i) avoid, or minimize when avoidance is not possible, tree cutting;
(ii) for any tree cut, conduct replacement planting at a ratio of 1:10 consistent with the approved EARF for Second CRDP and social forestry program of LGED (see **Appendix 7** for LGED Tree Plantation Program);
(iii) protect giant trees and locally-important trees (for religious reasons), if any, during implementation;
(iv) prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; and
(v) prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.

148. **Impacts on Aquatic Ecology.** The subproject sites are 3 khals and 2 ponds. One of the subproject khals, namely Chalna khal is connected to the Pussur river. This river is used by many locals for fishing, either for domestic consumption or livelihood. All aquatic species found at the Pussur river are not protected species. Nevertheless, the construction of the subproject may affect Pussur river due to siltation and therefore may impact the quality of the water and eventually the productivity and harvest of these aquatic resources.

149. To mitigate this impact, contractors will be required to:

(i) provide temporary protection at sections adjacent or near ponds or khals to avoid sliding of soils;
(ii) avoid excavation and other civil works during monsoon season;
(iii) store spoils away from these khals/ponds to avoid being washed down the ponds or khals; and
(iv) not undertake construction works near these sites during the spawning and breeding period between June and September.

150. **Impacts on physical cultural resources.** The subproject will not encroach into or run over any physical cultural resources. Strip maps showing no alignments with physical cultural resources, specifically religious establishment. As well, the subproject area is not a potential archaeological area and therefore no impact is envisaged. However, as a precautionary approach, the contractor will be required to:

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

As for religious establishments in the area, there is one identified mosque (an Eidgah Mosque) along the alignment of the khal .

Impacts on the socioeconomic Activities

151. **Traffic and disturbance to community** The impacts will result from excavation works, stockpiling, the operation of construction vehicles and equipment, and accidental damage to utilities (e.g., power supply poles, open drains, and water taps or hoses).

152. To mitigate these impacts, the contractor will be required to:
(i) prepare a traffic management plan in collaboration with local authorities;
(ii) where traffic congestion will likely occur, place traffic flagmen during working hours;
(iii) provide compensation to affected people;
(iv) manage stockpile;
(v) manage pumped water from excavations either to drains or drums for later use;
(vi) relocate the affected power supply poles, and
(vii) advise the concerned authority during accidental damage to utilities.

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

154. To mitigate these impacts, the contractor will be required to implement its approved SEMP, which should include a community health and safety plan following international best practices on community health and safety such as those in Section 4.3 of World Bank Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities.[15] As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:

(i) implement risk management strategies to protect the community from physical, chemical, or other hazards associated with sites under construction and decommissioning;
(ii) restricting access to the site, through a combination of institutional and administrative controls, with a focus on high risk structures or areas depending on site-specific situations, including fencing, signage, and communication of risks to the local community;
(iii) removing hazardous conditions on construction sites that cannot be controlled affectively with site access restrictions, such as covering openings to small confined spaces, ensuring means of escape for larger openings such as trenches or excavations, or locked storage of hazardous materials; and

[15]https://www.ifc.org/wps/wcm/connect/3aa0bc8048855992837cd36a6515bb18/4%2BConstruction%2Band%2BDecommissioning.pdf?MOD=AJPERES

(iv) implement measure to prevent proliferation of vectors of diseases at work sites;
(v) adequate space and lighting, temporary fences, shining barriers and signage at active work sites;
(vi) contractor's preparedness in emergency response;
(vii) adequate dissemination of GRM and contractor's observance and implementation of GRM; and
(viii) upon availability, local people should be given an opportunity for work in the subproject activities.

155. **Occupational health and safety hazards.** Workers will be exposed to the crosscutting threats of the impacts above during construction. Inadequate supply of safe and potable water and inadequate sanitation facilities; poor sanitation practices on site; poor housing conditions; the handling and operation of construction equipment; handling of hazardous substances; exposure to extreme weather and non-observance of health and safety measures pose additional threats to the health and safety of construction workers. Construction workers may be potentially exposed to communicable and transmittable diseases in the community and the workforce. Further to mention that the contractor will prepare Site Specific COVID-19 H&S Plan following the guidelines/instruction of ADB and Government of Bangladesh before the commencement of the work.

156. To mitigate these impacts, contractors will be required to implement its approved SEMP, which should include an occupational health and safety plan following international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities (footnote 9). As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

(i) Communication and Training

a) Training of all workers on occupational health and safety prior to construction works;
b) Conduct of orientation to visitors on health and safety procedures at work sites;
c) Signages strategically installed to identify all areas at work sites, including hazard or danger areas;
d) Proper labeling of equipment and containers at construction and storage sites; and
e) Suitable arrangements to cater for emergencies, including: first aid equipment; personnel trained to administer first aid; communication with, and transport to, the nearest hospital with an accident / emergency department; monitoring equipment; rescue equipment; firefighting equipment; and communication with nearest fire brigade station;

(ii) Physical Hazards

a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;
b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
c) Use of bracing or trench shoring on deep excavation works;

d) Adequate lighting in dark working areas and areas with night works;
e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits;

(iii) General Facility Design and Operation

a) Regular checking of integrity of workplace structures to avoid collapse or failure;
b) Ensuring workplace can withstand severe weather conditions;
c) Enough work spaces available for workers, including exit routes during emergencies;
d) Fire precautions and firefighting equipment installed;
e) First aid stations and kits are available. Trained personnel should be available at all times who can provide first aid measures to victims of accidents;
f) Secured storage areas for chemicals and other hazardous and flammable substances are installed and ensure access is limited to authorized personnel only;
g) Good working environment temperature maintained;
h) Worker camps and work sites provided with housekeeping facilities, such as separate toilets for male and female workers, drinking water supply, wash and bathing water, rest areas, and other lavatory and worker welfare facilities; and
i) Maintain records and make reports concerning health, safety and welfare of persons, and damage to property. Take remedial action to prevent a recurrence of any accidents that may occur.

D. Assessment of Environmental Impacts And Mitigation Measures For Bridge Construction

105. Anticipated impacts and corresponding mitigation measures for bridge construction are summarized in the table below:

Activity / Issues	Potentials Impacts	Proposed Mitigation Measures
Dismantle work of existing pedestrian bridges and excavation/earth work for sluice gate, and walkway	Generation of solid &Construction wastes due to the dismantle works of the existing foot over bridges. /sluice	Cover exposed loose dry soil and wastes materials before disposal; Ensure re-use of the solid wastes and other forms of the wastes materials that are suitable for re-use; Disposal of un-used soil, unsuitable materials and construction wastes at designated dump site.
	Generation of loose soil, waste materials	
	Accidents from careless work by the workers and careless use of hammer and excavator	Operate the hydraulic excavator carefully; Operate the hummer carefully for the dismantle work.
	Air pollution due to black smoke emission from excavator	Regular maintenance of the equipment.
Sand filling/Back filling work	Air and dust pollution affecting nearby settlements	Maintain adequate moisture content of soil and sand during transportation, and handling; Use cover for carrying sand and soil.
Cutting & welding of the reinforcement	Noise pollution due to steel cutter and welding machine if any	Avoid using of rod cutter and wielding machine at night; Avoid prolonged exposure to noise (produced by equipment) by workers.
	Potential health and safety risks from steel cutter and welding machine if any	Ensure use of the personal protective equipment's (helmet, goggles, gloves, safety boot) during cutting and welding of the reinforcement; Availability and access to first-aid equipment and medical supplies in case of any accidents.
RCC (reinforcement cement concrete) work	Air pollution due to black smoke emission from concrete mixer machine and vibrator machine	Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission.
	Noise nuisance from concrete mixer machine and vibrator machine	Avoid operation of the concrete mixer and vibrator machine at night; RCC work should be avoided at schooling time; Inform local people about casting work and potential impacts.

E. Assessment of Environmental Impacts and Mitigation Measures – Operation and Maintenance Phase

158. Once completed, the subproject drainage Khal will provide beneficial environmental impact to the subproject area and its population. Needless to say that potential flooding will be avoided and improved aesthetic or landscape will be expected.

159. However, these beneficial impacts will not be sustained if no proper operation and maintenance is in place. Hence, Chalna Pourashava as PIU will need to undertake the following actions to ensure that the subproject operates sustainably:

(i) Establish a program of regular visual inspection to identify problems early, before they become critical (breakage, plugging, etc.);

(ii) Ensure that all remedial action is implemented promptly, including clearing sediment and other material that could cause blockage, and conducting any required physical repairs to the drains to prevent leaks; and

(iii) Include in the Pourashava budget a permanent allocation for undertaking the above tasks.

VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Consultation

160. Stakeholder consultation and participation was an essential process during subproject preparation. The process of engaging stakeholders and affected people involved key informant interviews, on-site discussions and random field interviews of stakeholders.

Approach and Methodology for Consultation: The approach undertaken for information disclosure and consultation involved the following key processes:

- Idnetification of key stake holders such as primary (direct project influence) and secondary (indirect project influence) stakeholders;
- Undertaking expert consultations, interiews and focus group discussions (FGD);
- Undertaking structured on field consultations interviews and focus groups discussions(FGD) with the respective stakeholders;
- Assessing the influence and impact of the project and these stakeholder groups;
- Summarizing of key findings and observations from the consultations;

161. **Preliminary Consultation.** Public consultations were conducted in January 2020 and March 2020 which were attended by various stakeholders. The summary of consultation meeting is attached as **Appendix 8**. The following are some of the concerns discussed:

(i) The consultees will support the project activities;
(ii) The consultees believe that the project will bring benefit to the community people;
(iii) During the construction period short term, the consultees believe that community activities will be affected. However, the PIU explained that the project will ensure measures shall be put in place to avoid any negative impact to the community;
(iv) It was emphasized that no resettlement and land acquisition will be required for the project. However, compensations will be provided to affected persons who will be temporarily disrupted of their businesses during construction;
(v) It was confirmed with the local stakeholders that there is no protected areas in and around the project areas; and
(vi) It was also confirmed with the local stakeholders that the project will not impact on natural water body and will not contaminate the soil resources.

162. **Future consultations during final detailed design stage**. The stakeholder consultations during the final detailed design stage will continue to discuss about the subproject, including the implementation of the EMP and SEMP developed for the subproject. PMCU, PIU and PDSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS (footnote 16). Chalna PIU will ensure that these consultations include participation of the representatives of institutional establishments along the subproject vicinity alignments such as schools, hospitals, and religious establishments and mosques.

B. Information Disclosure

163. Information shall be disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available for the public in the subproject locations and providing a mechanism for the receipt of comments, and making documents available more widely by lodging them on ADB and LGED websites. LGED through the PMCU will submit to ADB the following documents for

disclosure on ADB's website:[16]

(i) the final IEE report;
(ii) new or updated IEE reports and corrective action plan prepared during project implementation, if any; and
(iii) semi-annual environmental monitoring reports.

164. PMCU will provide relevant environmental information, including information from the relevant documents in a timely manner, in an accessible place and in a form and language(s) understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used.

165. For the benefit of the community, the summary of the IEE will be translated in Bangla and made available at: (i) office of PMCU; and (ii) offices of the Chalna PIU. Hard copies of the IEE will be available in the PMCU and Chalna PIU, and accessible to citizens as a means of disclosing the document and at the same time creating wider public awareness. On demand, the person seeking information can obtain a hard copy of the complete IEE document at the cost of photocopy from the offices of the PMCU or Chalna PIU, on a written request and payment for the same to the Project Director. Electronic version of the IEE will be placed in the official website of LGED after approval of the documents by Government and clearance from ADB. PMCU will issue notification on the disclosure mechanism in local newspapers, ahead of the initiation of implementation of the project, providing information on the project, as well as the start dates, etc. The notice will be issued by the PMCU and Chalna PIU in local newspapers one month ahead of the implementation works. This will create awareness of the project implementation among the public. Posters designed to mass campaign the basic tenets of the IEE will be distributed to libraries in different localities that will be generating mass awareness.

C. Grievance Redress Mechanism

166. Second CRDP will adopt the grievance redress mechanism (GRM) outline of the first CRDP. The GRM shall be set up to register grievances of the people regarding technical, social and environmental aspects. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. The contractor will bear the cost for resolving any grievances. The GRM will be implemented in three levels. See **Figure 24** for the outline.

167. **First Level**. The first level and most accessible and immediate venue for the fastest resolve of grievances is the PIU, chiefly through the Environment and/or Social Safeguard Officers and Project Manager (or equivalent), with assistance from the Environmental and Social Safeguard Specialists of the PDSC. The contact phone number will be posted in the project areas and at PMU and PIU websites and notice boards. Grievances will be resolved through continuous interactions with affected persons and the PIU will answer queries and resolve grievances regarding various issues including EMP implementation, land acquisition, structures acquisition, livelihood impacts, entitlements, and assistance. Corrective measures will be undertaken at the field-level itself within five days and feedback provided to the complainant on actions taken for resolution. All grievances will be documented with full information of the person and issue. A sample grievance form that may be used is in

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

Appendix 9. The suggested format for record-keeping of grievance is in **Appendix 10**.

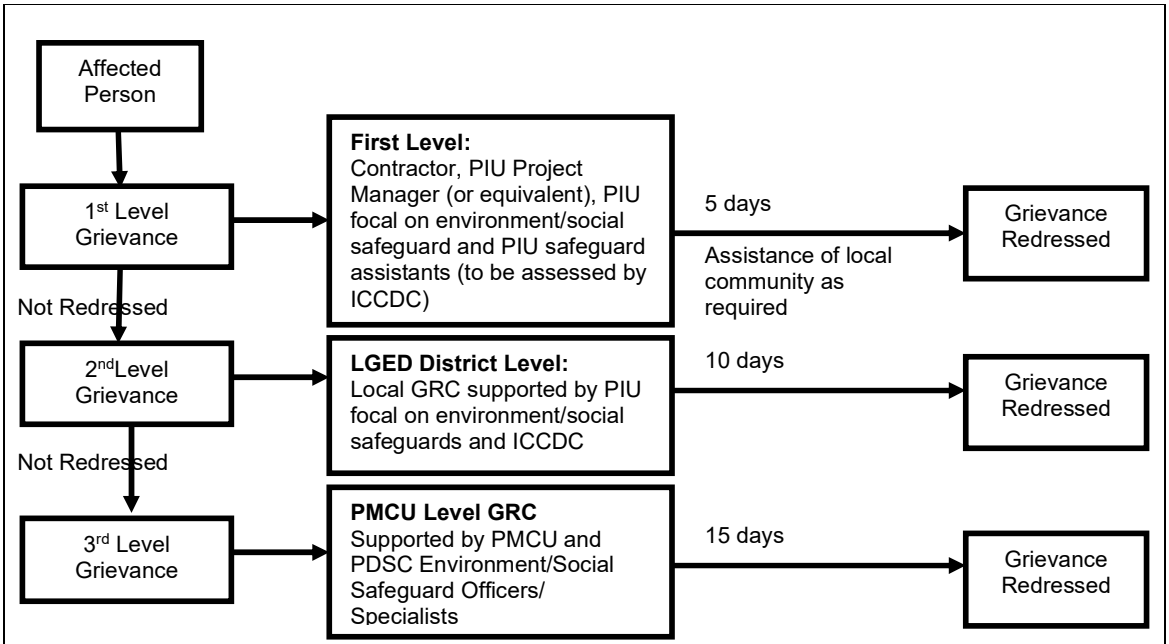
168. **Second Level**. Should the grievance remain unresolved, the PIU Project Manager (or equivalent), will activate the second level of the GRM by referring the issue (with written documentation) to the local Grievance Redress Committee (GRC) of the Pourashava or City Corporation, who will, based on review of the grievances, address them in consultation with the Safeguards Officers of the PIU and PMCU, and affected persons. A hearing will be called, if necessary, where the affected person can present his/her concern/issues. The process will promote conflict resolution through mediation. The PIU Project Manager will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow up actions so that formal orders are issued and decisions are carried out. The local GRC will consist of the following persons: (i) Chief Executive Officer or Secretary of the Upazila Parishad (GRC Chair); (ii) representative of the Chairman of the Upazila; (iii) representative of the affected persons; (iv) official of the land registry department; (v) official of the DOE divisional office; (vi) town planner of the Upazila Parishad; and (vii) environmental and/or social safeguards officers of the PIU. The local GRC shall meet weekly, unless the Head of the PIU informs that there are no grievances to address, or they shall meet as needed as per the severity of the grievance. The local GRC will suggest corrective measures at the field level and assign responsibilities for implementing its decisions.

169. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from land acquisition (temporary or permanent), asset acquisition and eligibility for entitlements, compensation and assistance, and other environmental or social safeguard issues unresolved at the first level of GRM; (ii) record grievances of affected persons, categorize and prioritize them and provide solutions within 10 days from receipt of grievance from the first level; and (iii) report to the aggrieved parties about developments regarding their grievances and decisions of the GRC.

170. **Third Level**. Should the grievance still remain unresolved, the PIU Head will activate the third level of the GRM by informing the PMCU Project Director who will, based on review of the local GRC minutes and consultation with the local GRC Chair, activate the PMCU level GRC. This committee shall comprise the following representatives: (i) Project Director, PMCU, (ii) Deputy Project Director, PMCU; (iii) Environmental/Resettlement Safeguards Officer of the PMCU; (iv) representative from Land Ministry, (v) representative from DOE; (vi) representative of the affected persons; and (vii) Environmental and/or Social Safeguards officers of the PIU. The Project Director will sign off on all grievances received by the PMCU.

171. The GRC at the PMCU level shall meet based on the receipt of grievances, and the meeting shall be convened and grievance redressed within 15 days of receipt of the grievance by the PMCU. The Environmental and/or Social Safeguards Officer of the PMCU will be responsible for processing and placing all papers before the PMCU 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, and final decision conveyed to the complainant.

Figure 27: Project Grievance Redress Mechanism[17]



GRC = Grievance Redress Committee; ICCDC = Institutional Capacity and Community Development Consultants, LGED = Local Government Engineering Department; PDSC = Preparation, Design and Supervision Consultant; PIU = Project Implementation Unit; PMCU = Project Management Coordination Unit.

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

173. In the event that the established GRM is not in a position to resolve the issue, the affected persons can also use the ADB Accountability Mechanism through directly contacting (in writing) the Complaint Receiving Officer at ADB headquarters. The complaint can be submitted in any of the official languages of ADB's Developing Member Countries. The ADB Accountability Mechanism information will be included in the Project Information Document to be distributed to the affected communities, as part of the project GRM.

174. If any grievance related to environmental safeguards issues (like dust generation/pollution, hindrance to pedestrian/vehicular movement, water accumulation at places, haphazard keeping of construction materials at roadside etc.) is raised by community people, such grievances are commonly resolved quickly at the field/local level (1st Step of already established GRM under the project). These type of non-formal complaints are resolve through interaction with complainants and PIU with the help of Environmental/Social safeguard Consultants. As the lodged complaints are mostly linked to the construction works, Contractors are to rectify those and will bear the necessary cost.

[17]Outline adopted from GRM of CRDP, and revised to conform with new arrangements and nomenclatures of Second CRDP.

VII. ENVIRONMENTAL MANAGEMENTPLAN

A. Institutional Arrangements

175. **Project Management Coordination Unit**. LGED will be the executing agency responsible for overall guidance of Second CRDP and implementation of urban roads and solid waste management subprojects. The PMCU, headed by a Project Director will be responsible[18] for planning, management, coordination, supervision and progress monitoring of Second CRDP in the two city regions. The PMCU has the responsibility of fulfilling environmental requirements of the government and conducting required level of environmental assessment as per ADB SPS. To ensure effective implementation of the environmental aspects, one full-time environmental safeguards officer who is a permanent employee of LGED has already been assigned at PMCU. The environmental safeguards officer will primarily be responsible for the compliance to the statutory and legal requirements, including overall supervision of the implementation of the environmental management provisions in the IEEs/EMPs for the subprojects. The PDSC will assist the PMCU in this regard.

176. **Project Implementation Unit**. The Chalna PIU will be responsible for the day-to-day activities of project implementation in the field and will have direct supervision to all contractors at subproject sites. Chalna PIU has already been assigned one environment support staff responsible for day-to-day monitoring of the project progress and implementation of the environmental provisions in the EMP, and the environment staff will ensure compliance with government and ADB requirements on environmental safeguards. The Chalna PIU will prepare quarterly progress reports on all aspects concerning environmental assessment, management, monitoring, and report to the PMCU.

177. **Preparation, Design and Supervision Consultants**. The Preparation, Design and Supervision Consultants (PDSC) team shall include the following environmental safeguards expertise to effectively implement the EARF and relevant provisions of the IEE reports of the subprojects: (i) an international environmental safeguards specialist (to be hired only on as needed basis), and (ii) national environmental specialists (for duration of implementation). These personnel will provide technical support to the PMCU and Chalna PIU including implementation of the environmental requirements, according to ADB SPS, and assist in monitoring impacts and mitigation measures associated with subprojects. The PDSC safeguards specialists will support environmental management functions including updating subproject IEEs with respect to environmental management plans, assisting in preparing IEEs, and assist in monitoring impacts and mitigation measures associated with subprojects. The consultants will also provide needed training and capacity building support to the PMCU and Chalna PIU. The Terms of Reference for project environmental personnel is provided in **Appendix 11**.

178. **Contractors**. The contractors of subprojects will have specific roles in the implementation of the EMPs. Each contractor shall have at least one environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. All these specific roles and responsibilities will be defined in the IEE reports, which shall form part of the contract documents. Chalna PIU will monitor contractors' environmental performance. **Table 14** summarizes the overall roles and responsibilities of PMCU, Chalna PIU, and ADB. More specific roles and responsibilities of these institutions, including the roles and responsibilities of PDSC and contractors shall be defined in the corresponding IEE reports of subprojects.

[18]PMCU responsibilities shall include management of (i) Local Government Grant facility, (ii) Investment components under the Second CRDP, and (iii) Institutional Strengthening and Capacity building of the local governments. The Second CRDP PMCU will be advised by a Technical Advisory and Selection Committee and an Urban Management Support unit.

Table 14: Institutional Roles and Responsibilities

PMCU	PIU	ADB
Pre-construction stage		
Environmental Officer of the PMCU, with assistance from the Environmental Specialist(s) of the MDSC to conduct Rapid Environmental Assessment (REA) for each subproject using checklists available on ADB's website. Based on the REA, categorize the project based on ADB's SPS. Submit all categorization forms to ADB.	MDSC will assist the PIU and conduct IEE (or update existing IEE) for all Category B subprojects, which will include an EMP. PIU with assistance from the Environmental Officer of the PMCU and the Environmental Specialist of the MDSC to carry out public consultation during IEE process and incorporate consultation findings into project designs and IEE.	ADB to review the REA checklists and reconfirm the categorization.
PMCU based on review, will approve the IEE and send to ADB for review and clearance before contract award. The IEE also made available on request. Ensure IEE with the corresponding EMP is part of contract documents for category B subprojects and/or components. If the subproject and/or component is of category 'C', the PMCU to provide generic mitigation measures, if any, to be implemented. For Category C subprojects, no IEE/EIA is required, only a review of the environmental implications.	After the approval of IEE by PMCU and clearance by ADB, PIU with the assistance of MDSC to disclose the IEE and EMP to public information as required by ADB's SPS. MDSC, on behalf of the PIU, to incorporate mitigation measures in project design, specified in IEE and incorporate environmental mitigation and monitoring measures that need to be incorporated into contract document.	ADB will review and grant clearance of IEE/EMPs for subprojects before award of contracts. ADB will disclose cleared and government-endorsed IEEs on its website.
Environmental Officer of PMCU to provide guidance to the PIU to ensure conformance of all subprojects to the regulatory compliance, with regard to environment. This shall include guidance in preparation of the documents as required for the issuance of ECC under the ECR and other necessary clearances such as for example tree cutting permits from the Ministry of Environment and Forests, submission of application forms, and liaising with agencies towards obtaining ECC, tree-cutting permits, and other clearances from relevant government agencies. Environmental Officer of PMCU shall notify the ADB on obtaining of these clearances, including the conditions specified if any in the clearances, and integration of these into the contracts/EMP.	ECR stipulates that for (i) green, (ii) orange-A, (iii) orange–B, and (iv) red category projects, obtaining of environmental clearance certificate from DOE is a prerequisite. The Environmental Support staff of the PIU with assistance from MDSC Environmental Specialists shall compile the necessary information required for submission of application forms for clearances, obtaining NOC from local authorities, etc. Until the obtaining of clearance certificate from DOE, the Environmental Support Staff will interact with the DOE on a regular basis and provide necessary documentation/clarifications as required.	ADB to ensure that the clearance requirements are included in the contract provisions/EMP.
Environmental Officer of PMCU to ensure that the IEE containing the EMP of each subproject is included in the bid and contract documents. At the same time, the Environmental Officer of PMCU to ensure that the total budget for implementing the EMP is included in the bid and contract documents.	The environmental support staff of PIU to ensure that: (i) each contractor prepares its SEMP based on the EMP in the subproject IEE, and (ii) budget is included in the SEMP.	
Construction stage		
PMCU to review the PIU monthly monitoring reports to ensure that all	Contractors to conduct environmental monitoring and implement EMPs. PIU with	ADB to review the reports

PMCU	PIU	ADB
mitigation measures are implemented. PMCU to consolidate the monthly reports and submit semi-annual reports to ADB for review. Corrective actions to be undertaken if needed.	support of the Environmental Specialist(s) of MDSC to (i) review and approve the contractors' implementation plan for the environmental provisions in the EMP, and (ii) monitor the implementation of mitigation measures by contractor. The MDSC with PIU to prepare monthly progress reports including a section on implementation of the mitigation measures and submit to PMCU for review. PMCU to submit semi-annual monitoring report to ADB.	and provide necessary advice/guidance needed to the PMCU.
Operation Stage		
LGED and PIUs to conduct monitoring, as specified in the environmental monitoring plan of EMP. The DOE to monitor the performance, if required and as specified in monitoring plan of EMP.		ADB to review semi-annual environmental monitoring report and disclose on its website. ADB to prepare Project Completion Report
PMCU to continue submission of semi-annual environmental monitoring report to ADB until ADB issues a Project Completion Report.		

ADB = Asian Development Bank, DOE = Department of Environment, ECC = Environmental Compliance Certificate, ECR = Environmental Conservation Rules, EIA = Environmental Impact Assessment, EMP = Environmental Management Plan, IEE = initial environmental examination, MDSC = Management, Design, and Supervision Consultant, NOC = no objection certificate, PIU = Project Implementation Unit, PMCU = Project Management Coordination Unit, REA = Rapid Environmental Assessment, SPS = Safeguards Policy Statement.

B. Environmental Management Plan

179. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels (**Table 15**).

180. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMCU, Chalna PIU, consultants and contractors. The EMP will (i) ensure that the activities are undertaken in a responsible non-detrimental manner; (ii) provide a pro-active, feasible and practical working tool to enable the measurement and monitoring of environmental performance on site; (iii) guide and control the implementation of findings and recommendations of the environmental assessment conducted for the subproject; (iv) detail specific actions deemed necessary to assist in mitigating the environmental impact of the subproject; and (v) ensure that safety recommendations are complied with. The EMP includes a monitoring program to measure the environmental condition and effectiveness of implementation of the mitigation measures. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries.

181. The contractor will be required to (i) carry out all of the mitigation and monitoring measures set forth in the approved EMP; and (ii) implement any corrective or preventive actions set out in safeguards monitoring reports that PMCU will prepare from time to time to monitor implementation of this IEE, EMP and site-specific EMP (SEMP). The contractor shall allocate budget for compliance with these IEE, EMP and SEMP measures, requirements and actions. The contractor will be required to submit to PIU, for review and approval, SEMP including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid wastes and excavation spoils; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program per EMP. No works can commence prior to approval of SEMP. The contractor will prepare Site-specific COVID-19 Health and Safety Plan before commencement of construction following the guidelines of ADB and Government of Bangladesh.

Table 15: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Design and Pre-Construction Phase					
Consents, permits, environmental clearances, etc.	Failure to obtain necessary consents, permits, etc. can result to design revisions and work stoppage	Obtain all of the necessary consents, permits, environmental clearances, etc. before the start of civil works. Include in detailed design drawings and documents all conditions and provisions if necessary.	PMCU, Chalna PIU, and PDSC	Incorporated in final design and communicated to contractors.	Before award of contract
Existing utilities such as electric poles, water supply lines, sewerage lines, telephone cables, etc.	Disruption of services	Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction. Require construction contractors to prepare a contingency and spoil management plan.	PMCU, Chalna PIU, and PDSC	List of affected utilities and operators; Bid document to include a requirement for a contingency plan for service interruptions, e.g. provision of water if disruption is more than 24 hours, spoil management plan.	During detailed design phase; Review of spoils management plan: Twice (once after first draft and once before final approval)
Storm water runoff and conveyance of pollutants.	Besides stormwater, silts, solid wastes, domestic wastewater and septic tank effluents from within the residential and commercial establishments may enter the subproject Khal and pollute the Passur River.	The design to consider the following: The inlet design to ensure that only storm or rain water flows into the drainage system; Prevent households from connecting outlets of septic tanks and grey water to the community canals;	PMCU, PDSC, Chalna Pourashava	Incorporated in the drainage master plan and in the final detailed design. Testing of water quality of subproject khal	During detailed design phase During post construction phase Once in a year (Chalna Pourashava will bear the cost)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	Also, the silts and solid wastes from the community canals may be washed down to the subproject khals, which could result to heavy siltation of the Khal and obstruct flow along the khal in the medium to long term.	Provide siltation or sedimentation chambers (or similar structures) at all outlets of community canals along the Subproject Khal to prevent accumulation of silts and solid wastes in the said canal. This will also prevent potential pollution of the Passur River; and Position the outlets of community canals enough to have space for the provision of siltation or sedimentation chambers (or similar structures), including accessibility during operation and maintenance (O&M) phase.			
Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	Determine locations before award of construction contracts.	Chalna PIU and PDSC	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land.	During detailed design phase
Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	Follow the principle of "Reduce, Reuse, Recycle, and Recover" Prohibition of unwanted littering and discharge of waste. Solid waste is managed and disposed through the municipal collection system.	Contractor	Contractor's records. Visual inspection.	Visual inspection by Chalna PIU on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		Develop a plan for waste management prior to commencing of construction and get approval from PIU.			
Sources of raw materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, resulting water logging, and water pollution	Prepare list of quarry sites and approved sources of materials.	Chalna PIU and PDSC	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of quarry sites	During detailed design phase, with a discussion with detailed design engineers and Chalna PIU on the suitability of sources and permit for additional quarry sites if necessary.
EMP Implementation Training	Impact to the environment, workers, and community	Project Manager and Contractor should be trained on EMP implementation, including spoils management, traffic management, community and occupational health and safety, COVID-19 health & safety, Bangladesh Labor Act, and other standard operating procedures.	PMCU, Chalna PIU, PDSC, Contractor's EHS Supervisor (or equivalent)	Record of completion of training (Safeguards Compliance Orientation). Contractor records for EMP implementation at worksites.	During the detailed design phase and before the mobilization of workers to site
Environmental baseline data for parameters air quality, noise level, water quality etc.	Failure to establish the environmental quality benchmark for subsequent monitoring would lead to an absence of yardstick to compare to and thus analyze the magnitude of the impact from subproject construction activities	Analyze and gather baseline environmental data (Ambient air quality (PM10, PM2.5, NOx, SOx & CO); Surface water (pH, DO, Cl- BOD5d, COD, NH4/NO3, TSS, TDS & total coliform); Ground water quality (pH, DO, Cl-, EC, As, NO3 BOD5d, COD,);and Noise level	Contractor, Chalna PIU, and PDSC	Testing of Ambient air quality; Surface water quality ; Ground water quality and Noise level	Once before construction activities commence (sampling will take place at the start and end part of the khals

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
2. During Construction Phase					
A. Physical Characteristics					
Topography landforms, geology, and soils and river morphology and hydrology	Sand, gravel or crushed stone will be required for this subproject. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on the river).	Prepare Aggregates Management Plan as part of the SEMP. Source aggregates only from entities with environmental clearances and license. Use quarry sites and sources permitted by relevant government agencies only, such as the Bangladesh Water Development Board for sand quarrying. No new quarry sites shall be used for the subproject. Verify suitability of all material sources and obtain approval from implementing agency. Document all sources of materials and include in the monthly reporting to the PIU.	Contractor	Records of sources of materials.	Chalna PIU on a monthly basis
Construction of component of the subproject (Bridge, sluice gate, walkway etc.)	Construction related impact Dust emission Noise pollution	Cover exposed loose dry soil and wastes materials before disposal; Ensure re-use of the solid wastes and other forms of the	Contractor	Contractor records for EMP implementation at worksites.	Chalna PIU on a monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	Pedestrian and vehicle movement	wastes materials that are suitable for re-use; Disposal of un-used soil, unsuitable materials and construction wastes at designated dump site. Operate the hydraulic excavator carefully; Maintain adequate moisture content of soil and sand during transportation, and handling; Use cover for carrying sand and soil. Avoid prolonged exposure to noise (produced by equipment) by workers. Avoid operation of the concrete mixer and vibrator machine at night; Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission. Inform local people about casting work and potential impacts.			
Water quality	Pollution of Pussur River due to: (i) poorly managed construction sediments, and waste materials; (ii) poor sanitation practices of construction workers; and (iii) improper storage of	Dispose excess spoils as per the sample Spoil Management Plan attached in Appendix 4 of IEE. Locate temporary storage areas on flat grounds and	Contractor	Areas for stockpile storage of fuels and lubricants and waste materials. Number of silt traps	Visual inspection by Chalna PIU and PDSC on weekly basis Frequency and

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	petroleum products or chemicals used during construction such as fuel, oil and lubricants.	away from any surface drainage routes (ideally at least 100 m from surface water). Shield temporary storage areas with sandbags. Provide adequate water supply and sanitation facilities at work sites. Provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. Provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean up of equipment, and response measures in case spills or emergencies. ensure no refueling within 100m from surface water.		installed along trenches leading to water bodies. No visible degradation to nearby drainage, water bodies due to construction activities. Results of river water quality testing.	sampling sites to be finalized.
Groundwater quality	Pollution of groundwater resource due to potential seepage of construction chemicals such as fuels and temporary latrines at construction camps.	Provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality. Provide portable toilets at construction camps and	Contractors	Areas for stockpile storage of fuels and lubricants. Availability of sanitary latrines at construction camps.	Visual inspection by Chalna PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		ensure handling of the septic waste will be done by authorized transporters. If pit latrines is to be used, contractors to ensure it follows the guidelines set by the government on installation of latrines and/or follow international best practice requiring latrines to be least 30 m from any receiving body of water or drinking water source depending on the type of soil in the area.			
Air quality	Excavation and construction works will create dust from various sources such as excavation of dry soil; backfilling; loading, transport and unloading of raw materials and spoils; movement of vehicles; rock-crushing; and concrete mixing. Smoke emission from construction vehicles and burning of fuels from labor camps may contain pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons that are dangerous to human health.	Confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP). Consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials. Bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites. Damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. If re-surfacing of disturbed roads cannot be done immediately, spread crushed	Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; A certification that vehicles are compliant with air quality standards. Results of ambient air quality testing.	Visual inspection by Chalna PIU and PDSC on monthly basis Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		gravel over backfilled surfaces. During demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris. Place signage at active work sites in populated areas. Require trucks delivering aggregates and cement to have tarpaulin cover. Clean wheels and undercarriage of vehicles prior to leaving construction sites; Limit speed of construction vehicles on access roads and work sites to a maximum of 30 km/h. Prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes). Use vehicles that have government-issued permits and registrations. Prohibit open burning of solid waste.			
Acoustic environment	Noise level at the construction sites and their vicinities may be elevated due to construction	Provide prior information to the local public, including institutions such as schools and hospitals, about the work	Contractor	Number of complaints from sensitive receptors;	Visual inspection by Chalna PIU and PDSC on monthly

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	activities. This will impact both the workers and community people near the construction sites, especially in noise-sensitive areas such as near health care facilities, educational institutions and places of worship.	schedule. use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical; restrict noisy activities to day time; avoid use of noisy equipment or doing noisy works at night time; limit engine idling to a maximum of one minute; spread out the schedule of material, spoil and waste transport; minimize drop heights when loading and unloading coarse aggregates; and not use horns unless it is necessary to warn other road users or animals of a vehicle's approach.		Use of silencers in noise- producing equipment and sound barriers; Results of ambient noise level measurements.	basis. Frequency and sampling sites to be finalized.
Aesthetics	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	dispose excess spoils as per the sample Spoil Management Plan attached in Appendix 4 of IEE; avoid stockpiling of excess excavated soils as far as possible; avoid disposal of any debris and waste soils in or near	Contractor	Number of complaints from sensitive receptors; Worksite clear of hazardous wastes; Worksite clear of any wastes unutilized materials, and debris;	Visual inspection by Chalna PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		water bodies/rivers; coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; recover used oil and lubricants and reuse or remove from the sites; Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and Remove all wreckage, rubbish, or temporary structures which are no longer required.		Transport route and worksite cleared of dirt	
B. Ecological Resources					
Terrestrial ecology including terrestrial biodiversity	Removing and damaging flora and fauna by the construction workers	Prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; Prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.	Contractor	Complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	Visual inspection by Chalna PIU and PDSC on monthly basis
Aquatic ecosystem	Construction and rehabilitation works at the subproject Khal will degrade the quality of water flowing to the Pussur River. As such, aquatic species found at the Pussur river	avoid excavation and other civil works during monsoon season; store spoils away from the canal to avoid being washed	Contractor	Reports of Contractors to Chalna PIU.	Visual inspection by Chalna PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	will be affected.	down back to the canal; and not undertake construction works near these sites during the spawning and breeding period between June and September.			
Slope erosion and canal sedimentation	Sedimentation of surface drainage networks, biological systems disruption	Retaining the existing plants and vegetation of canal bank and palisading, Scheduling to avoid heavy rainfall periods Contouring and minimizing length and steepness of slopes Mulching to stabilize exposed areas Re-vegetating areas promptly Designing channels and ditches for post-construction flows Lining steep channel and slopes (e.g. use jute matting)	Contractor	Visual Inspection	Monthly in the segment of construction.
C. Socioeconomic Characteristics					
Traffic and disturbance to community	At some areas along the subproject Khal, some construction and rehabilitation works will impede the flow of traffic. These activities may also cause damage to	prepare and implement a traffic management plan in collaboration with local authorities; where traffic congestion will likely occur, place traffic	Contractor	Traffic route during construction works, Including number of permanent signs, barricades, and flagmen on worksite;	Visual inspection by Chalna PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	community facilities and utilities that could result to inconvenience of the local people.	flagmen during working hours; provide compensation to affected people; manage stockpile; manage pumped water from excavations either to drains or drums for later use; relocate the affected power supply poles, and advise the concerned authority during accidental damage to utilities. erect and maintain barricades if required inform through display board about nature, duration of construction and contact for complaints complete the work quickly nearby institution, place of worship, business, hospitals, and schools. consult with business and institutions for workschedules. restore damaged properties and utilities		Number of complaints from sensitive receptors; Some signages placed at the subproject location; Number of walkways, signages, and metal sheets placed at subproject location	
Socioeconomic status	Opportunity for increasing local revenue.	Engage the local workforce. Secure construction materials from local market.	Contractor	Employment records; Records of sources of materials Records of compliance to Bangladesh Labor	Visual inspection by Chalna PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				Act 2006	
Community health and safety	Construction works will impede the access of residents and business in limited cases	Implement the community health and safety plan in the SEMP, which follows international best practices on occupational health and safety such as those in Section 4.3 of World Bank EHS Guidelines on Construction and Decommissioning Activities Restrict work force in designated areas. Identify stockyard areas in consultation with local administration Work on private land requires written permission of landowners and PDSC. Prefer small mechanical excavator for trenching Construct gender friendly toilets for workers Prohibit alcohol and drugs on site Prevent excessive noise; Code of conduct for workers includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no	Contractor	The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (Appendix 10); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at the subproject location; Agreement between landowner and contractors in case of using private land as work camps, storage areas, etc.	Visual inspection by Chalna PIU and PDSC on weekly basis Frequency and sampling sites to be finalized

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		trespassing, no residence at construction sites, and no obligation to potentially dangerous work Maintain a complaint logbook in workers camp and take action promptly of complaints			
Workers Health & Safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working at height and excavation works. COVID-19 hazards as well as the usual construction and transportation hazards	Implement the occupational health and safety plan in the SEMP, which follows international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities Comply Labor Act 2006 Exclude public from worksites Provide personal protective equipment to workers and ensure their effective usage Document procedures to be followed for site activities; and Maintain accident reports and records. Make first aid kits readily available Maintain hygienic accommodation in work camps.	Contractor	Equipped first-aid stations; Medical insurance coverage for workers; Number of accidents; Records of supply of uncontaminated water; Condition of eating areas of workers; Record of health and safety orientation training; Availability of personal protective equipment at construction site; Number of moving equipment outfitted with audible back- up alarms; Signage for storage and disposal areas; Condition of sanitation facilities for workers; and	Visual inspection by Chalna PIU and PDSC on a weekly basis. Frequency and sampling sites to be finalized

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		Ensure uncontaminated water for drinking, cooking and washing, Assure clean eating areas Make sure sanitation facilities are readily available Provide medical insurance coverage for workers; Provide orientation for guest visitors; Ensure that visitors do not enter hazard areas unescorted; Require workers to wear high visibility clothes; Ensure moving equipment is outfitted with audible backup alarms; Chemical and material storage areas need to be marked clearly; Use of earplugs enforced at work areas with high noise level caused by operating equipment or machineries at the sites. Train all site personnel on environmental health and safety including COVID-19 health 7 safety		Records of results of noise level measurements.	

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
D. Historical, Cultural, and Archaeological Characteristics					
Physical and cultural heritage	The subproject will not encroach or run over into any physical, and cultural resources. As well, the subproject area is not a potential archaeological area and therefore no impact is envisaged. There are no archaeological, paleontological, or architectural sites of significance listed by Bangladesh Department of Archaeology.	However, as a precautionary approach, the contractor will be required to: strictly follow the protocol by coordinating immediately with Chalna PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works; stop work immediately to allow further investigation if any finds are suspected; and request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find, and comply with further instructions.	Contractor	Records of chance finds	Visual inspection by Chalna PIU and PDSC on monthly basis.
E. Others					
Submission of EMP implementation Report	Unsatisfactory compliance to EMP	Appointment of EHS supervisor Timely monitoring reports with field photographs	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by Contractor to Chalna PIU; Quarterly report by Chalna PIU to PMCU, and Semi-annual report by PMCU to ADB.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
3. Post-Construction Phase					
Post Construction Activities	Damage due to debris, spoils, excess construction materials	Remove spoils wreckage, rubbish, or temporary structures no longer required; All excavated roads shall be reinstated to original condition; All disrupted utilities should be restored; All affected structures rehabilitated /compensated; The construction camp needs to clear of spills; e.g. oil, paint, etc. and other pollutants after dismantling; All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled; Request PMCU/PIU in writing that worksites and camps are vacated and restored to pre-project conditions.	Contractor	PMCU and/or Chalna PIU report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	Before handover of completed works to Chalna PIU.
Environmental legislation compliance	Lack of awareness in Chalna PIU about legislations and IEE requirements	Strengthen capacity of Chalna PIU staffs	PMCU, Chalna PIU, PDSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	Chalna PIU - After completion of the drainage subproject

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Domestic wastewater discharge	Illegal entry of waste water from buildings or households; Solid Waste disposal to the drains resulting to water pollution and clogging.	The design includes cover slab for the proposed drain hence, it should be ensured that each drain is provided with cover slab Prepare and implement maintenance plan. Provision of regular monitoring. Put into effect the local ordinance that prohibits discharge of domestic wastewater, septage and solid wastes into community canals including the subproject Khals.	Chalna PIU	Water quality of discharge at outfalls	Chalna PIU - Quarterly depending on the situation and capacity Chalna PIU

C. Environmental Monitoring Program

182. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist. **Table 16** shows the proposed Environmental Monitoring Plan for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

Table 16: Environmental Monitoring Program

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PRE-CONSTRUCTION					
Secure Environmental Compliance Certificate from Department of Environment	PMCU office	PMCU, PDSC	Copy of approved ECC	Before construction activities	PMCU, PDSC
IEEs and EMPs are included in bid and contract documents	PMCU office	PMCU, PDSC	Copies of bid and contract documents	Before approval tender document	PMCU, PDSC
Site-specific EMP (SEMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SEMP	Before construction activities commence	PMCU, PDSC
Spoil Management Plan (SMP) submitted by Contractor for approval by PIU	PIU office	Contractor, PIU	Copy of approved SMP	Before construction activities commence	PMCU, PDSC
Traffic Management Plan (TMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PMCU, PDSC
Baseline environmental data gathering: Sampling & measurement of **Ambient air quality** (PM_{10}, $PM_{2.5}$, NOx, SOx & CO); **Surface water** (pH, DO, **Cl^-** BOD^{5d}, COD, NH^4/NO^3, TSS, TDS & total coliform); **Ground water quality** (pH, DO, Cl^-**, EC,** As, NO^3 BOD^{5d}, COD,);and **Noise level**	All subproject sites	Contractor	Sampling & measurement of Ambient air quality (Surface water Ground water quality and Noise level	Once before commencement of construction activities (sampling will take place at the start and end part of the khals)	PMCU, Chalna PIU, PDSC
Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before construction activities commence	PMCU, Chalna PIU, PDSC
CONSTRUCTION					
Implementation of SEMP; including implementation of community and occupational health and safety measures, consulting businesses and institutions regarding operating hours and factoring this in work schedules and ensure there is provision of alternate access to businesses and institutions during construction activities, etc.	Subproject sites	Contractor	Site visits, Contractor records,	Weekly or as needed	Chalna PIU, PDSC
Implementation of SMP, Implementation of SMP, which include disposal of spoil material at a location approved to by Chalna PIU, use of tarpaulin or similar cover to trucks during transport, quick removal of spoils stocked at construction sites, etc.	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	Chalna PIU, PDSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
Implementation of TMP, , including the list of roads to be closed, number of flagmen to be designated along length of drainage per work day, type and number of signs/barricades to be used, etc	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	Chalna PIU, PDSC
Conduct of analytical tests of **Ambient air quality** (PM_{10}, $PM_{2.5}$, NOx, SOx & CO); **Surface water** (pH, DO, **Cl^-** BOD^{5d}, COD, NH^4/NO^3, TSS, TDS & total coliform); **Ground water quality** (pH, DO, Cl^-**, EC,** As, NO^3 BOD^{5d}, COD,);and **Noise level**	Subproject sites	Contractor	Contractor records, Results of laboratory analyses	At least semi-annual or before completion of construction activities (sampling will take place at the start and end part of the khals)	PMCU, Chalna PIU, PDSC
Develop and apply archaeological protocol to protect chance finds	All subproject sites	Contractor, PMCU, Chalna PIU, PDSC	Contractor records	Once until protocol is approved	PMCU, Chalna PIU, PDSC
Provide EHS training for all personnel	All subproject sites	Contractor	Contractor records; Interviews to workers	Monthly	Chalna PIU, PDSC
Keep accident reports and records	All subproject sites	Contractor	Contractor records; Interviews to workers and community people	Monthly	Chalna PIU, PDSC
Employ workforce from communities near sites	All subproject sites	Contractor	Contractor records	Monthly	Chalna PIU, PDSC
Implementation of EHS measures at construction camps	Construction camp sites	Contractor	Site visits; Interviews to workers at camps	Monthly	Chalna PIU, PDSC
Management of wastes, aquatic ecosystem, slope erosion, canal sedimentation and reinstatement of sites	All subproject sites	Chalna PIU	Site observation	Monthly	Chalna PIU
OPERATION AND MAINTENANCE					
Passage of local ordinance prohibiting discharge of wastewater, septage and solid wastes into community drains including the subproject Khal.	Pourashava Office	Chalna PIU	Records of Pourashava	Start of O & M Phase	Chalna PIU
Maintain safe passage for vehicles and pedestrians during maintenance activities	Subproject road sites	Chalna PIU	Site observations	Monthly	Chalna PIU
Maintain all (i) safety structures such as railings and footpaths along the drainage embankment; and (ii) warning signages at critical points along the drainage alignment particularly the accident-prone areas and areas near institutional establishments such as schools, places of worship, hospitals.	Subproject road sites	Chalna PIU	Site observations	Monthly	Chalna PIU
Provide signboards informing nature and duration of maintenance activities	Subproject road sites	Chalna PIU	Site observations	Monthly	Chalna PIU

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
Prevent run-off/deposit of foreign materials (oil, grease, solid waste, plastics) into water courses, and clean drain periodically; dispose of materials removed from drains	Subproject road sites	Chalna PIU	Site observations	Monthly	Chalna PIU
Dispose of material from blocked drain in location away from roadway and drain	Subproject road sites	Chalna PIU	Site observations	Monthly	Chalna PIU
A proper traffic management plan can be introduced and strictlyfollow the BRTA rules;	at bridge/road sites	Chalna PIU	Site observations	Start of O & M Phase	Chalna PIU
Establish the speed breaker and safety sign near the bridge site to limit the speed of the vehicle and to reduce the occurrence of accidents	at bridge sites	Chalna PIU	Site observations	Start of O & M Phase	Chalna PIU
Bridge site should be clean properly after completion of theconstruction activities so that the natural drainage system may not hampered	at bridge sites	Chalna PIU	Site observations	Start of O & M Phase	Chalna PIU
Proper removal of construction camp facilities and construction wastes from the bridge site after completion of the works	at bridge sites	Chalna PIU	Site observations	Start of O & M Phase	Chalna PIU
Ensure no throwing of trashes (empty soft drink cans/bottles and any kind of solid wastes into the khal by installing/hanging trash cans/bins	at bridge sites	Chalna PIU	Site observations	Weekly	Chalna PIU

D. Capacity Development Training

183. The PMCU safeguards experts (environmental and social) with support from PDSC Environment Specialist and Social Safeguard Specialist will be responsible for training the Chalna PIU' safeguards officers (environmental and social). Training modules will need to cover safeguards awareness and management in accordance with both ADB and government requirements as specified below:

(i) Environmental Safeguards
  (a) sensitization on ADB's policies and guidelines on environment;
  (b) introduction to environment and environmental considerations in roads, drainage and solid waste management projects;
  (c) review of IEEs and integration into the project detailed design;
  (d) improved coordination within nodal departments; and
  (e) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites.

(ii) Social Safeguards
  (a) sensitization on ADB's policies on Involuntary Resettlement and Indigenous People;
  (b) introduction to social safeguards assessment and document requirements;
  (c) Consultation and participations requirements;
  (d) Project GRM and ADB's Accountability Mechanism (AM); and
  (e) monitoring and reporting system.

184. The proposed training project along with the frequency of sessions is presented in **Table 17**.

Table 17: Training Program for Environmental Management

Items	Pre-construction	Construction	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staff	Experiences and best practices sharing
Purpose	To make the participants aware of the environmental safeguard requirements of ADB and Government of Bangladesh and how the project will meet these requirements	To build the capacity of the staff for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and Government of Bangladesh	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	Module 1: Orientation ADB Safeguards Policy Statement Government of Bangladesh Environmental Laws and Regulations Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental	Roles and responsibilities of officials/contractors/consultants towards protection of the environment Environmental issues during construction Implementation of EMP Monitoring of EMP implementation Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed

Items	Pre-construction	Construction	
	assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts Module3: COVID-19 H&S Training and OH&S training program for the contractor and PIU with special emphasis of handling pandemic situation.		
Duration	1 day	1 day	1 day on a regular period to be determined by PMCU and PDSC
Participants	PMCU and PIU staff (technical and environmental) involved in the project implementation	PMCU, PIU, Contractors	PMCU, PIU, Contractors

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

185. Most of the costs associated with environmental mitigation and enhancement measures are included in the EMP budget. In consideration to the environmental impacts and their mitigation measures for this sub-project, some items need to be incorporated in the BOQ of this sub-project. A substantial part of environmental costs shall cover under Civil Works Contract. However, environmental costs under Civil Works Contract are not included here. Costs of these items will be dealt elsewhere in the respective project component document. The environmental costs presented in **Table 18** are tentative provisions based on experience of undertaking similar works under different LGED projects. For the details of environmental costs under civil works contract, individual contract package bid document may be consulted. It is assumed that the environmental cost under civil works contract for each contract package will be more or less same.

Table 18: Tentative EMP Budget for BOQ

(*The following items need to be incorporated in the BOQ of this sub-project)*

Cost Estimates for Environmental Management

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
1	Environmental Monitoring a) Air Quality, b) Noise level, c) Water quality, d) Sediment at work site to the entire satisfaction of the engineer-in-charge.	LS			4,30,000.00	Cost included in the BoQ as Provisional sum item (non-competitive item).
2	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the Engineer-in-charge.	LS			1,50,000.00	
3	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge.	LS			1,00,000.00	
4	Proper disposal of camp site wastes to the entire satisfaction of the engineer-in-charge.	LS			1,00,000.00	
5	Maintain First aid box at camp site to the entire satisfaction of the Engineer-in-charge.	LS			20,000.00	
6	Miscellaneous	LS			2,00,000.00	
				Sub-Total :	10,00,000.00	

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
7	Prevention of spillage, leakages of polluting materials to the entire satisfaction of the engineer-in-charge.					Contractor (GCC Clause 27.1 (a), 27.1(d) of Particular Conditions of Contract)
8	Providing and maintaining adequate potable water supply facilities (Shallow Tube well) at camp site and work site to the entire satisfaction of engineer-in-charge. Water Supply Tube well 04 Nos.	Nos.	4			Contractor (GCC Clause 29.2 of General Conditions of Contract)
9	Providing and maintaining adequate sanitation facilities at camp site and work site to the entire satisfaction of engineer-in-charge. Sanitation Toilet 06 nos. (02 for women and 04 for men)	Nos.	6			Contractor (GCC Clause 29.2 of General Conditions of Contract)
10	**Traffic Management** Maintaining traffic management at worksite from time of commencement of construction activities to time of completion activities, including ensuring that the road is safe for users (this includes providing necessary barricades, warning signs/lights, guide signs, flagmen, maintaining diversion roads by cutting, filling, constructing, etc. or by any other means) in accordance with the full satisfaction of the Engineering-in-charge.					Contractor (GCC Clause 27.1 (b) of General Conditions of Contract)
11	**Spoil Management Facility** Safe transportation and disposal of excavate spoils/ wastes generated out of subproject activities in a manner so that no environmental pollution or hazard to health of workers/local people.	cum	49819.74	81.00	40,35,398.94	Cost included in the BoQ (Road Item No. 21 and Bridge Item No. 22)
12	**Installation of signboards/billboards** Precautionary signboards/ danger signals/ billboards in appropriate places to notify people about the project.	sqm	15.12	1570.32	2,29,375.24	Cost included in the BoQ (Bridge Item No. 18)
13	**Working labour shed:** Construction of Labor shed with C.I sheet Roofing, fencing and brick soling floor as per approved plan and to the entire satisfaction of the engineer-in-charge.					Contractor (GCC Clause 29.2 of General Conditions of Contract)

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
14	**Personal Protection Equipment for Workers** Providing and maintaining appropriate (safe design, fit and comfort) personal protection equipment (PPE) to ensure the highest possible protection for employees in establishing and maintaining a safe and healthful working environment at workplace.					Contractor (GCC Clause 27.1 (a), 29.1 of Particular Conditions of Contract)
15	**Removal of equipment/ surplus materials/ rubbish/temporary structures/fully reinstate** On completion of the Contract, Contractor shall remove the equipment, surplus materials, slope erosion, canal sedimentation, rubbish and temporary structures of all types and shall leave sites in clean condition to the entire satisfaction of the engineer-in-charge and local people					Contractor (GCC Clause 27, 40.3, 80.2 of Particular Conditions of Contract)
16	**Occupational Health and Safety** To ensure safety of health and hazards for construction workers including -Adequate housing for all workers -Safe and reliable water supply; -Hygienic sanitary facilities and sewerage system					Contractor (GCC Clause 27, 29.1 of Particular Conditions of Contract)
17	**Community Health and Safety** To ensure safety of health and hazards on local resources and infrastructures of nearby communities					Contractor (GCC Clause 27 of Particular Conditions of Contract)
18	**COVID-19 Health and Safety** Washable cloth face mask, disposable hand gloves, wash basin & water container, soap, alcohol based sanitizer, pump spray, disinfectant, tissue papers, garbage bin, plastic bag, contactless temperature reader etc.					Contractor (GCC Clause 27.1 (d) of Particular Conditions of Contract)
19	Training on Environmental Management Plan, Health& Safety and COVID-19 related thread for the contractor's workforce					PDS-2 Consultants under CRDP-2

186. The cost for Environmental Quality Tests of Various Components –Water (surface and underground), Ambient air and Noise level, and Soil quality is given below.

Table 19: Indicative Costs for Environmental Quality Tests (Part of EMP Budget in BOQ)

Sl. No.	Environmental Parameters	Analytical Parameter	Unit cost (BDT)	Frequency (times) / Sampling Location	Total cost (BDT)
1	Ambient Air Quality	Suspended Particulate Matter (SPM), Particulate Matter (PM 2.5), Particulate Matter (PM 10), Oxides of Sulphur (Sox), Oxides of Nitrogen (NOx), Carbon Monoxide (CO),	40,000	2 times / (sampling location - at the start and end part of the khals)	40,000x2=80,000
2	Noise Quality	*Noise Level (dB) in selected busy areas at and around the* subproject road/bridge/khal site *(under Normal Condition and with Traffic)*	20,000	2 times / (sampling location - at the start and end part of the khals)	20,000x2=40,000
3	Groundwater Quality	pH, Total suspended solids (TSS), Total dissolved solids (TDS), Dissolved oxygen (DO), Arsenic (As), Iron (Fe), Chloride (Cl), Electrical Conductivity (EC), nitrate-N (NO_3-N)	20,000	2 times / (sampling location - at the start and end part of the khals)	20,000x2=40,000
4	Surface Water Quality	pH, Total suspended solids (TSS), Total dissolved solids (TDS), Turbidity, Dissolved oxygen (DO), Biological oxygen demand (BOD_{5days}), Chemical oxygen demand (COD), Arsenic (As), Iron (Fe), Chloride (Cl), Electrical Conductivity (EC), nitrate-N (NO_3-N, fecal and total coli-form	20,000	2 times / (sampling location - at the start and end part of the khals)	20,000x2=40,000
5	Soil Quality Test	Organic matter, pH, N, P, K, Salinity, Fe, Mn, Mo, Pb	20,000	2 times	20,000x2=40,000
6	Miscellaneous (Sampling, laboratory reagent and others)		LS		1, 90,000
				Total Cost:	**4,30,000**

VIII. MONITORING AND REPORTING

186. PMCU will monitor the progress of EMP implementation in the different subproject jurisdictions. The PMCU and PIU will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. The contractor will conduct day to day implementation of the SEMP.

187. The contractor will submit monthly reports to the PIU with jurisdiction over the subproject sites. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS supervisor (or equivalent) on a daily basis. A sample daily monitoring sheet which can be used by the contractors is in **Appendix 13**. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

188. The PIU will submit quarterly environmental monitoring reports to PMCU, which will include summary of daily monitoring activities of contractor and results of any independent monitoring or inspection activities of the PIU. In the conduct of these independent inspection activities, PIU will be supported by PDSC in this regard. A sample inspection checklist is in **Appendix 14**. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

189. PMCU shall consolidated quarterly reports from the PIUs including Chalna PIU and results of its independent monitoring or inspection activities. PMCU shall accomplish semi-annual environmental monitoring report (SEMRs), which shall be submitted to ADB for review and disclosure on ADB website. Submission of SEMR will continue until ADB issues a Project Completion Report. The template for the SEMR is attached as **Appendix 15**.

ADB will carry out the following monitoring actions to supervise Second CRDP implementation:

(i) On a need basis, conduct site visits for subproject with potential adverse environmental or social impact;
(ii) Conduct supervision missions with detailed review by ADB's environment/social safeguard specialists and/or officers and/or consultants for subprojects with adverse environmental and social impacts;
(iii) Review the SEMRs submitted by PMCU to ensure that adverse impacts and risks are mitigated as planned in the EMP;
(iv) Work with LGED to rectify to the extent possible any failures to comply with its environmental safeguard commitments, as covenanted in the loan agreement and elaborated in all environmental safeguard documents; and formulate and implement a corrective action plan to re-establish compliance as appropriate; and
(v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

IX. CONCLUSION AND RECOMMENDATIONS

190. The proposed subproject is not an environmentally critical undertaking. IEE indicates that the proposed subproject, and its components, is not located within or adjacent to environmentally sensitive areas.

191. The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season, the potential adverse impacts during construction would be site-specific.

192. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally responsible construction practices, are commonly used at construction sites and are well known to contractors. Hence, mitigation measures would not be difficult to implement.

193. Based on the above findings, the classification of the subproject under Package No. CRDP-II/LGED/CHALNA/NCB/2021/W-01 as Category B per ADB SPS is confirmed, and no further special study or detailed EIA needs to be undertaken. However, this IEE has been prepared based on final detailed designs of the subproject. Considering this IEE as the final IEE, it will be submitted to ADB for final review and disclosure.

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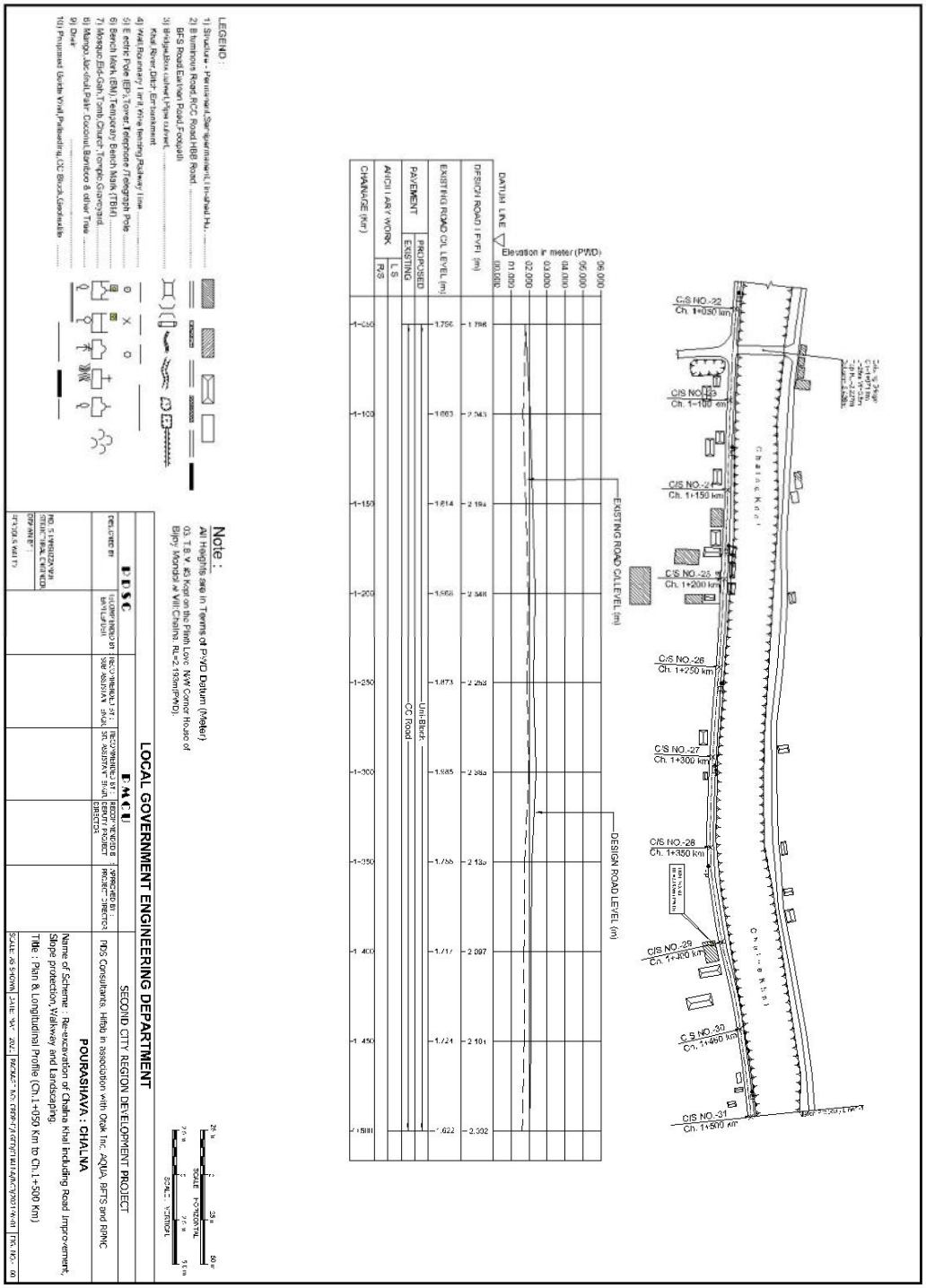
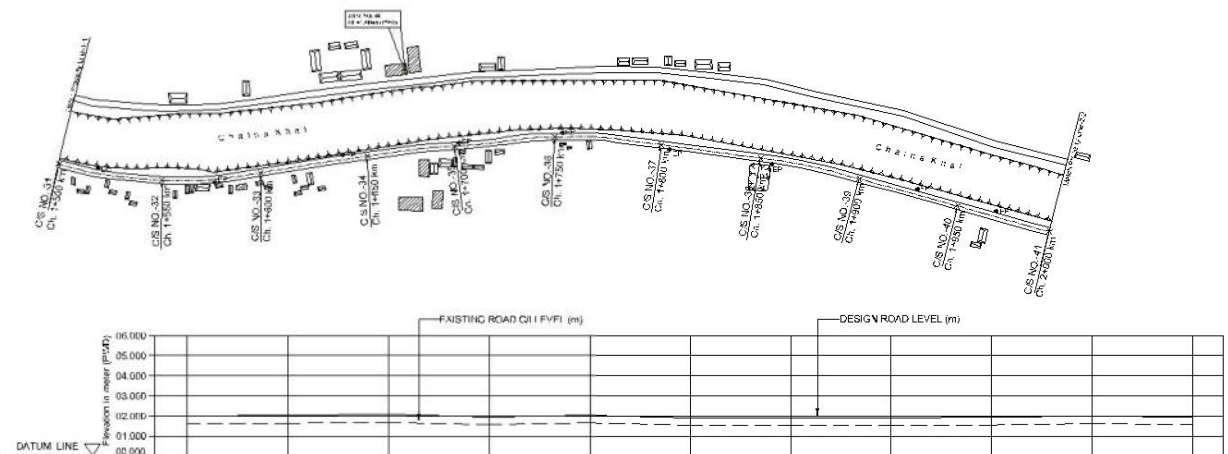
Appendix 1: Strip Maps of Subproject Alignment – Improvement of the road alongside the Chalna Khal (Ch.1060-2500m)





DESIGN ROAD LEVEL (m)		2.002	2.019	2.059	1.95[illegible]	2.039	1.9[illegible]	1.503	1.503	1.929	2.004	1.943
EXISTING ROAD C/L LEVEL (m)		1.622	1.609	1.679	1.671	1.649	1.531	1.523	1.523	1.540	1.624	1.569
PAVEMENT	PROPOSED	Uni-Block										
	EXISTING	CC Road										
ANCILLARY WORK	L/S											
	P/S											
CHAINAGE (Km)		1+500	1+550	1+600	1+650	1+700	1+750	1+800	1+850	1+900	1+950	2+000

LEGEND :

1) Structure - Permanent, Semipermanent, Tin-shed, Hut
2) Bituminous Road, RCC Road, HBB Road, BFS Road, Earthen Road, Footpath
3) Bridge, Box culvert, Pipe culvert, Khal, River, Ditch, Embankment
4) Wall, Boundary Limit, Wire fencing, Railway Line
5) Electric Pole (EP), Tower, Telephone /Telegraph Pole
6) Bench Mark (BM), Temporary Bench Mark (TBM)
7) Mosque, Eid-Gah, Tomb, Church, Temple, Graveyard
8) Mango, Jackfruit, Palm, Coconut, Bamboo & other Tree
9) Drain
10) Proposed Guide Wall, Palisading, CC Block, Geotextile

Note :

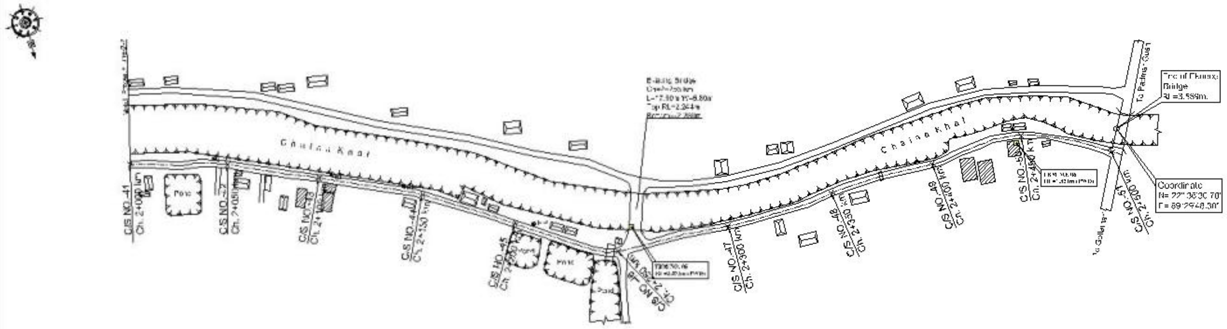
04. T.B.M. #4 Kept on the Plinth Level N/W Corner House of Gobindha Roy at Vill:Par Chalna. RL=1.909m(PWD).

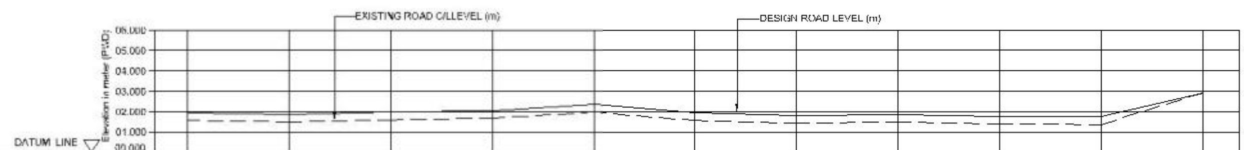
SCALE : HORIZONTAL (25 m – 0 – 25 m – 50 m)

SCALE : VERTICAL (2.5 m – 0 – 2.5 m – 5.0 m)

LOCAL GOVERNMENT ENGINEERING DEPARTMENT						
PDSC		PMCU				SECOND CITY REGION DEVELOPMENT PROJECT
DESIGNED BY	RECOMMENDED BY : [illegible]	RECOMMENDED BY : SUB ASSISTANT ENGR.	RECOMMENDED BY : SR. ASSISTANT ENGR.	RECOMMENDED BY : DEPUTY PROJECT DIRECTOR	APPROVED BY : PROJECT DIRECTOR	PDS Consultants, Hifab in association with Otak Inc. AQUA, BETS and RPMC
MD. S [illegible] STRUCTURAL ENGINEER; DRAWN BY : [illegible]						**POURASHAVA : CHALNA** Name of Scheme : Re-excavation of Chalna Khal including Road Improvement, Slope protection, Walkway and Landscaping. Title : Plan & Longitudinal Profile (Ch.1+500 Km to Ch.2+000 Km)

SCALE: AS SHOWN | DATE: MAY 2021 | PACKAGE NO: CRDP-I/LGED/CHALNA/NC3/2021/W-01 | FIG. NO.- 00

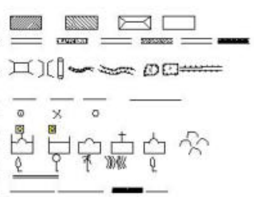




DESIGN ROAD LEVEL (m)		1.943	1.875	1.974	2.059	2.356	1.937	1.806	1.870	1.757	1.757	2.926
EXISTING ROAD C/L LEVEL (m)		1.863	1.495	1.591	1.679	1.970	1.337	1.420	1.400	1.377	1.360	2.926
PAVEMENT	PROPOSED	Uni-Block										
	EXISTING	CC Road										
ANCILLARY WORK	L/S											
	R/S											
CHAINAGE (Km)		2+000	2+050	2+100	2+150	2+200	2+250	2+300	2+350	2+400	2+450	2+500

LEGEND :

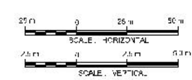
1) Structure - Permanent,Semipermanent,Tin-shed,Hut ....
2) Bituminous Road,RCC Road,HBB Road, ... BFS Road,Earthen Road,Footpath
3) Bridge,Box culvert,Pipe culvert, ... Khal,River,Ditch,Embankment
4) Wall,Boundary Limit,Wire fencing,Railway Line ....
5) Electric Pole (EP),Tower,Telephone /Telegraph Pole ....
6) Bench Mark (BM),Temporary Bench Mark (TBM) ....
7) Mosque,Eid-Gah,Tomb,Church,Temple,Graveyard............
8) Mango,Jackfruit,Palm,Coconut,Bamboo & other Tree ....
9) Drain ....
10) Proposed Guide Wall,Palisading,CC Block,Geotextile ....



Note :

05. T.B.M. #5 Kept on the Wing wall top S/E Corner of Bridge at Vill:Anondo Nagar. RL=2.472m(PWD).

06. T.B.M. #6 Kept on the Plinth Level N/W Corner House of Somir Trobdor at Vill:Vill:Anondo Nagar. RL=1.824m(PWD)

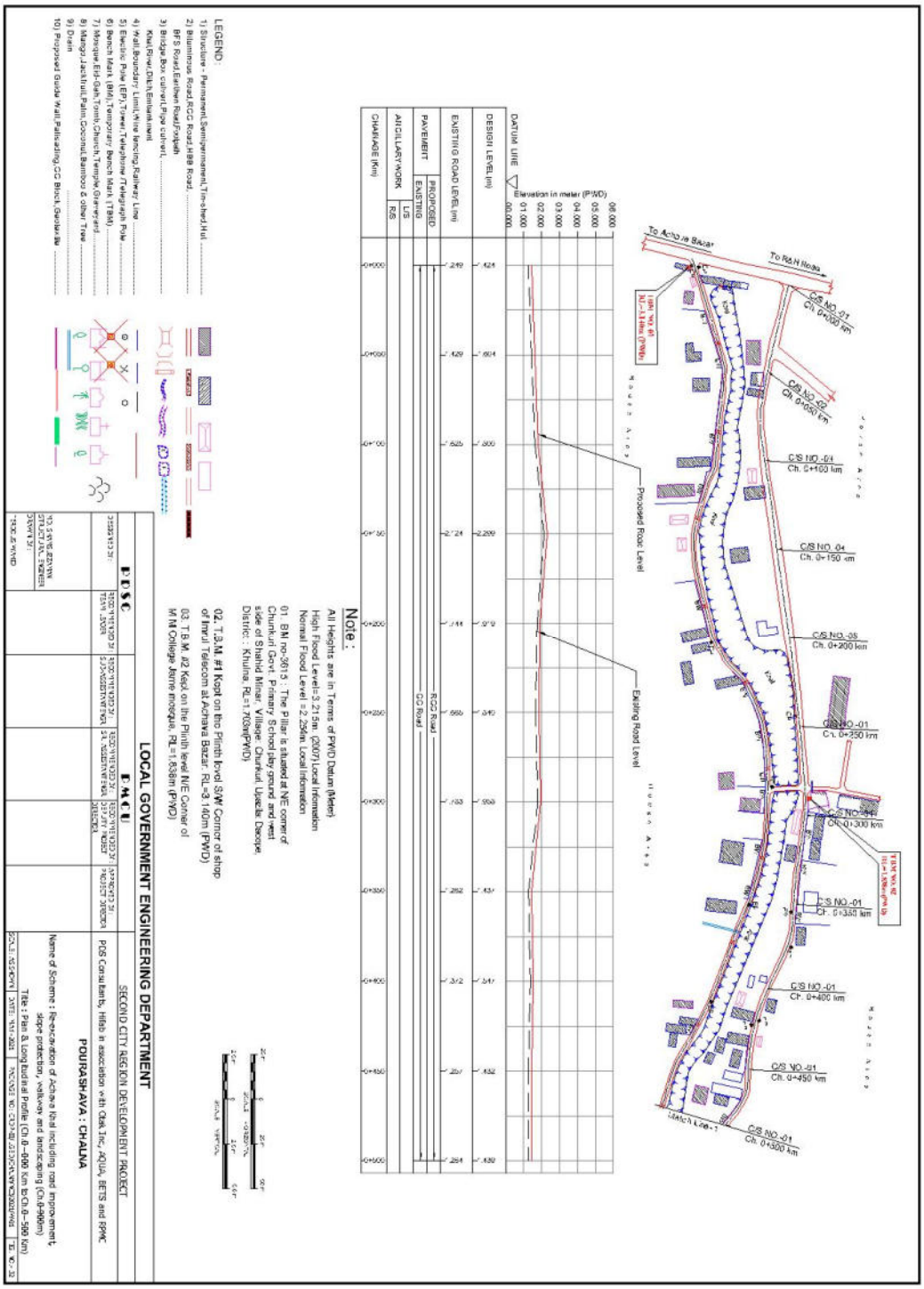


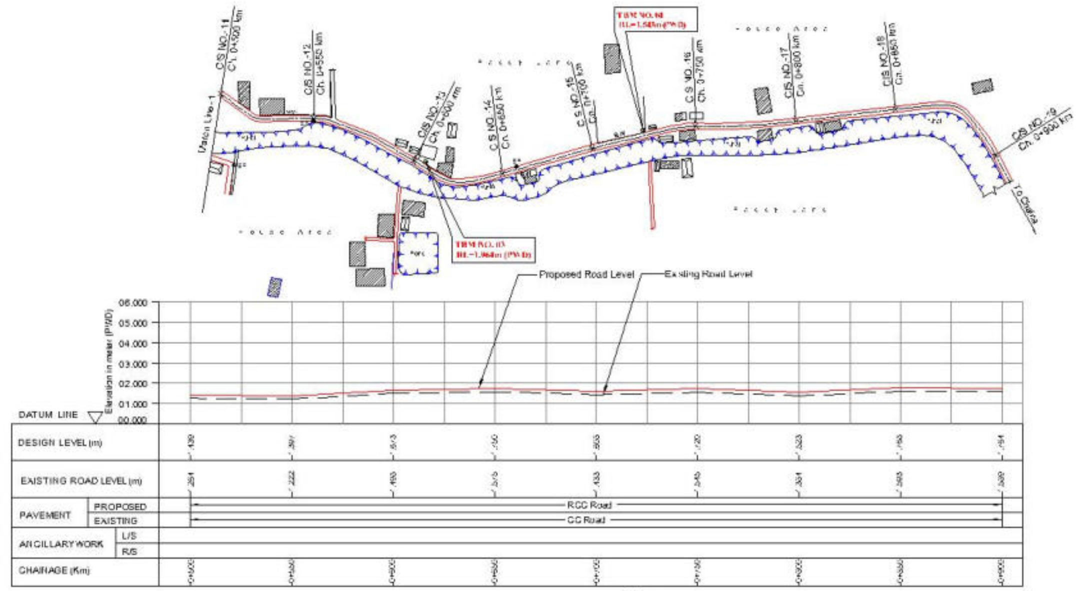
LOCAL GOVERNMENT ENGINEERING DEPARTMENT

PDSC		PMCU				SECOND CITY REGION DEVELOPMENT PROJECT
DESIGNED BY	RECOMMENDED BY : TEAM LEADER	RECOMMENDED BY : SUB ASSISTANT ENGR.	RECOMMENDED BY : SR. ASSISTANT ENGR.	RECOMMENDED BY : DEPUTY PROJECT DIRECTOR	APPROVED BY : PROJECT DIRECTOR	PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
MD. S [illegible] STRUCTURAL ENGINEER DRAWN BY : [illegible]						**POURASHAVA : CHALNA** Name of Scheme : Re-excavation of Chalna Khal including Road Improvement, Slope protection,Walkway and Landscaping. Title : Plan & Longitudinal Profile (Ch.2+000 Km to Ch.2+500 Km)

SCALE: AS SHOWN | DATE: MAY 2021 | PACKAGE NO: CRDP-2/LGED/CHALNA/NO3/2021/W-01 | DWG. NO.- 00

Appendix 2: Strip Maps of Subproject Alignment - Improvement of the road alongside the Achava khal (Ch.0-900m)





Note :

All Heights are in Terms of PWD Datum (Meter)

High Flood Level=3.215m. (2007) Local Information

Normal Flood Level =2.254m. Local Information

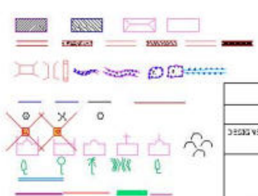
01. BM no-3615 : The Pillar is situated at N/E corner of Chunkuri Govt. Primary School play ground and west side of Shahid Minar, Village: Chunkuri, Upazila: Dacope, District : Khulna, RL=1.703m(PWD)

04. T.B.M. #3 Kept on the Plinth level S/W Corner of house of Badan Roy at Achava, RL=1.964m (PWD)

05. T.B.M. #4 Kept on the Boundary wall N/W Corner of Rody Brauher, village : Achava, RL=1.543m (PWD)

LEGEND:

1) Structure - Permanent,Semipermanent,Tin-shed,Hut
2) Bituminous Road,RCC Road,HBB Road, BFS Road,Earthen Road,Footpath
3) Bridge,Box culvert,Pipe culvert, Khal,River,Ditch,Embankment
4) Wall,Boundary Limit,Wire fencing,Railway Line
5) Electric Pole (EP),Tower,Telephone /Telegraph Pole
6) Bench Mark (BM),Temporary Bench Mark (TBM)
7) Mosque,Eid-Gah,Tomb,Church,Temple,Graveyard
8) Mango,Jackfruit,Palm,Coconut,Bamboo & other Tree
9) Drain
10) Proposed Guide Wall,Palisading,CC Block,Geotextile

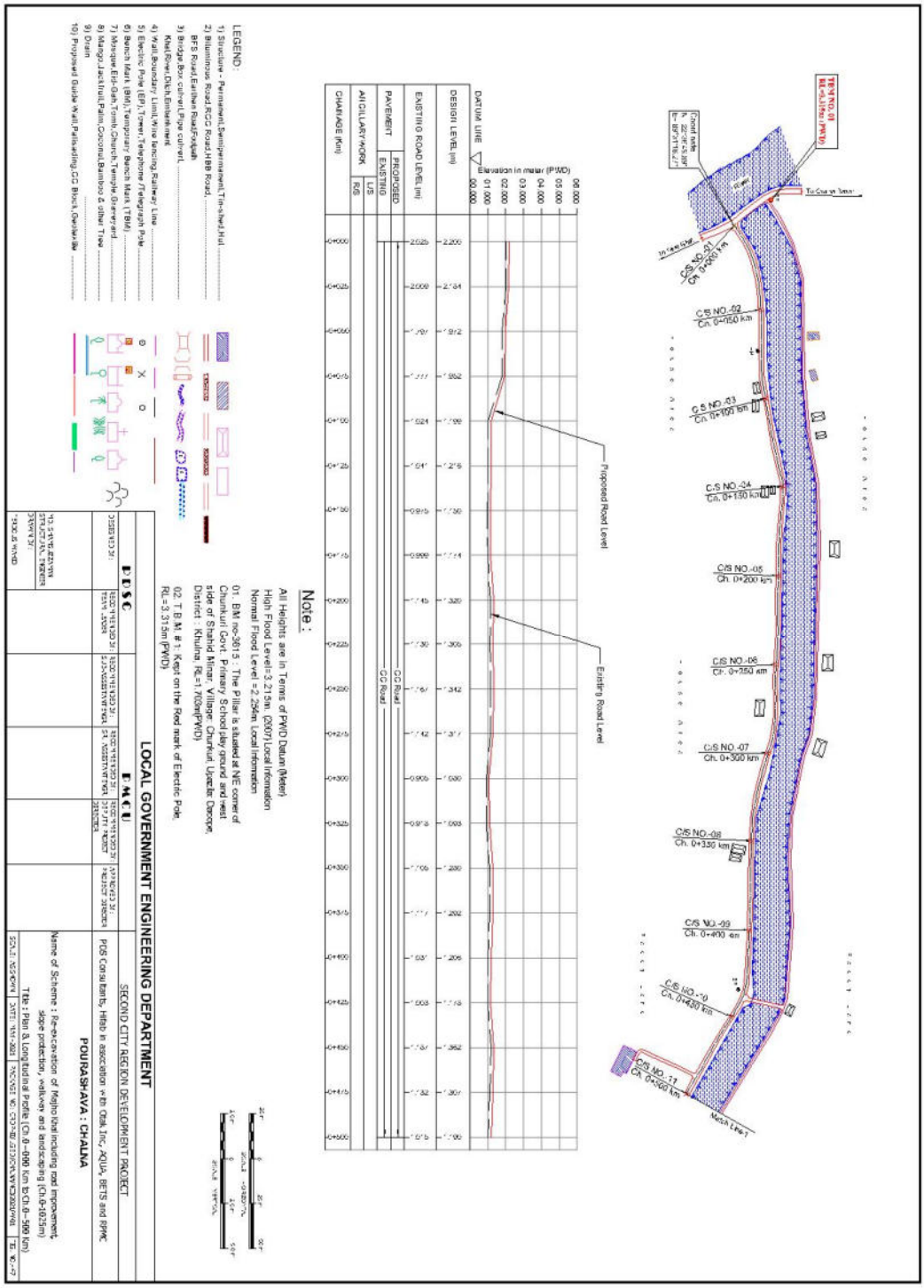


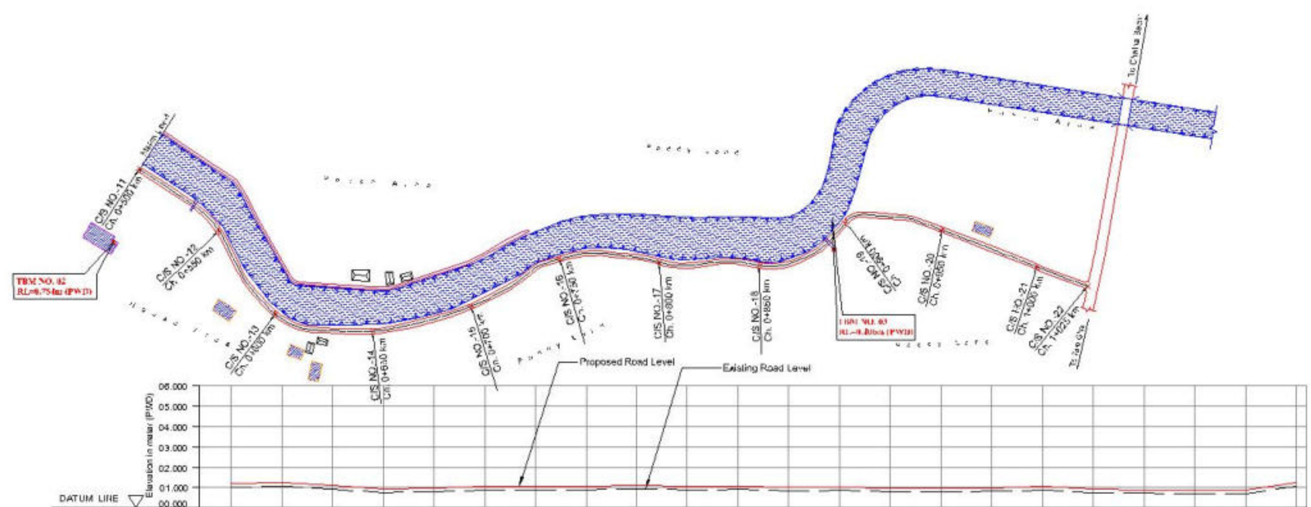
LOCAL GOVERNMENT ENGINEERING DEPARTMENT

PDSC		PMCU				SECOND CITY REGION DEVELOPMENT PROJECT
DESIGNED BY:	RECOMMENDED BY: TEAM LEADER	RECOMMENDED BY: SUB-ASSISTANT ENGR.	RECOMMENDED BY: SR. ASSISTANT ENGR.	RECOMMENDED BY: DEPUTY PROJECT DIRECTOR	APPROVED BY: PROJECT DIRECTOR	PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
MD. SHAMSUZZAMAN STRUCTURAL ENGINEER; DRAWN BY: FERDOUS WAHID						POURASHAVA : CHALNA Name of Scheme : Re-excavation of Achava Khal including road improvement, slope protection, walkway and landscaping (Ch.0-900m) Title : Plan & Longitudinal Profile (Ch.0-500 Km to Ch.0-900 Km)

SCALE: AS SHOWN | DATE: MAY-2021 | PACKAGE NO: CRDP-II/LGED/CHALNA/W2/2021/W01 | FIG. NO.- 33

Appendix 3: Strip Maps of Subproject Alignment - Improvement of the road alongside the Majho khal (Ch.0-1025m)





		0+500	0+525	0+550	0+575	0+600	0+625	0+650	0+675	0+700	0+725	0+750	0+775	0+800	0+825	0+850	0+875	0+900	0+925	0+950	0+975	1+000	1+025
DESIGN LEVEL (m)		1.190	1.233	1.089	0.933	0.977	1.042	1.047	1.067	1.106	1.033	1.077	1.033	1.033	0.956	0.964	0.982	1.030	0.988	0.983	0.872	0.853	1.221
EXISTING KHAL G.LEVEL (m)		1.075	1.053	0.974	0.756	0.795	0.867	0.872	0.882	0.931	0.878	0.902	0.833	0.853	0.737	0.789	0.807	0.863	0.723	0.716	0.687	0.676	1.046
PAVEMENT	PROPOSED	CC Road																					
	EXISTING	CC Road																					
ANCILLARY WORK	L/S																						
	R/S																						
CHAINAGE (Km)		0+500	0+525	0+550	0+575	0+600	0+625	0+650	0+675	0+700	0+725	0+750	0+775	0+800	0+825	0+850	0+875	0+900	0+925	0+950	0+975	1+000	1+025

Note :

All Heights are in Terms of PWD Datum (Meter)
High Flood Level=3.215m. (2007) Local Information
Normal Flood Level =2.254m. Local Information

01. BM no-3613 : The Pillar is situated at N/E corner of Chunkuri Govt. Primary School play ground and west side of Shahid Minar, Village: Chunkuri, Upazila: Dacope, District : Khulna, RL=1.703m(PWD)

03. T.B.M. # 2 : Kept on the Plinth Level N/W Corner of Kolisha Govt. School, village: Kolisha, RL=0.754m(PWD)

04. T.B.M. # 3 : Kept on the Plinth Level N/E Corner of U-Drain. at village: Kolisha. RL=0.408m (PWD)

SCALE HORIZONTAL

SCALE VERTICAL

LEGEND :

1) Structure - Permanent,Semipermanent,Tin-shed,Hut
2) Bituminous Road,RCC Road,HBB Road, BFS Road,Earthen Road,Footpath
3) Bridge,Box culvert,Pipe culvert, Khal,River,Ditch,Embankment
4) Wall,Boundary Limit,Wire fencing,Railway Line
5) Electric Pole (EP),Tower,Telephone /Telegraph Pole
6) Bench Mark (BM),Temporary Bench Mark (TBM)
7) Mosque,Eid-Gah,Tomb,Church,Temple,Graveyard
8) Mango,Jackfruit,Palm,Coconut,Bamboo & other Tree
9) Drain
10) Proposed Guide Wall,Palisading,CC Block,Geotextile

LOCAL GOVERNMENT ENGINEERING DEPARTMENT

PDSC		DMCU				SECOND CITY REGION DEVELOPMENT PROJECT
DESIGNED BY :	RECOMMENDED BY : TEAM LEADER	RECOMMENDED BY : SR./ASSISTANT ENGR.	RECOMMENDED BY : SR. ASSISTANT ENGR.	RECOMMENDED BY : DEPUTY PROJECT DIRECTOR	APPROVED BY : PROJECT DIRECTOR	PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
MD. SHAMSUZZAMAN STRUCTURAL ENGINEER DRAWN BY : TAROQUE WAHID						POURASHAVA : CHALNA Name of Scheme : Re-excavation of Majho Khal including road improvement, slope protection, walkway and landscaping (Ch.0-1025m) Title : Plan & Longitudinal Profile (Ch.0-500 Km to Ch.1-025 Km)

Appendix 4: Sample Spoil Management Plan

Purpose and application: Spoil Management Plan (SMP) is to describe how Second CRDP will manage the spoil generated and reuse related to design and construction works. This is an integral part of EMP. The objective of SMP is to reuse of spoil from works in accordance with the spoil management hierarchy outlined in this document.

Objectives of SMP: The objectives of SMP are:

(i) To minimize spoil generation where possible
(ii) Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
(iii) Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
(iv) Minimize any further site contamination of land, water, soil
(v) Manage the transportation of spoil with consideration of traffic impacts and transport related emissions

Structure of SMP:
Section1: Introduction of SMP
Section2: Legal and other requirements
Section3: Roles and responsibilities
Section4: Identification and assessment of spoil aspects and impacts
Section5: Spoil volumes, characteristics and minimization
Section6: Spoil reuses opportunities, identification and assessment
Section7: Onsite spoil management approach
Section8: Spoil transportation methodology
Section9: Monitoring, Reporting, Review, and Improvements

Aspects and potential impacts

The key aspects of potential impacts in relation to SMP are listed in table below

Aspects	Potential Impacts
Air Quality	Potential for high winds generating air borne dust from the stockpiles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and groundwater	Contamination of surface and ground water
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a that does not have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

Spoil volumes, Characteristics and Minimization

Spoil volume calculations: Estimate the volumes of spoils produced from each of the construction sites.

Characterization of spoil: Based on the type of spoil; characterization is done (sandstone, mud-mix materials, reusable materials

Adopt Spoil Reduce, Reuse Opportunities: An overview of the assessment methodology to be used is mentioned below.

- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

Identification of possible safe disposal sites for spoil: Those spoils which can't be reuses hall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior cliental approval should be obtained to use it as spoil disposal area. The local administration must be consulted and if required permission should be obtained from them.

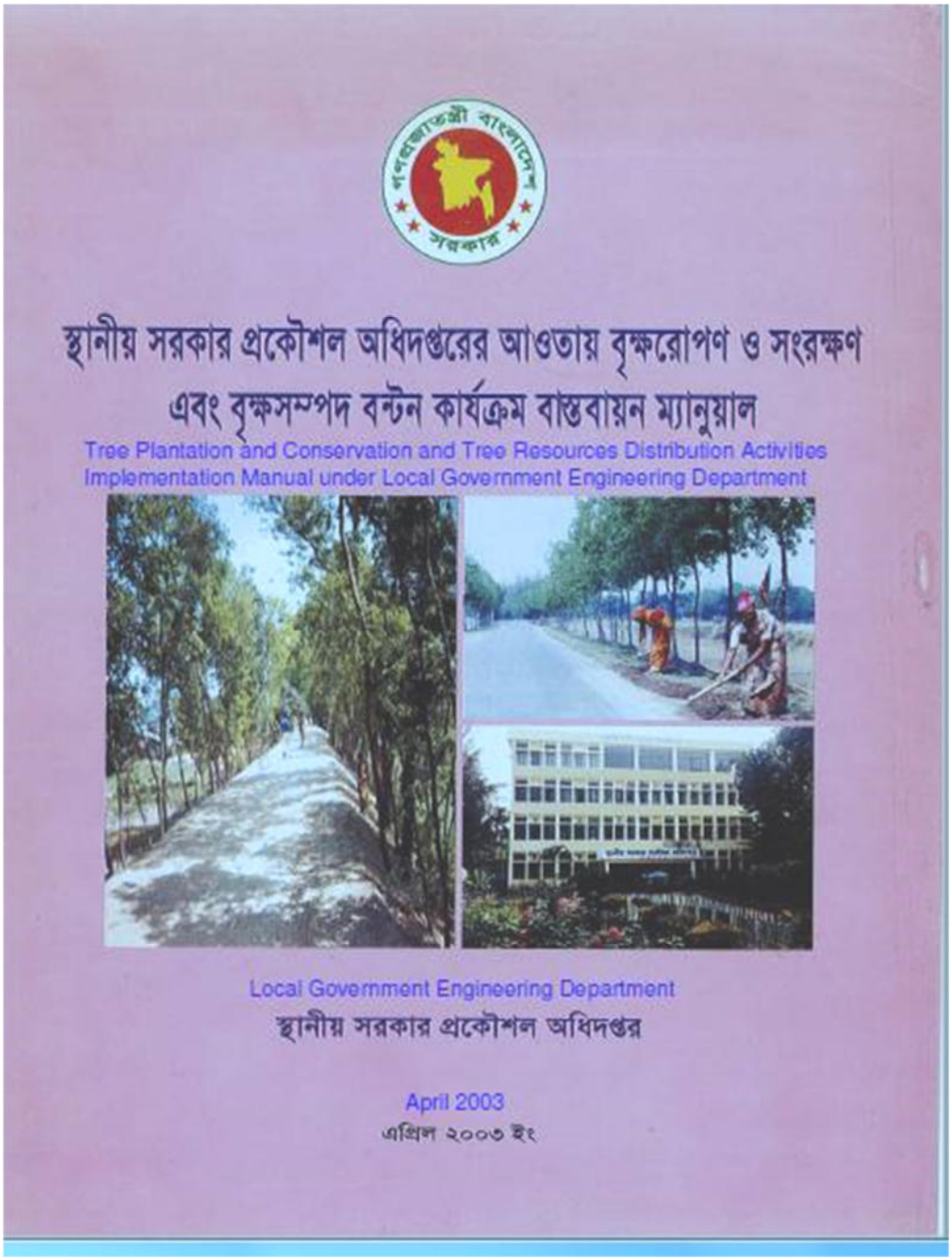
Storage and stockpiling Transportation and haulage route

Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit to the PDSC for their review and approval.

Summary of Key Issues and Remedial Actions

Summary of follow-up time-bound actions to be taken within a set time frame.

Appendix 5: LGED Tree Plantation Program Manual (Cover Page and Table of Contents)
Note: Copy of the full manual is available upon request at the PMCU Office



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

Table of Contents

2.6 Wage
- 2.6.1 Wage Fixation
- 2.6.2 Bank Account
- 2.6.3 Wage Payment
- 2.6.4 Compulsory Savings

2.7 Distribution of Income from Trees
- 2.7.1 Tree Resources Distribution System
- 2.7.2 Template: Tree Resources Distribution
- 2.7.3 Contract signed for Distribution of Tree Resources among different parties according to the Adopted Policy
- 2.7.4 Monitoring the Implementation of the Contract

2.8 Financing
- 2.8.1 Source of Funding for the Program
- 2.8.2 Financing Process

2.9 Description of Responsibility of Representatives of Local Government Organizations and of LGED Officials in the Implementation of Road Maintenance (off-pavement), Plantation and Conservation Program
- 2.9.1 Responsibility of Union Parishad (UP)
- 2.9.2 Responsibility of UP Male/Female Member
- 2.9.3 Responsibility of UP Chairman
- 2.9.4 Responsibility of Upazila Parishad
- 2.9.5 Responsibility of Upazila Executive/Nirbahi Officer (UNO)
- 2.9.6 Responsibility of LGED's Community Organizer (CO)
- 2.9.7 Responsibility of Sub-Assistant Engineer
- 2.9.8 Responsibility of Upazila Engineer (UE)
- 2.9.9 Responsibility of LGED's Executive Engineer (Training)
- 2.9.10 Responsibility of LGED's District Executive Engineer

3. Tree Plantation at Embankment and Canal Bank and their Conservation

3.1 Selection of Proposals for Tree Plantation and Conservation at Embankment Slope and Canal Bank

3.2 Implementation

3.3 Selection of Tree Species
- 3.3.1 Tree planting Distance
- 3.3.2 Tree Sapling Planting Method
- 3.3.3 Tree Caring and Prohibition
- 3.3.4 Inspection and Monitoring

3.4 Wages

3.5 Financing

3.6 Implementing Agency

3.7 Tree Resources Distribution

3.8 Distribution of Money from Sale of Trees Grown at Embankment Slope and Canal Bank

Annexures

A) Road

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

B) Embankment

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

Appendix 6: Public Consultations

Details of date, location, type of participants, objective of consultation and discussed issues are presented in a tabular form below:

Sl. No	Date of Consultation	Subproject Components & Place of consultation	Objective/Number & Type of Participants	Issues Discussed
1.	24.12.2019	**Venue:** Chalna Pourashava Meeting Hall	**Objectives of Consultation**: • Evaluate existing situation of road & drainage condition and identify the issues. ▪ Find way forward to address the identified issues through planning process & Public consultation ▪ To introduce second CRDP among stakeholders ▪ To listen to the stakeholders about their experiences, and recommendations **Number /Type of Participants:** 71 (Male 53 (74.6%) +Female 18 (25.4%) - (Mayor, Councilors, Retired Govt. Officials, Local Elite, Businessmen, project beneficiaries etc.)	General perception about the project and the awareness about the proposed project are disseminated in the meeting. The following pre-defined issues are discussed in the consultation meetings: • Information dissemination about the subproject • possible impacts of the subproject • participation of local people in different project activities • Employment potential for local people in the project works • Loss of residential/commercial structures, if any due to the project • Resettlement and land acquisition (if foreseen specially on private land). • Impact on social issues due to the project • Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites), if any • Any critical issue or concern by the local people regarding the project • Grievances redress mechanism etc.

Finding in the public consultation meeting

- Local people will support the project activities.
- The main issue arising from the consultation is that the people of this area suffering huge traffic congestion due to movement of heavy container truck. They cannot easily move to the school, hospital, and their working place from their due to congestion. . Peoples will be benefitted who are residing alongside the road of area if the project will undertake..
- The area is dominating business area about 70% are depends on business and the rest service and cultivations.
- During construction period short term community activities will be affected.
- No resettlement and land acquisition required for due to the project, only compensation need for the unauthorized shop and residence.
- There is no protected area in and around the project area.
- The project will never impact on natural water body and not contaminate the soil resources.
- The NGOs within the areas are: ASA, BRAC, Grameen Bank, Karitas, MSS, ODC, UPPR, JIZ, Gonosasto, etc.
- It assured by the participant, that they will welcome the project, and will support/cooperate in all stages of the project works.

Photographs of Community Consultations

Consultation for Chalna Pourashava Package W-01 schemes

Consultation for Chalna Pourashava Package W-01 schemes

LIST OF PARTICIPANTS

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
নগর অঞ্চল উন্নয়ন প্রকল্প
আগার গাঁও, শেরে বাংলা নগর, ঢাকা।

প্রকল্পের নামঃ- চালনা পৌরসভার ড্রেনেজ মাস্টার প্ল্যান

Sub Project Name: Chalna Pourashava Drainage Master Plan.

Focus Group Discussion:

উপস্থিতির হাজিরাঃ Attendance of The Participants :-

ক্রঃ নংঃ SL.N	নাম Name	ঠিকানা Address	মোবাইল Mobile	পেশা Profession	স্বাক্ষর Signature
১/	[illegible]	চালনা পৌরসভা ৬নং ওয়ার্ড.	[illegible]	ব্যবসা	[signature]
২/	[illegible]	〃	[illegible]	[illegible]	[signature]
৩/	[illegible]	চালনা পৌরসভা ৬নং ওয়ার্ড	01745026805	[illegible]	[signature]
৪।	[illegible]	〃	[illegible]	[illegible]	[signature]
৫/	[illegible]	সাংবাদিক [illegible]	01714 [illegible] 86	সাংবাদিক	[signature]
৬।	[illegible]	[illegible]	01713-708877	〃	[signature]
৭/	[illegible]	[illegible]	[illegible]	[illegible]	[signature]
৮/	[illegible]	[illegible]	[illegible]	[illegible]	[signature]
৯।	[illegible]	[illegible]	01612311730	[illegible]	[signature]
১০।	মোঃ [illegible] ইসলাম	চালনা- [illegible] ওয়ার্ড	01724-842689	কৃষি	[signature]
১১।	[illegible]	সাবেক [illegible] চালনা [illegible]	[illegible]		[signature]
12.	Pronob Mallick	Chalna Pourashava	01970-881718	Service	[signature]
13.	Md Shirajul Islam	Secretary, Chalna Municipality	01714932733	Service	[signature]
14	[illegible]	[illegible]	01715182541	[illegible]	[signature]
১৫।	মোঃ [illegible] খান	কাউন্সিলর [illegible] চালনা পৌরসভা	01711-347882	কাউন্সিলর	[signature]
১৬/	[illegible]	কাউন্সিলর [illegible]	01932249240	কাউন্সিলর	[signature]
১৭/	[illegible]	[illegible]	[illegible]	[illegible]	[signature]
১৮।	[illegible]	[illegible]	01711451961	কাউন্সিলর	[signature] 28/12/17
১৯।	[illegible]	কাউন্সিলর [illegible] ওয়ার্ড	01915-200440	কাউন্সিলর	[signature]
২০	[illegible]	[illegible]	[illegible] 97	কাউন্সিলর	[signature]

[signature]
সনত কুমার বিশ্বাস
মেয়র
28/12/17 চালনা পৌরসভা, খুলনা।

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
নগর অঞ্চল উন্নয়ন প্রকল্প
আগারগাঁও, শেরে বাংলা নগর, ঢাকা।

প্রকল্পের নামঃ- চালনা পৌরসভা ড্রেনেজ মাস্টার প্ল্যান

Sub Project Name: Chalna Pourashava Drainage Master Plan.

Focus Group Discussion:

উপস্থিতির হাজিরাঃ Attendance of Participants.

ক্রঃ নং: SL.No.	নাম Name	ঠিকানা Address	মোবাইল Mobile	পেশা Profession	স্বাক্ষর Signature
২১	মোঃ [illegible]	চালনা বাজার-	০১৭১১ — ৬০০৪১১	ব্যবসা	[illegible]
২২	[illegible] বিশ্বাস	গোবিন্দপুর	০১৭১১১৬০২৯৫	[illegible]	[illegible]
২৩	কামলেশ [illegible]	[illegible]	০৭৭১০৭৭৫৬৭৮	কৃষি	[illegible]
২৪	মোঃ আব্দুস সাত্তার	চালনা বন্দর ৪নং ওয়ার্ড	01725-037115	ঠিকাদার	[illegible]
২৫	সুজন কুমার রায়	[illegible] -	০১৭৭৪৪৪০৮২৮২	কাঠমিস্ত্রি	[illegible]
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২৯	[illegible]	[illegible]	01921-109496	কৃষি	[illegible]
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৩১	[illegible]	[illegible]	০১৭০৭৪৭৯২২৬০	[illegible]	[illegible]
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৩৩	হাসিনা বেগম	চালনা বাজার-	01718767341	[illegible]	[illegible]
৩৪	[illegible]	[illegible]	01915193966	C.H.V	[illegible]
৩৫	মীরা সরকার	চালনা	01718 62367	গৃহিনী	মীরা
৩৬	বিউটি সাহা	চালনা	01914163012	C.H.V.	বিউটি সাহা
৩৭	রিক্তা বিশ্বাস	চালনা	01989-580360	C.H.V.	রিক্তা
৩৮	[illegible]	[illegible] চালনা	01989555472	C.H.V	[illegible]
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৪০	লিপিকা রায়	চালনা বাজার	01724783319	C.H.V	লিপিকা

[illegible]
২৪/১২/১৭
সনত কুমার বিশ্বাস
মেয়র
চালনা পৌরসভা, খুলনা।

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
নগর অঞ্চল উন্নয়ন প্রকল্প
আগার গাঁও, শেরে বাংলা নগর, ঢাকা।

প্রকল্পের নামঃ- চালনা পৌরসভার ড্রেনেজ মাস্টার প্ল্যান

Sub Project Name: Chalna Pourashava Drainage Master Plan

Focus Group Discussion:

উপস্থিতির হাজিরাঃ Attendance of the Participants.

ক্রঃ নংঃ SL.N	নাম Name	ঠিকানা Address	মোবাইল Mobile	পেশা Profession	স্বাক্ষর Signature
৪১	[illegible] (মেম্বর)	[illegible]	01713090040	[illegible]	[illegible]
৪২	সফিকুল	[illegible]			Safiq 29/11/19
৪৩	মঞ্জু রানী মিস্ত্রি	চালনা বাজার	01925670286	[illegible]	[illegible]
৪৪	আলোরানী রায়	চালনা পৌরসভা ডাকোপ, খুলনা	01947825041	সহকারি কাউন্সিলর	[illegible]
৪৫	মোস্তফা কাজী	৪নং ওয়ার্ড চালনা পৌরসভা	01933823981	কাউন্সিলর	[illegible]
৪৬	চন্দন সাহা	৫নং ওয়ার্ড চালনা পৌরসভা	01735-156764	সাঃ সম্পাদক [illegible]	[illegible]
৪৭	[illegible]	২নং [illegible] ওয়ার্ড চালনা	01721-686407	শিক্ষক	[illegible]
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৪৯	[illegible]	২নং [illegible] ওয়ার্ড	01713-914[illegible]	কৃষি	[illegible]
৫০	মোঃ [illegible]	৪নং ওয়ার্ড চালনা বাজার নলা	01980-407262	ব্যবসা	[illegible]
৫১	বিদ্যুদাস মন্ডল	৩নং ৯নং ওয়ার্ড [illegible]	01736-009450	কৃষি	বিদ্যুদাস মন্ডল
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৫৩	আক্তার হো. হাবিবর	চালনা সবুজপল্লী	01922626100	সাংবাদিক	[illegible]
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৫৫	[illegible]	চালনা পৌরসভা ৯নং ওয়ার্ড	01915879294	চাকুরি	[illegible]
৫৬	কনিকা মিস্ত্রী	চালনা পৌরসভা	01918-002887	[illegible]	[illegible]
৫৭	ঝর্না বিশ্বাস	চালনা পৌরসভা	01923-939016	গৃহিনী	ঝর্না বিশ্বাস
৫৮	সুস্মিতা সরকার	চালনা পৌরসভা	01944-248875	ছাত্রী	সুস্মিতা
৫৯	সুব্রত [illegible]	চালনা বাজার	01825688[illegible]	[illegible]	সুব্রত [illegible]
৬০	পার্থ মিস্ত্রী	চালনা পৌরসভা	01946439266	ছাত্র	পার্থ মিস্ত্রী

[illegible signature] 29/11/19
সনৎ কুমার বিশ্বাস
মেয়র
চালনা পৌরসভা, খুলনা।

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
নগর অঞ্চল উন্নয়ন প্রকল্প
আগার গাঁও, শেরে বাংলা নগর, ঢাকা।

প্রকল্পের নামঃ- চালনা পৌরসভার ড্রেনেজ মাস্টার প্ল্যান

Sub Project Name: Chalna Pourashava Drainage Master Plan

Focus Group Discussion:

উপস্থিতির হাজিরাঃ Attendance of The Participants.

ক্রঃ নংঃ SL.N	নাম Name	ঠিকানা Address	মোবাইল Mobile	পেশা Profession	স্বাক্ষর Signature
৬১	[illegible] Amin	[illegible]	01724534613	Job	[illegible]
৬২	মো: [illegible]	চালনা পৌরসভা	01911187328	চাকুরী	[illegible]
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৭০	আমিরুল শেখ	৭নং ওয়ার্ড চালনা পৌরসভা	01911815660	ছাত্র	[illegible]
৭১	[illegible]	চালনা পৌরসভা ২নং ওয়ার্ড	01712464219	চাকুরী	[illegible]

[illegible] [illegible]
সনত কুমার বিশ্বাস
মেয়র
চালনা পৌরসভা, খুলনা।

Appendix 7: Sample Grievance Registration Form

(To be available in Bangla and Other Local Language, if any)

The _____Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.

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

Date		***Place of registration***			
Contact Information/Personal Details					
Name		**Gender**	■ **Male** ■ **Female**	**Age**	
Home Address					
Village / Town					
District					
Phone no.					
E-mail					
Complaint/Suggestion/Comment/Question Please provide the details (who, what, where and how) of your grievance below: If included as attachment/note/letter, please tick here:					
How do you want us to reach you for feedback or update on your comment/grievance?					

FOR OFFICIAL USE ONLY

Registered by: (Name of Official registering grievance)	
Mode of communication: ■ **Note/Letter** ■ **E-mail** ■ **Verbal/Telephonic**	
Reviewed by: (Names/Positions of Official(s) reviewing grievance)	
Action Taken:	
Whether Action Taken Disclosed:	■ **Yes** ■ **No**
Means of Disclosure:	

Appendix 8: Suggested Template for Record-Keeping of Grievances

Sl. No.	Date of receipt of grievance	Name and contact details of complainant	Description of complaint	Nature of complaint	Decisions taken	Response given to complainant and date	Whether closed/ resolved

Appendix 9: Indicative Terms of Reference for Safeguards Specialist for PMCU, PIUs and PDSC

A. Preparation, Design, and Supervision Consultants (PDSC)

1. Environmental Safeguards Specialist (National)

1. **Experience.** A civil engineer with specialization in environment, having at least 5-10 years of working experience related to the integration of environmental issues in design, and construction of infrastructure projects. Past experience working on donor projects preferable.

2. Detailed Tasks:

(i) Prepare Initial Environmental Examination (IEE)in accordance with the Environmental Assessment Review Framework (EARF) for subprojects;
(ii) Assist PMCU Environment Officer in ensuring prepared IEEs are submitted to ADB for review;
(iii) Assist PMCU in ensuring approved IEEs are disclosed on PMCU/LGED website;
(iv) Ensure approved final IEEs and Environmental Management Plans (EMPs) are included in contract documents;
(v) Assist PMCU in ensuring compliance of Second CRDP and its subprojects with all relevant national laws;
(vi) Interact with the sector specialists and integrate environmentally sound practices into the detailed design of project components;
(vii) Work out the site specific mitigation and adaptation measures for components as required and integrate the same into contractual provisions;
(viii) Assist the international environment/Climate Change specialist in environmental training programs and workshops for the staffs of the PMCU, PIU and contractors and in accordance to the Capacity Building Program;
(ix) Prepare activity plans as identified in IEE (includes site management plans, waste management plans, sludge management and disposal plans, occupational safety plans, etc.);
(x) Assist PIU in reviewing the contractors' SEMPs to ensure compliance with the IEE/EMP;
(xi) Assist PIU in supervising the implementation of the EMP and SEMP by the contractors;
(xii) Assist PIU in preparing quarterly environmental monitoring reports and submit to PMCU;
(xiii) Review site specific environmental enhancement/mitigation designs worked out by the contractor and assist PIU in approving such designs;
(xiv) Assist in providing occupational health and safety training for contractors' personnel before commencement of civil works for all sub-projects;
(xv) Assist the PMCU environment officer in preparing semi-annual environmental monitoring reports and submit to ADB;
(xvi) Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project;
(xvii) Assist PMCU and PIUs in attending to or facilitating responses to any public grievances per GRM; and
(xviii) Assist in any other task assigned by the PMCU Environment Officer and/or supervising consultant in relevance to effective project implementation.

B. Project Management Coordination unit (PMCU)

1. Environmental Safeguards Officer – PMCU

3. **Experience.** An Environmental Engineer / scientist with experience in management of environmental issues of infrastructure projects and understanding of the regulatory framework for environmental management in Bangladesh.

4. Detailed Tasks:

(i) Ensure the conformance of all Subprojects proposed under Second CRDP to the regulatory compliance to the Government, with reference to environmental requirements, with support from the Environmental Officer of the PIUs. This shall include preparation of the documents as required under the Environmental Conservation rules, submission of application forms, and obtaining clearances from the DOE; and ensuring conformance to the clearance conditions laid down in the clearances for the Subprojects by the DOE;
(ii) Liaise with the various Government agencies on environmental and other regulatory matters pertaining to implementation of the subprojects;
(iii) Work closely with the PIUs and provide guidance on the shifting of utilities and services, including obtaining necessary clearances from the respective line agencies, prior to award of civil works contracts;
(iv) Provide support and assistance to the Government Agencies and the Asian Development Bank to supervise the implementation of the IEE during the construction as well as operation stage of the project ;
(v) Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE and advise PIUs for compliance with statutory requirements;
(vi) Work in close co-ordination with the Social Safeguards officer of the PMCU and participate in the Grievance Redressal Mechanism for all grievances that are brought forward to the PMCU. Monitor on a continuous basis the effective functioning of the Grievance mechanisms at the PIU and Pourashava levels on all grievances related to environmental issues; and
(vii) Jointly (with the environmental engineer of the PMCU), review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the PDSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions.

2. Environmental Engineer - PMCU

5. **Experience.** A Civil Engineer with specialization in Environment with experience in implementation of environmental management plans of infrastructure projects, especially those funded by donor agencies.

6. Detailed Tasks.

(i) Review the IEE Document and contract clauses and ensure adequacy under ADB's Environmental Assessment Guidelines, 2003 and the updated Safeguards Policy Statement, 2009 and identify any areas for improvement.
(ii) Ensure that the subproject design and specifications adequately reflect the IEE.
(iii) Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE.
(iv) Review and approve the Contractor's Implementation Plan for the environmental measures, as per IEEs/EMPs.
(v) Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE/EMP.
(i) Jointly (with the environmental safeguards officer of the PMCU), review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the PDSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions.
(ii) Document the good practices in the project, with support from Environmental Specialists of the PDSC and PIU on (a) incorporation and integration of environmental

issues into engineering design and (b) on implementing environmental measures in the construction, and dissemination of the same.

C. Project Implementation Unit (PIU)

1. Environmental Officer (PIU)

7. **Experience.** A civil engineer with working experience related to the integration of environmental issues in design, and construction of infrastructure projects.

8. Detailed tasks:

(i) Support the Environmental Safeguards officer of the PMCU towards ensuring the conformance of the subproject to the regulatory compliance to the Government, with reference to environmental requirements; including preparation of documents required for clearances, obtaining clearances from the divisional office of the DOE, etc..
(ii) Work with the PDSC Environmental Specialists in the preparation of the Environmental Safeguards Documents; including integration of environmental provisions into the contract provisions of the respective subprojects.
(iii) With support of the PMCU and PDSC Environmental Specialists, monitor compliance of the implementation of the environmental provisions; and ensure that identified control measures are effective and in compliance with the IEE.
(iv) Review and approve the Contractor's Implementation Plan for the environmental measures, as per IEEs/EMPs.
(v) Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE/EMP; including the implementation of the environmental monitoring plan outlined in the IEE.
(vi) Establish dialogue with the affected communities and ensure that the environmental concerns and suggestions are incorporated and implemented in the project.
(vii) Participate in the Grievance redressal of all grievances pertaining to environment and support the PIU/Pourashava in redressal of the same.
(viii) Prepare and submit environmental monitoring and implementation progress reports with support from PDSC consultants, to the PMCU.
(ix) Assist Environmental Specialist of the PMCU to prepare good practice dissemination notes based on the experience gained from site supervision.

Appendix 10: Traffic Management Plan Template

A. Principles

1. One of the prime objectives of this traffic management plan (TMP) is to ensure the safety of all the road users along the work zone, and to address the following issues:

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

B. Operating Policies for Traffic Management Plan

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

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

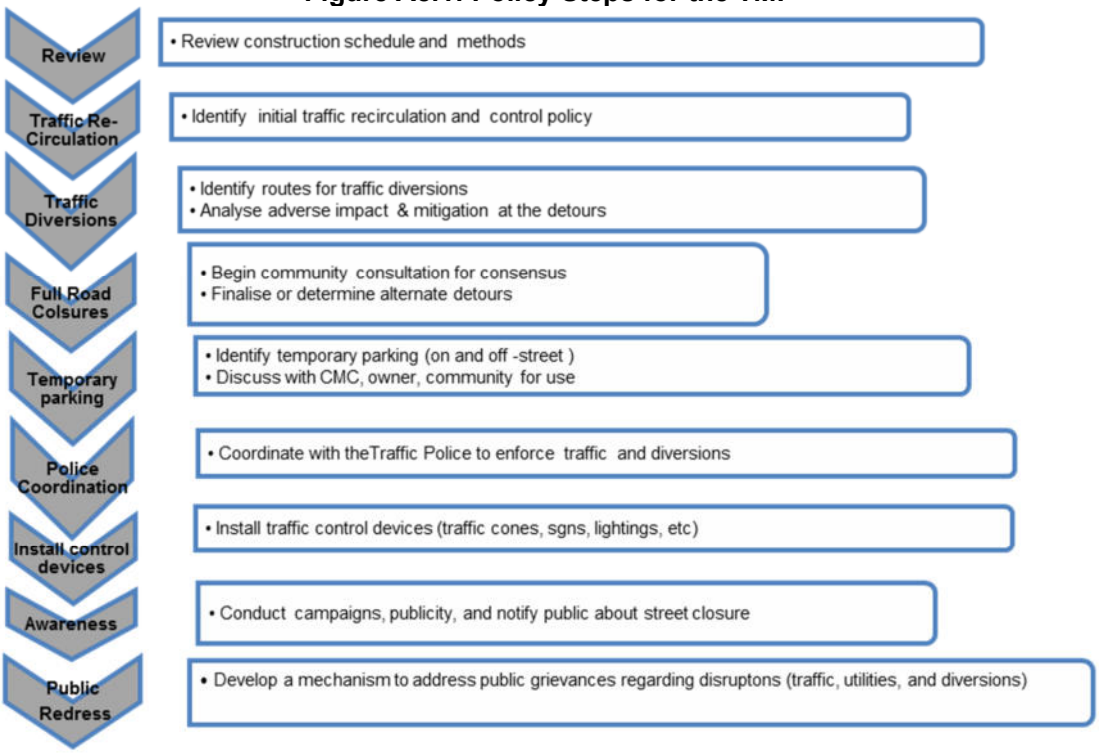
C. Analyze the Impact Due to Street Closure

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

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

4. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the Detour Street or public opposition, the full closure can be restricted to weekends.

Figure A8.1: Policy Steps for the TMP



D. Public awareness and notifications

5. As per discussions in the previous sections, there will be travel delays during the constructions, as is the case with most construction projects, albeit on a reduced scale if utilities and traffic management are properly coordinated. There are additional grounds for travel delays in the area, as most of the streets lack sufficient capacity to accommodate additional traffic from diverted traffic as a result of street closures to accommodate the works.

6. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

7. The PMCU and PIU will also conduct an awareness campaign to educate the public about the following issues:

- traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
- defensive driving behavior along the work zones; and
- reduced speeds enforced at the work zones and traffic diversions.

8. It may be necessary to conduct the awareness programs/campaigns on road safety during construction.

9. The campaign will cater to all types of target groups i.e. children, adults, and drivers. Therefore, these campaigns will be conducted in schools and community centers. In addition, the project will publish a brochure for public information. These brochures will be widely circulated around the area and will also be available at the PMCU, PIU and the contractor's site offices. The text of the brochure should be concise to be effective, with a lot of graphics. It will serve the

following purpose:

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

E. Vehicle Maintenance and Safety

10. A vehicle maintenance and safety program shall be implemented by the construction contractor. The contractor should ensure that all the vehicles are in proper running condition and it comply with roadworthy and meet certification standards of Government of Bangladesh. All vehicles to be used shall be in perfect condition meeting pollution standards of Government of Bangladesh. The vehicle operator requires a prestate of shift checklist. Additional safety precautions will include the requirement for:

- Driver will follow the special code of conduct and road safety rules of Government of Bangladesh.
- Drivers to ensure that all loads are covered and secured drivers to ensure operation equipment can't leak materials hauled
- Vehicles will be cleaned and maintained in designed places.

F. Install traffic control devices at the work zones and traffic diversion routes

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

- Signs
- Pavement Markings
- Channelizing Devices
- Arrow Panels
- Warning Lights

12. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

13. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

14. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) for regulating the traffic during night time.

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

16. The PIU and contractor will coordinate with the local administration and traffic police regarding the traffic signs, detour, and any other matters related to traffic. The contractor will prepare the traffic management plan in detail and submit it along with the EMP for the final approval.

Appendix 11: Sample Daily Monitoring Sheet for Contractors

CITY REGIONS DEVELOPMENT PROJECT II
Contractor Monitoring Sheet

Name of Subproject: _____
Location of Subproject: _____
Chainage covered (for linear works): _____
Supervising PIU: _____
Contractor: _____
Contractor EHS Supervisor (or equivalent): _____
Date of monitoring: _____

Summary of Findings

Monitoring Item	Status	Remarks
1. Compliance with Local Permit Requirements	**(Secured / Application Submitted / Not Applicable)**	
Location/zoning permits		
Permit to construct		
Building permit		
Transport / hauling permits		
2. Compliance with IEE Requirements	**(Approved / Under Preparation / Submitted to PIU for Approval)**	
Site-specific EMP (SEMP)		
Corrective Action Plan, if any		
3. Compliance with SEMP		
Construction Site	**(Satisfactory / Needs Improvement / Not Implemented)**	
- Conduct of toolbox talk		
- Use of PPE		
- Rest areas for male and female workers		
- Toilets for male and female workers		
- Medical kits		
- Drinking water supply		
- Dust control		
- Noise control		
- Solid waste management		
- Wastewater management		
- Chemicals storage (fuel, oil, etc.)		
- Siltation or erosion control		
- Heavy equipment staging / parking area		
- Barricades around excavation sites		
- Access to residential houses/shops/businesses		
- Traffic routing signages		
- Lightings at night		
- Trench shoring / landslide protection		
Construction Workers' Camp Site	**(Available / Needs Improvement / Not Available)**	
- Quarters for male and female workers		

Monitoring Item	Status	Remarks
- Sleeping utilities (e.g. beds, pillows, blankets, mosquito nets, etc.)		
- Power/Electricity supply		
- Drinking water supply		
- Toilets for male and female workers		
- General purpose water supply (cooking, washing, bathing)		
- Cooking facilities and areas		
- Solid waste management		
- Wastewater management		
- Pest control		
4. Implementation of GRM	**(Yes / No or None / Under Resolution)**	
Complaints		
Complaints resolution		
5. Environmental Quality Measurement	**(Passed / Failed / Not Applicable)**	
Ambient air quality sampling		
Noise level measurement		
Receiving water quality sampling		

Other Issues: _____

_____

_____

_____

Attachments:
1. Copies of permits secured, if any.
2. Photos taken at worksites, if any.
(photos attached in previous monitoring sheets should not be used again).
3. Laboratory results of environmental quality measurements, if any.

Prepared by: _____
Name, Designation and Signature

Appendix 12: Sample Inspection Report for PMCU and PIUs

CITY REGIONS DEVELOPMENT PROJECT II
SITE INSPECTION CHECKLIST

Subproject: _____ Date: _____
Location: _____
Chainage (for linear works): _____

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

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

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

Other Issues: _____

_____

_____

_____

Prepared by: _____

Name, Designation and Signature

Appendix 13: Semi-Annual Environmental Monitoring Template

- Introduction
- Overall project description and objectives
- Environmental category as per ADB Safeguard Policy Statement, 2009
- Environmental category of each subproject as per national laws and regulations
- Project Safeguards Team

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

- Overall project and sub-project progress and status
- Description of subprojects (package-wise) and status of implementation (preliminary, detailed design, on-going construction, completed, and/or O&M stage)

Package Number	Components/List of Works	Contract Status (specify if under bidding or contract awarded)	Status of Implementation (Preliminary Design/Detailed Design/On-going Construction/Completed/O&M)[19]	If On-going Construction	
				%Physical Progress	Expected Completion Date

[19] If on-going construction, include %physical progress and expected date of completion

- COMPLIANCE STATUS WITH NATIONAL/STATE/LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS[20]

Package No.	Subproject Name	Statutory Environmental Requirements[21]	Status of Compliance[22]	Validity if obtained	Action Required	Specific Conditions that will require environmental monitoring as per Environment Clearance, Consent/Permit to Establish[23]

- Compliance status with environmental loan covenants

No. (List schedule and paragraph number of Loan Agreement)	Covenant	Status of Compliance	Action Required

- Compliance status with the environmental management plan (refer to EMP TaBLES in APPROVED IEE/S)
- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise IEE Documentation Status

Package Number	Final IEE based on Detailed Design				Site-specific EMP (or Construction EMP) approved by Project Director? (Yes/No)	Remarks
	Not yet due (detailed design not yet completed)	Submitted to ADB (Provide Date of Submission)	Disclosed on project website (Provide Link)	Final IEE provided to Contractor/s (Yes/No)		

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

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

Package Name	Contractor	Nodal Person	Email Address	Contact Number

[20] All statutory clearance/s, no-objection certificates, permit/s, etc. should be obtained prior to award of contract/s. Attach as appendix all clearance obtained during the reporting period. If already reported, specify in the "remarks" column.
[21] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)
[22] Specify if obtained, submitted and awaiting approval, application not yet submitted
[23] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

- With reference to approved EMP/site-specific EMP/construction EMP, complete the table below

Summary of Environmental Monitoring Activities (for the Reporting Period)[24]

Impacts (List from IEE)	Mitigation Measures (List from IEE)	Parameters Monitored (As a minimum those identified in the IEE should be monitored)	Method of Monitoring	Location of Monitoring	Date of Monitoring Conducted	Name of Person Who Conducted the Monitoring
Design Phase						
Pre-Construction Phase						
Construction Phase						
Operational Phase						

[24] Attach Laboratory Results and Sampling Map/Locations

Overall Compliance with CEMP/ EMP

No.	Sub-Project Name	EMP/ CEMP Part of Contract Documents (Y/N)	CEMP/ EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

- **APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT**
- Briefly describe the approach and methodology used for environmental monitoring of each sub-project.

- **MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)**
- Discuss the general condition of surroundings at the project site, with consideration of the following, whichever are applicable:

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

- Briefly discuss the basis for environmental parameters monitoring.
- Indicate type of environmental parameters to be monitored and identify the location.
- Indicate the method of monitoring and equipment used.
- Provide monitoring results and an analysis of results in relation to baseline data and statutory requirements.

As a minimum the results should be presented as per the tables below.

Air Quality Results

Site No.	Date of Testing	Site Location	Parameters (Government Standards)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Site No.	Date of Testing	Site Location	Parameters (Monitoring Results)		
			PM10 µg/m3	SO2 µg/m3	NO2 µg/m3

Water Quality Results

Site No.	Date of Sampling	Site Location	Parameters (Government Standards)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Site No.	Date of Sampling	Site Location	Parameters (Monitoring Results)					
			pH	Conductivity µS/cm	BOD mg/L	TSS mg/L	TN mg/L	TP mg/L

Noise Quality Results

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Government Standard)	
			Day Time	Night Time

Site No.	Date of Testing	Site Location	LA_{eq} (dBA) (Monitoring Results)	
			Day Time	Night Time

- **GRIEVANCE REDRESS MECHANISM**
- Provide information on establishment of grievance redress mechanism and capacity of grievance redress committee to address project-related issues/complaints. Include as appendix Notification of the GRM (town-wise if applicable).

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

- **SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS**

- Summary of follow up time-bound actions to be taken within a set timeframe.

- **APPENDIXES**
- Photos
- Summary of consultations
- Copies of environmental clearances and permits
- Sample of environmental site inspection report
- all supporting documents including **signed** monthly environmental site inspection reports prepared by consultants and/or contractors
- Others

Appendix 14: Environmental Clearance Certificate (ECC)

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

Memo No: DOE/Clearance/5194/2013/53 Date: 10 /02/2019

Subject: Environmental Clearance for City Region Development Project-II (CRDP-II).

Ref: Your application on 30/08/2018 and 27/12/2018.

Please refer to your letter and the captioned subject mentioned above, I have the pleasure to convey the approval of Environmental Clearance for City Region Development Project-II (CRDP-II).

A copy of the said Environmental Clearance Certificate is attached herewith for your kind information and necessary action at your end.

10.02.2019

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 8181673

Project Director
City Region Development Project-II (CRDP-II)
Local Government Engineering Department
RDEC LGED Bhaban (Level-4), Agargaon, Sher-e-Bangla Nagar, Dhaka.

Copy Forwarded to :

1) PS to Secretary, Ministry of Environment, Forest and Climate Change, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
3) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Government of the People's Republic of Bangladesh
Department of Environment
Paribesh Bhaban, E-16, Agargaon
Sher-e-Bangla Nagar, Dhaka-1207
www.doe.gov.bd

Environmental Clearance Certificate

Section 12 of the Environment Conservation Act, 1995 (Amended 2010)

Clearance Certificate Number: 53

File number: DOE/Clearance/5194/2013/

Clearance Certificate Issue Date: 10 February 2019

Renewal date not later than: 09 February 2020

A. Clearance Certificate Type
Environmental Clearance Certificate

B. Clearance Certificate Holder
Project Director City Region Development Project-II (CRDP-II) Local Government Engineering Department RDEC LGED Bhaban (Level-4), Agargaon, Sher-e-Bangla Nagar, Dhaka.

C. Premises to which this Clearance Certificate Applies
Construction and Rehabilitation of Roads and associated Drainage subprojects in Dhaka region comprise 9 roads in Gazipur City Corporation, 31 roads in Savar Upazila and Municipality, 10 roads in Rupganj Upazila and 23 roads in Araihazar Upazila of Narayanganj District.

D. Activities for which this Clearance Certificate Authorizes and Regulates
Construction and Rehabilitation of Roads and associated Drainage Network. These roads and associated drainage subprojects in Dhaka region comprise 9 roads in Gazipur City Corporation, 31 roads in Savar Upazila and Municipality, 10 roads in Rupganj Upazila and 23 roads in Araihazar Upazila of Narayanganj District.

E. Terms and Conditions for Environmental Clearance Certificate

1. **Limit Condition for Discharges to Air and Water**: The Environmental Clearance Certificate must comply with schedule 2 and 10, rule 12 of the Environment Conservation Rules, 1997.

2. **Noise Limit**: The Environmental Clearance Certificate must comply with the Noise Pollution (Control) Rules, 2006.

In case of non-coverage of ECR 1997 the World Bank Environment, Health and Safety Guideline shall be adhered to.

3. Operating conditions:

3.1 Activities must be carried out in a competent manner. This includes:
(a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
(b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

3.2 All plant and equipment installed at the premises or used in connection with the Environmental Clearance activity:
(a) must be maintained in a proper and efficient condition; and
(b) must be operated in a proper and efficient manner.

3.3 Construction works shall be restricted to day time hours so as to avoid/mitigate the disturbance of local lives as well as implementation schedules of the works shall be notified in advance to nearby residents.

3.4 Storage area for soils and other construction materials shall be carefully selected to avoid disturbance of the natural drainage.

3.5 This shall be ensured that soil is obtained from nearby areas, which are free of invasive plants. Re-vegetation and replanting shall be undertaken if rehabilitation works involve extensive vegetation clearance.

3.6 Vegetation clearance shall be minimizing at the construction phase as to minimize soil erosion. Soils for embankments shall be properly tested and compacted to ensure stability.

3.7 Proper construction practices shall be followed that minimize loss of habitats and fish breeding, feeding & nursery sites.

3.8 Proper and adequate sanitation facilities shall be ensured in labor camps throughout the proposed project period.

3.9 In order to control noise pollution, vehicles & equipment shall be maintained regularly; working during sensitive hours and locating machinery close to sensitive receptor shall be avoided.

3.10 No solid waste can be burnt in the project area. An environment friendly solid waste management should be in place during whole the period of the project in the field.

3.11 Proper and adequate on-site precautionary measures and safety measures shall be ensured so that no habitat of any flora and fauna would be demolished or destructed.

3.12 All the required mitigation measures suggested in the IEE report are to be strictly implemented and kept operative/functioning on a continuous basis.

3.13 Any heritage sight, ecological critical area, and other environmentally and/or religious sensitive places shall be avoided during project construction phase.

3.14 Resettlement plan should be properly implemented and people should be adequately compensated, where necessary.

3.15 Construction material should be properly disposed off after the construction work is over.

3.16 The Environmental Management Plan included in the IEE report shall strictly be implemented and kept functioning on a continuous basis.

4.1 Monitoring and Recording conditions:

4.1.1 The results of any monitoring required to be conducted by this Clearance Certificate must be recorded.

4.1.2 The following records must be kept in respect of any samples required to be collected for the purposes of this Clearance Certificate:
(a) the date(s) on which the sample was taken;
(b) the time(s) at which the sample was collected;
(c) the point at which the sample was taken; and
(d) the name of the person who collected the sample.

4.2 Requirement to monitor concentration of pollutants discharged

For each monitoring, the Clearance Certificate holder must monitor (by sampling and obtaining results by analysis) the following parameter: air quality, water quality and Noise.

5. **Reporting Conditions:** Environmental Monitoring Reports shall be made available simultaneously to Head quarters and respective Regional office of the Department of Environment on a quarterly basis during the whole period of the project.

6. **Notification of environmental harm:** The Clearance Certificate holder or its employees must notify the Department of Environment of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident.

F. Recording of pollution complaints

The certificate holder must keep a legible record of all complaints made to the certificate holder or any employee or agent of the certificate holder in relation to pollution arising from any activity to which this Environmental certificate applies. The record must include details of the following:

(a) the date and time of the complaint;
(b) the method by which the complaint was made;
(c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
(d) the nature of the complaint;
(e) the action taken by the certificate holder in relation to the complaint, including any follow-up contact with the complainant; and
(f) if no action was taken by the certificate holder, the reasons why no action was taken.

The record of a complaint must be kept for at least 4 years after the complaint was made. The record must be produced to any authorized officer of the DOE who asks to see them.

G. **Validity of the Clearance Certificate**

This Environmental Clearance is valid for one year from the date of issuance and Project Director shall apply for renewal to the Dhaka Regional Office with a copy to Head Office of DOE in Dhaka at least 30 days ahead of expiry.

Violation of any of the above conditions shall render this clearance void.

This Environmental Clearance Certificate has been issued with the approval of the appropriate authority.

10.02.2019

(Syed Nazmul Ahsan)
Director (Environmental Clearance)
Phone # 8181673

Appendix 15: Renewal of Environmental Clearance Certificate (ECC)

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

Memo No: DoE/Clearance/5194/2013/61 Date: 24/03/2021

Subject: Renewal of Environmental Clearance Certificate for "Second City Region Development Project (CRDP-2), Local Government Engineering Department, LGED Bhaban, Agargaon, Sher-E-Bangla Nagar, Dhaka"

Ref: Your application dated 24/02/2021.

With reference to your above application, the Department of Environment hereby renews the Environmental Clearance Certificate in favor of the Second City Region Development Project (CRDP-2) subject to fulfilling the terms and conditions stated in Environmental Clearance Certificate issued on 10.02.2019 vide memo no. DoE/Clearance/5194/2013/53.

2. This renewal is valid upto 09 February, 2022. An application for further renewal along with a) the renewal fees (as per the ECR, 1997) b) VAT on renewal fees (in separate Treasury Chalan) and c) all associated documents shall be submitted to the Head Office of DoE with a copy to Dhaka Regional/Khulna Divisional Office at least 30 days ahead of expiry date.

24.03.2021

(Masud Iqbal Md. Shameem)
Director (Environmental Clearance)
Phone: 8181673

Project Director
Second City Region Development Project (CRDP-2)
Local Government Engineering Department,
LGED Bhaban, Agargaon
Sher-E-Bangla Nagar, Dhaka.

Copy Forwarded to :

1) PS to Secretary, Ministry of Environment, Forest and Climate Change, Bangladesh Secretariat, Dhaka.
2) Director, Department of Environment, Dhaka Regional Office, Dhaka.
3) Director, Department of Environment, Khulna Divisional Office, Khulna.
4) Assistant Director, Office of the Director General, Department of Environment, Head Office, Dhaka.

Appendix 16: Terrestrial Flora alongside the subproject drainage khals and adjacent areas

Sl. No.	Local Name	Scientific name	Availability Status	IUCN Status
	Natural woody plants			
	Titijam	*Eugenia sp.*	F	E
	Pitraj	*Amoora rohituka*	C	F
	Jarul	*Lagerstroemia speciosa*	F	R
	Hijal	*Barringtonia acutangula*	E	E
	Nim	*Azadirachta indica*	F	R
	Fruit trees			
	Amloki	*Phyllanthus emblica*	R	R
	Amrah	*Spondias pinnata*	F	F
	Boroi/Kul	*Ziziphus jujuba*	C	F
	Jam	*Syzygium cumini*	C	F
	Jamrul	*Eugenia javanica*	F	F
	Kala	*Musa* spp.	C	F
	Karamcha	*Carissa carandas*	R	R
	Lebu	*Citrus* spp.	C	C
	Narikel	*Cocos nucifera*	C	C
	Pepe	*Carica papaya*	C	F
	Peyara	*Psidium guajava*	C	C
	Supari	*Areca catechu*	C	C
	Tal	*Borassus flabellifer*	C	F
	Aam	*Mangiferaindica*	C	C
	Khoksha/dumur	*Ficus sp.*	C	F
	Shaora	*Streblus asper*	F	R
	Titijam	*Eugenia sp.*	F	E
	Jambura	*Citrus grandis*	F	R
	Kamranga	Averrhoa carambola	F	F
	Kanthal	*Artocarpus heterophyllus*	C	F
	Supari	*Areca catechu*	C	C
	Wild medicinal plants			
	Basak	*Adhatoda vasica Nees.*	R	R
	Dhutura	*Datura metel Linn.*	F	R
	Durba ghas	*Cynodon dactylon Pers*	C	C
	Kalokeshi	*Eclipta alba (Hassk).*	F	R
	Kalomegh	*Andrographis paniculata*	R	E
	Lajjabati (white)	*Mimosa pudica Linn.*	R	E
	Olotkombol	*Abroma augusta L.*	F	R
	Sharpagandha.	*Rauwolfia serpentina*	R	E
	Telakucha	*Coccina cordifolia (L)*	C	R

Status: Vc - very common, C - common, F- fairly common, R – rare and E- endangered, (Source: Field survey, July 2021)

Appendix 17: Identified fishes in proposed subproject Khals and adjacent canals

Sl. no	Local Name	Scientific	Availability Status	IUCN Status
	chingri	*Palaemon spp.*	C	F
	Shol	*Channa striatus*	C	R
	Taki	*Channa punctatus*	C	F
	Chela	*Onygaster phulo*	F	E
	Mola	*Amblypharyngodon mola*	F	R
	Rui	*Labeo rohita*	C	C
	Catla	*Catla catla*	C	C
	Mrigal	*Cirrhinus mrigala*	C	C
	Tatkini	*Cirrhinus reba*	F	E
	Tit punti	*Puntius ticto*	F	R
	Punti	*Puntius stigma*	C	F
	Thai punti	*Puntius gonionotus*	F	F
	Shingi	*Heteropneustes fossilis*	C	F
	Magur	*Clarias batrachus*	R	E
	Boal	*Wallago attu*	C	E
	Kani pabda	*Ompok bimaculatus*	R	E
	Pangas	*Pangasius pangasius*	C	C
	Rita	*Rita rita*	F	E
	Ayre	*Mystus aor*	C	E
	Tengra	*Mystus vittatus*	C	F
	Chapila	*Gudusia chapra*	C	E
	Baim	*Mastacembelus armatus*	C	E
	Gochi baim	*Mastacembelus pancalus*	C	F
	Tara baim	*Macrognathus aculeatus*	R	E
	Khalisha	*Colisa fasciatus*	C	F
	Koi	*Anabas testudineus*	F	R
	Telapia	*Oreochromis niloticus*	C	C
	Baila	*Glossogobius giuris*	C	R
	Baro chanda	*Chanda nama*	R	R
	Choto chanda	*Chanda ranga*	F	R
	Vetki	*Lates calcarifer*	C	F
	Parshe	*Liza spp.*	C	F
	Datina	*Pomadasys hasta*	C	F

Status: C = Common, F =Fairly Common, R =Rare and E = Endangered (Source: Field survey, July 2021)