

Initial Environmental Examination

Project No. 49329-006
April 2023

Bangladesh: Second City Region Development Project

Drainage Improvement in Nowapara Pourashava
Package No. CRDP-II/LGED/NOWAPARA/NCB/2021/W-01

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

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ABBREVIATIONS

ADB	-	Asian Development Bank
BDT	-	Bangladesh Taka
BOD	-	biological oxygen demand
BOQ	-	Bill of Quantities
CEO	-	Chief Executive Officer
CRDP	-	City Region Development Project
DCC	-	Dhaka City Corporation
DMDP	-	Dhaka Metropolitan Development Plan
DOE	-	Department of Environment
DPHE	-	Department of Public Health Engineering
DSMC	-	Design, Supervision and Management Consultant
DWASA	-	Dhaka Water Supply and Sewerage Authority
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
LGI	-	Local Government Institution
MDSC	-	Management, Design and Supervision Consultant
NGO	-	nongovernment organization
NOC	-	no objection certificate
O&M	-	operations and maintenance
PIU	-	Project Implementation Unit
PMCU	-	Project Management Coordination Unit
REA	-	Rapid Environmental Assessment
ROW	-	right of way
RPM	-	respiratory particulate matter
RSS	-	resettlement support staff
SPS	-	Safeguard Policy Statement
SWM	-	Solid Waste Management

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Executive Summary

The Second City Region Development Project (the project) will support development in the city regions of Dhaka and Khulna by building upon infrastructure and capacity building initiatives implemented during the first City Region Development Project (CRDP) funded by the Asian Development Bank (ADB). The project will finance additional crucial infrastructure in urban and peri-urban areas needed to stimulate growth and improve livability Dhaka and Khulna, two densely populated rapidly growing city regions of Bangladesh. The project will also continue strengthening capacity for project development, sustainable service delivery, and community awareness. The project will be implemented over a five-year period.

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/NOWAPARA/NCB/2021/W-01. This package includes improvement of roadway including roadside drain, reconstruction of discrete drains. The following specific components to be improved and/or developed are involved in the Nowapara Pourashava in Khulna region: (i) **Scheme 1:** Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work.; (ii) **Scheme 2:** Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road); **Scheme 3:** Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement; .(iv) **Scheme 4:** Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.; v) **Scheme 5:** Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m).

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, the subproject is classified as Environmental Category B per ADB SPS, 2009 as no diverse, irreversible or unprecedented significant impacts are envisaged. ADB's Environment and Safeguards Division confirmed this categorization on 27 August 2018. 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 3 (three) subproject roads to be improved is 3.295 km, and in addition, these road associated side drains 2.64 km plus 1 (one) discrete drain is 3.546 km are to be improved. The subproject road alignments pass more or less through built-up areas of small and medium enterprises, markets or bazars, agricultural or 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 subproject 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). The project 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.

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

For civil works, the Contractor are 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 prepare from time to time to monitor implementation of this IEE, EMP, and SEMP. The Contractor allocates a budget for compliance with these EMP measures, requirements and actions.

Monitoring and Reporting. The 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 the project.

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 Khulna region. The subproject will not have diverse, irreversible or unprecedented adverse environmental impacts and the potential significant 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 Nowapara 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 (the project) will support development in the city regions of Dhaka and Khulna by building upon infrastructure and capacity building initiatives implemented during the first City Region Development Project (CRDP)¹ funded by the Asian Development Bank (ADB). The project will finance additional crucial infrastructure in urban and peri-urban areas needed to stimulate growth and improve livability in Dhaka and Khulna, two densely populated rapidly growing city regions of Bangladesh. The project will also continue strengthening capacity for project development, sustainable service delivery, and community awareness. The project will be implemented over a five-year period. Specifically, the project will support the (i) construction, upgrade and rehabilitation of selected Dhaka city region roads, bridges and culverts, including drainage; (ii) construction, upgrade and rehabilitation of drainage in Khulna city region; and (iii) development of a Khulna city corporation comprehensive solid waste management plan and small works.

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

3. The project has been classified as environmental category B per ADB Safeguard Policy Statement (SPS), 2009.² Project preparation was supported by (i) a project preparatory technical assistance (TA);³ and (ii) a project design advance loan of \$5 million to finance preparation, design and supervision consultancy services. Part of the preparatory work was the preparation of the environmental assessment and review framework (EARF) and initial environmental examination (IEE) reports in accordance with the requirements of ADB SPS, 2009. Further support was provided by ADB in preparing the EARF and IEE reports for sample subprojects to meet the requirements for projects proposed under a sector loan modality.

This IEE report has been prepared for the subproject covered by package number CRDP-II/LGED/NOWAPARA/NCB/2021/W-01, which includes the following schemes to improve the roadway including roadside drain, reconstruction of discrete drains in the Nowapara Upazila in Khulna city region: (i) **Scheme 1:** Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work.; (ii)

¹ ADB. 2010. *People's Republic of Bangladesh: City Region Development Project*. Manila.

² ADB's Environment and Safeguards Division confirmed the Category B classification of the project on 27 August 2018. 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. ADB Environment and Safeguards Division confirmed this categorization on 27 August 2018.

³ ADB. *People's Republic of Bangladesh: City Region Development Project II*.

Scheme 2: Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road); **Scheme 3:** Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement; .(iv) **Scheme 4:** Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.; v) **Scheme 5:** Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m).

A. Purpose of the Initial Environmental Examination

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 project, 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 was initially conducted, and results of the rapid assessment show that the project is unlikely to cause any diverse, irreversible or unprecedented significant impacts, and therefore classified under Category B per ADB SPS, 2009. ADB's Environment and Safeguards Division confirmed this categorization on 27 August 2018. Thus, this IEE has been prepared in accordance with ADB SPS, 2009 requirements for environment category B projects. The location of the subproject is shown in **Figures 1 & 2**.

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. 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;

- 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/meetings with various stakeholders including local communities;
- Information is to be disseminated about the subproject, and accordingly the project affected people and other stakeholders are to be involved in consultation discussion; and
- A simple environmental assessment checklist for environmental assessment process is to be developed, and the affected people and other stakeholders for the purpose are to be involved within the process

This IEE has been carried out using reconnaissance survey, field visits, consultation with stakeholders and others, Non-Government Organizations (NGOs), review of existing data, assessment to identify adverse impacts and preparation of EMP and monitoring program at all stages of subproject implementation. Physical assessments were made for entire corridors with respect to terrestrial and aquatic resources, including physical cultural resources and other natural and man-made structures.

Figure 1: Location Map of Nowapara Package W-01 Subproject

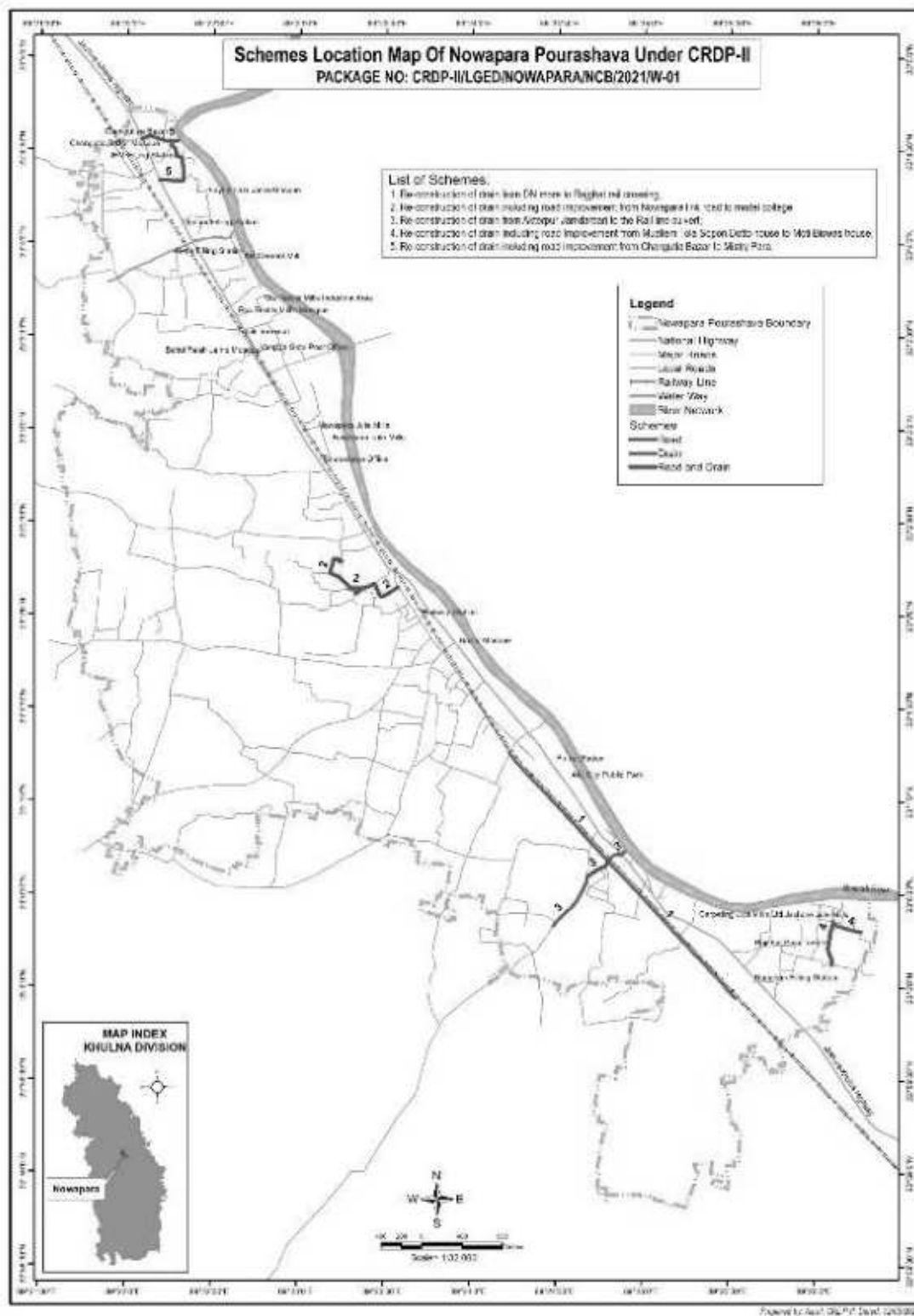
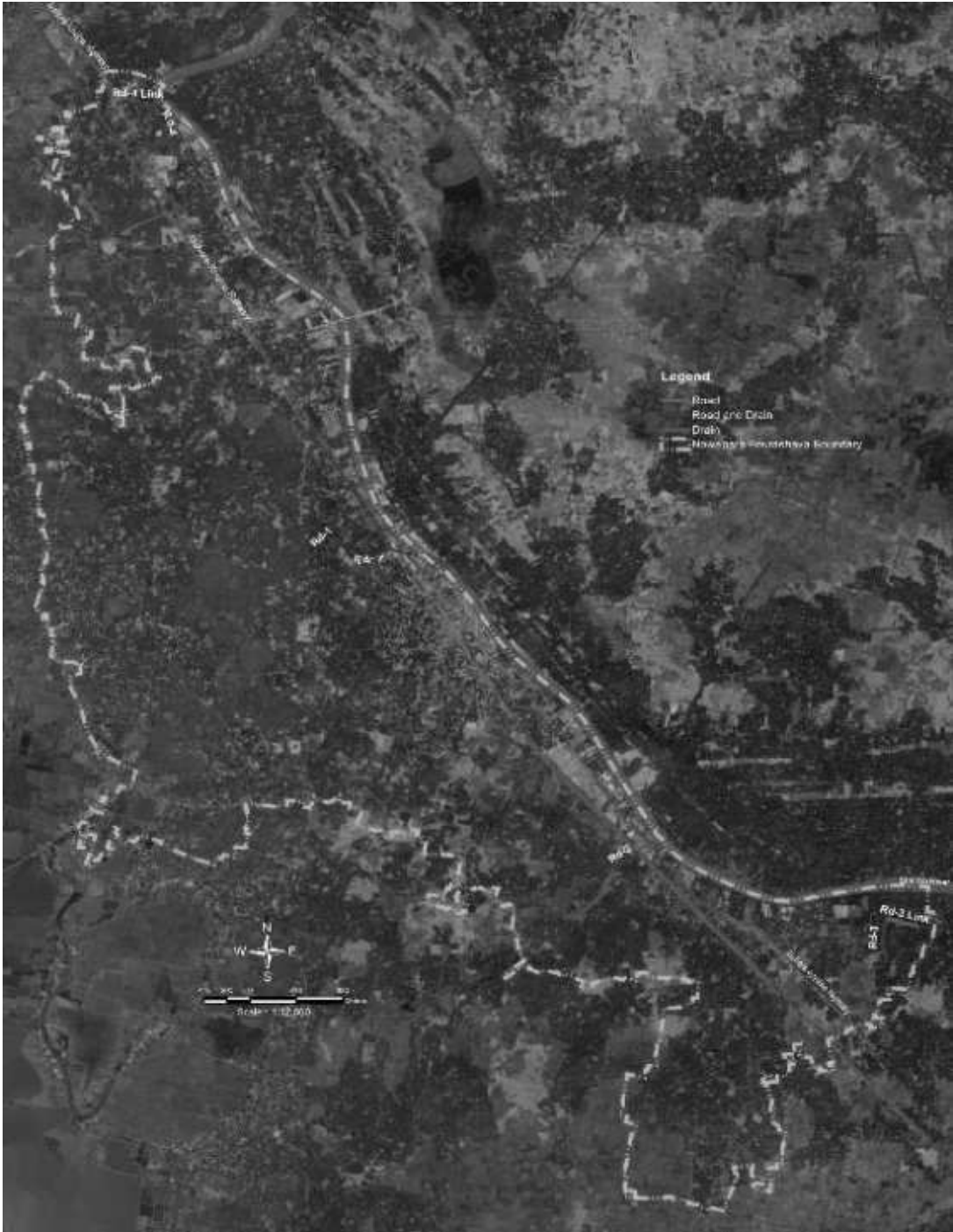


Figure 2: Location Map of Nowapara Package W-01 Subproject on Google Map



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, the project 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.

⁴ ADB. 2009. *Safeguard Policy Statement*. Manila.

13. **Public Disclosure.** The Local Government Engineering Department (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
- (iii) Environmental monitoring reports submitted during subproject implementation upon receipt.

14. **Consultation and Participation.** PMCU and Nowapara PIU have carried out meaningful consultation⁶ at Nowapara Pourashava Office on 23/12/2019 with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results have been documented and reflected in the IEE report (**Appendix 7**).

15. **Grievance Redress Mechanism.** The 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.** The 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 Nowapara 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

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."

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.

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, 2009.

19. **Occupational Health and Safety.** PMCU⁷ shall ensure that workers⁸ 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) 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.** The 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. This includes specific community road safety especially for children and elderly persons.

22. **Physical Cultural Resources.** The PMCU is responsible for sitting 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.

⁷In 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.

⁸Including 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.

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

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.** IEE, which contain the EMP, shall be included in bidding and contract documents and verified by Nowapara PIU. The PMCU and Nowapara 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 Nowapara 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 EMP; 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 and PMCU has obtained ADB's clearance of such updated IEE; and (iii) IEE (i.e., IEE in compliance with Environmental Conservation Rules[ECR], 1997) approved by the Department of Environment (DOE) 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

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.

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; (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.

DOE = Department of Environment, ECC = Environmental Clearance Certificate, ECR = Environmental Conservation Rules, EIA = environmental impact assessment, EMP = environmental management plan, ETP = Effluent Treatment Plant, IEE = initial environmental examination, LCC = location clearance certificate, TOR = term of reference.

^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**.

30. **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 for environmental clearance from DoE. The accomplished application form is submitted to DOE together with requirements as enumerated in

31. **Table 1.** The proponent is also required to pay equivalent application fee prescribed in Schedule 13 of ECR, 1997

32. The ECC is issued within 30 days from receipt of the application by DOE. Such ECC is required to renew every year from the date of its effectivity. For the Second CRDP, PMCU is responsible for the renewal application of the ECC. Application for said ECC has been approved and renewed¹². The approved and the renewed ECC have been attached in this IEE (**Appendix 13 &14**)¹³. The renewed ECC is valid up to 09 February, 2023.

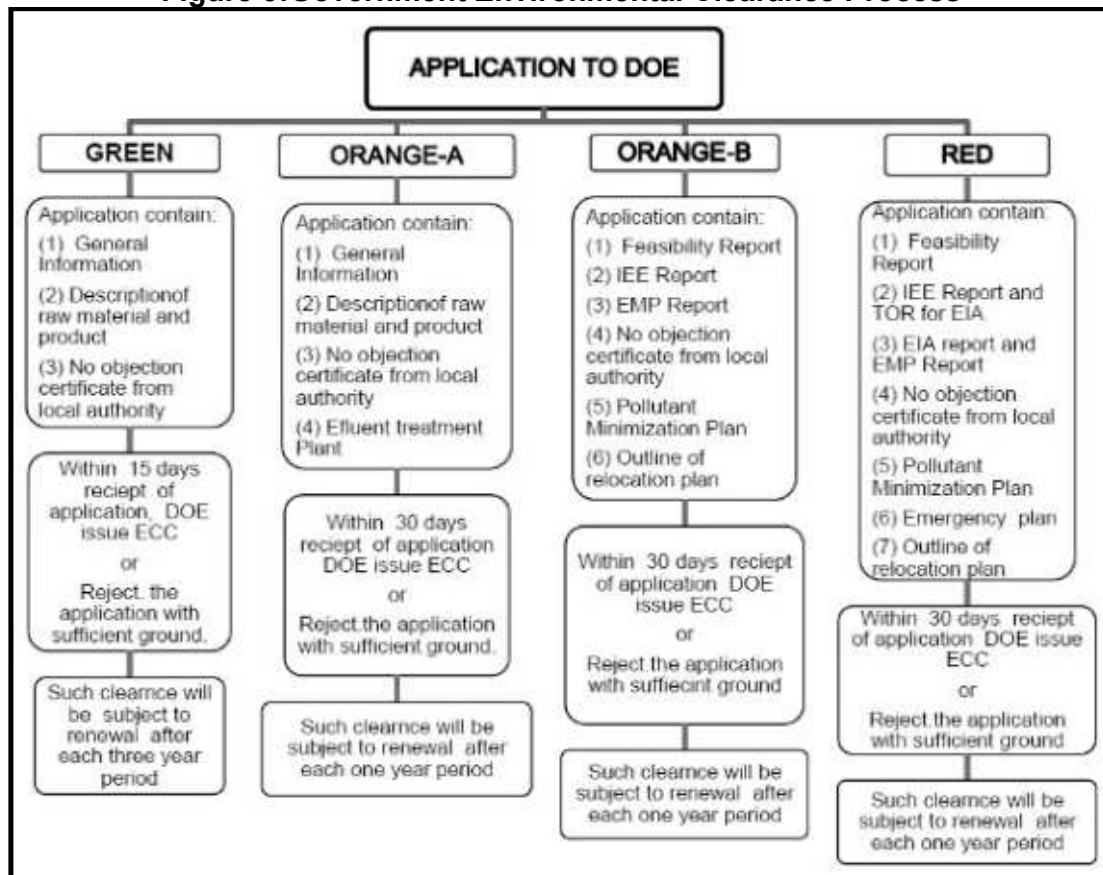
¹¹ www.doe-bd.org

¹²Per information from PMCU, the required fee for ECC application and other necessary documents was submitted to DOE on 30th August 2018 and got approval on 10th February 2019. Further the ECC has been renewed on 11th May 2022 which is valid till 9th February 2023.

¹³Per information from PMCU, the required fee for ECC application and other necessary documents have been submitted to DOE, and accordingly the ECC has been renewed up to 9th February 2023.

33. **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.

Figure 3: Government Environmental Clearance Process



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

D. Applicable Environmental Standards

34. 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** and **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)

^a Schedule 2 of ECR, 1997

^b Source: WB Environmental, Health and Safety General Guidelines, 2007.

^c Source: Air Quality Guidelines for Europe, Second Edition, 2000; WHO Regional Office for Europe, Copenhagen

^d 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.

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)

(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 µg/ m³.

(c) The objective is attained when the expected number of days per calendar year with a 24- hour average of 15 µg/ m³ 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

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 _{eq} 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
Silent Zone	50	40	55	45	45	35

^a Schedule 4 of ECR, 1997

^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		5.0 or above	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

35. 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, and 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 resources. The main focus of this policy is to protecting the environment, controlling pollution, conserving biodiversity and tackling the adverse effects of climate change.	This Policy is applicable to CRDP-2 as the proposed interventions are required to comply with all the policy/directives 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 <i>khas</i> 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 <i>khas</i> 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

Laws, Regulations, and Standards	Details	Relevance/Applicability
		drainage improvement of Pourashavas
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	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, drainage, food and drink, birth and death registration, vector and infectious disease control, etc. for the residents. LGIs have the authority to address	The subproject aims to help Chalna Pourashava (as the LGI) achieve or fulfill these mandates.

Laws, Regulations, and Standards	Details	Relevance/Applicability
unified ordinance for all City Corporations of 14 May 2008 (Local Government Ordinances 16, and 17 of 2008); City Corporation Act 2009, 15 Oct 2009, and; Pourashava Act 2009, 6 Oct 2009.	all related issues within their legal and administrative mandate.	
National Forestry Policy, 2016	This 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	The 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

36. **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 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

37. The proposed subproject is a combination of construction and rehabilitation of the following roadway and drain components: (i) **Scheme 1:** Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work.; (ii) **Scheme 2:** Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road); **Scheme 3:** Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement; .(iv) **Scheme 4:** Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.; v) **Scheme 5:** Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m). Description of road 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: Improvement of Roadway and Drain

Sl. No.	Scheme no. (Road/Drain/Khal/Pond)	Description	Length, (km/m)	Existing Carriageway Width, (m)	Existing Vacant Road Width, (m)
1	Scheme no. 1 (Discrete Drain)	Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work.	3.546km	Details of the proposed drain re-construction are in Table 13	
2	Scheme no. 2 (Road-1)	Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road.	1.270km	3.00 ~3.70	3.93 ~ 7.75
	+	Re-construction of drain from Nowapara link road to model college (Ch.0-1090m) including 180m link drain.	1.270km	Details of the proposed drain re-construction are in Table 13	
3	Scheme no. 3 (Roadside Drain-3)	Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement.	0.900km	Details of the proposed drain re-construction are in Table 13	
	+	Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement.	0.255km	3.30 ~5.78	3.00
4	Scheme no. 4 (Road-3)	Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.	0.760km	3.7	4.72 ~ 7.84
	+	Re-construction of drain from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m)	0.470km	Details of the proposed drain re-construction are in Table 13	
5	Scheme no. 5 (Road-4)	Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m)	1.010km	4.20	4.72 ~ 7.80
	+	Re-construction of drain from Changutia Bazar to Mistry para (Ch.0-1010m)	1.010km	Details of the proposed drain re-construction are in Table 13	

B. Existing Condition of Subproject Scheme Components

1. Scheme no. 1: Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work

38. **Drain Location:** This subproject scheme starts from DN more (N 23°1' 15.487" and E 89° 24' 13.570") and ends at Rajghat rail crossing (N 23° 59' 56.628" and E 89° 25' 32.445") (Ch.0-3301m).

39. **Drain Condition:** There is no functional drainage along this road causing water logging and inconvenience to the traffic and adjacent residents.

Figure 4: Photograph of existing condition of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work



Existing condition of drainage at Chainage 3225

2. Scheme no. 2: Improvement of road from Nowapara link road to model college (Ch. 0-1090m) including 180m link road.

40. **Road Location:** The subproject road is 1.090 km long, one of the 1st priority readiness road subproject of selected Link Roads, start from Nowapara link Road (N 23°2'8.905" and E 89° 23'34.5") and ends at Model College (N 23°2'17.263" and E 89°23'14.976"). This road passes through several Bazars, built-up areas and open fields. The area is predominantly residential, but currently, many small and large industries are developing in the subproject area. Existing vacant road width varies along the road; minimum 3.93 m at Ch. 550m and maximum is 7.75m at Ch. 275m. Existing carriageway width is 3.0m to 3.7m along the road alignment.

41. **Road Condition:** The carriageway width is 3.0m to 3.7m along the road alignment.. The existing road surface is made of BC/BFS road with earthen soft shoulder, and most of the road has suffered wear and tear with cracks, pot-holes, 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** shows some of the existing conditions of this road.

42. **Drain:** There are non-functional U-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.

43. **Structure:** There are no structures for cross drainage purpose along the entire road length.

44. **Existing Alignment and Right-of-Ways (RoW):** The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies along the road, minimum 3.93 m at Ch. 550m and maximum is 7.75m at Ch. 275m. Existing carriageway width is 3.0m to 3.7m along the road alignment, and carriageway width is 3.0m to 3.7m along the road alignment. 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 as per Detailed design.

45. **Strip Map.** The strip map showing the locations of the structures along this alignment is in **Appendix 1**. 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 due to the improvement the subproject road.

Figure 5: Site Photographs of existing condition of road from Nowapara link road to model college (Ch. 0-1090m) including 180m link road.



Existing condition of the road at Chainage 810m

3. Scheme no. 3: Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement.

46. **Road Location:** The subproject road improvement section is 0.255km long (from Ch. 625m-880m), it starts from Akterpur Jamdarbari (N 23° 0' 19.813" and E 89° 24' 28.935") and ends at Moti Biswas house.(N 23° 0' 43.925" and E 89° 24' 544.135").. This road passes through several Bazars, built-up areas and open fields. The area is predominantly residential, but currently, many small and large industries are developing in the subproject area. The existing vacant width of proposed road section for improvement (chainage 625m-880m) varies along the road; minimum is 3.30 m at chainage 850 and maximum is 5.78 m at chainage 740. Existing carriageway width is of the proposed road section for improvement is 3.00 m.

47. **Road Condition:** The Existing carriageway width is of the proposed road section for improvement is 3.00 m. The existing road surface is made of BC/BFS road with earthen soft shoulder, and most of the road has suffered wear and tear with cracks, pot-holes, 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 6** shows some of the existing conditions of this road.

48. **Drain:** There is no functional drain alongside this road causing water logging and inconvenience to the traffic and adjacent residents. 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.

49. **Structure:** There are no structures for cross drainage along the entire road length.

50. **Existing Alignment and Right-of-Ways (RoW):** The existing subproject road section will be improved within existing alignment / RoW. The vacant road width varies along the road, minimum 3.33 m at Ch. 850m and maximum is 5.78m at Ch. 740m. Existing carriageway width is 3.0m along the road alignment. 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 as per Detailed design.

51. **Strip Map.** The strip map showing the locations of the structures along this alignment is in **Appendix 2** 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 due to the improvement the subproject road.

Figure 6: Photograph of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement



Existing condition of the road at Chainage 600

4. Scheme no. 4: Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road

52. **Road Location:** The subproject is 0.760 km long, one of the 1st priority readiness road subproject of selected Link Roads, start from Muallem Tola Sopon Dotto house (N 23° 0' 36.162" and E 89° 24' 40.934") and ends at Moti Biswas house (N 23° 0' 40.697" and E 89° 24' 48.069"). 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 4.72m at Ch.020m and maximum is 7.84m at Ch.220m. Existing carriageway width is 3.7m all throughout the road alignment.

53. **Road Condition:** This road contains carriageway of width 3.7m all throughout the road alignment. The existing road surface is made of herring bone bond (HBB) road and brick flat soling (BFS). Major part of the road has suffered wear and tear with cracks, pot-holes, 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** shows some of the existing conditions of this road.

54. **Drain:** There is no 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.

55. **Structure:** There is 1 (one) structure in the form of a U-drain at at link-1 for cross drainage purpose.

56. **Existing Alignment and Right-of-Ways (RoW):** The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 4.72m ~ 7.84m and includes carriageway of width 3.7m. 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.

57. **Strip Map.** The strip map showing the locations of the physical cultural structures, particularly religious structures along this alignment is in **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.

Figure 7: Site Photographs of existing condition of Road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road. (0.760km)



Existing condition of the road at chainage 0.00

5. Scheme no. 5: Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m)

58. **Road Location:** The subproject is 1.010 km long, one of the 1st priority readiness road subproject of selected Link Roads, start from Changutia Bazar (N 23° 0' 7.418" and E 89° 26' 5.825") and ends at Mistry para (N 23° 0' 21.619" and E 89° 26' 6.227"). 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 5.52m at Ch.050m and maximum is 7.8m at Ch.455m. Existing carriageway width is 4.2m all throughout the road alignment.

59. **Road Condition:** This road contains carriageway of width 4.2m all throughout the road alignment. The existing road surface is made of bituminous concrete (BC) all throughout. Major part of the road has suffered wear and tear with cracks, pot-holes, 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 8** shows some of the existing conditions of this road.

60. **Drain:** There is no 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.

61. **Structure:** There are 4 (four) U-Drains at Ch.320m, Ch. 647m, Ch. 8442m and Ch. 990m for cross drainage purpose.

62. **Existing Alignment and Right-of-Ways (RoW):** The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 5.52m ~ 7.80m and includes carriageway of width 4.2m. 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.

63. **Strip Map.** The strip map showing the locations of the physical cultural structures, particularly religious structures along this alignment is in **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.

Figure 8: Photograph of existing condition of Road Changutia Bazar to Mistry Para (Ch.0-1010m)



Existing condition of the road at Chainage 795

C. Proposed Interventions or Development

1. Scheme no. 1: Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work

64. The drain is to be constructed within available vacant road width of the existing road alignment. RCC box drain will be constructed along the road within its vacant width according to the design. A cross section of the drain according to the final design is displayed in **Appendix 17**.

2. Scheme no. 2: Improvement of road from Nowapara link road to model college (Ch. 0-1090m) including 180m link road.

65. Proposed interventions planned for the Existing Road from Nowapara link road to model college (Ch.0-1090m) including 180m link road 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 BC/RCC carriageway of width 3.0-3.7m and the side/s of the carriageway will have earthen (soft) shoulder depending on the availability of vacant road width;
- (iii) Pavement works comprising construction of 175mm concrete pavement over BFS; 250mm improved sub-grade (ISG);
- (iv) Pavement works comprising construction of 150mm WBM over Existing BC Road.
- (v) Pavement works comprising construction of 250mm ISG; 200mm AS and 220X110X80mm Uni-block over 200 mm WBM;
- (vi) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand;

66. However, the existing status with the proposed development interventions of the subproject road is summarized in **Table 8**.

Table 8: Summary of Proposed Improvement Works of Road from Nowapara link road to model college (Ch.0-1090m) including 180m link road

Scheme Name of Subproject	Length / Area	Scheme Components	Details of Proposed Works	Existing condition	Location
Scheme no. 2: Road 1- Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road.	1.270 km	BC/CC /Uni-Block Pavement, soft shoulders, protection works and Drain	Road: a) 3m carriageway BC Road from Ch. 00-355m b) 3m carriageway CC Road from Ch. 355-575m & Ch. 00-180m (Link-01). c) 3.7m carriageway BC Road from Ch. 575-760m d) 3.7m carriageway Uni Block Road from Ch. 760-1090m	Road: a) 3.0m carriageway BC Road from Ch. 00-355m b) 3m carriageway BFS Road from Ch. 355-575m & Ch. 00-180m (Link-01). c) 3.7m carriageway BFS Road from Ch. 760-1090m	Start at Nowapara link road & Ended at model college
Drain-2		Box Drain	Construction of Box Drain	Details of the proposed Box Drain are in Table 13 .	

However, the typical section for the roadways and drainage design with their cross-sections are exhibited in **Appendix 17**.

3. Scheme no. 3: Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement

67. Proposed interventions planned for the Existing Road from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road 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 220X110X 80mm Uni-block over 200 mm WBM;
- (iv) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand;

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

Table 9: Summary of Proposed Improvement Works of Road from from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road

Scheme Name of Subproject	Length / Area	Subproject Components	Details of Proposed Works	Existing condition	Location
<u>Scheme no. 3</u> Road 2- Improvement of Road from AKterpur Jamdarbari to the rail line Culvert	0.255 km	Uni Block Road	Road: 3m carriageway Uni Block Road from Ch. 625-880m.	Road: 3m carriageway BFS Road from Ch. 625-880m.	Start From AKterpur Jamdarbari & Ended at rail line Culvert.
Drain-3	0.900 km		Construction of Box Drain	Details of the proposed Box Drain are in Table 13	

However, the typical section for the roadways and drainage design with their cross-sections are exhibited in **Appendix 17**.

4. Scheme no. 4: Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road

69. Proposed interventions planned for the Existing Road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road 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 Concrete pavement carriageways of width 3.7m (for the main Road) and width 3.0m (for Link Road-01) according to design, the side/s of the carriageway will have soft shoulders depending on the availability of vacant road width;
- (iii) Concrete Pavement works comprising construction of 175mm concrete pavement over single layer polyethylene sheet over 100mm CC over 250mm improved subgrade.
- (iv) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand; and
- (v) Protection works (palisading) have been proposed at locations where ditches and ponds adjacent to the road embankment are found. These will protect road edges from being eroded or sliding. The side slope of road embankment will be of 1:1.5. Location and proposed length of protection are shown in **Table 10** below. The site photograph of the proposed road section (Ch. 00m – 25m) where protection works are to be constructed is displayed in **Figure 9**.

Table 10: Locations and Lengths of Proposed Protection Works along Road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road

Sl.no	Left Side Chainage / Length (m)	Right Side Chainage / Length (m)
1	Ch. 00 m – 25 m = 25m	Not applicable
Total Length: = 25m		

However, the existing status with the proposed development interventions of the subproject road is summarized in **Table 11**.

Figure 9: Site photograph of the proposed section (Ch. 00m – 25m) of the road for protection works



Table 11: Summary of Proposed Improvement of Road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road. (0.760km)

Scheme Name of Subproject	Length / Area	Scheme Components	Details of Proposed Works	Existing condition	Location
<u>Scheme no. 4</u> Road-3: Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.	0.760 km	RCC/CC Pavement, protection works	<u>Road:</u> a) 3.7m carriageway RCC Road from Ch. 00-470m. b) 3.0m carriageway RCC Road from Ch. 00-290m link road <u>Protection Works</u> At one segment (Details are given in Table 10)	<u>Road:</u> 1. 3.7m carriageway BFS Road from Ch. 00-470m. 2. 3m carriageway HBB Road from Ch. 00-290m (Link-01). <u>U-Drains:</u> <ul style="list-style-type: none"> • 1 No. U-Drain at Ch. 187m • 1 No. Pipe Drain at Ch. 190m (Link-01). 	Start at Muallem Tola Sopon Dotto house & Ended at Moti Biswas house
Drain-4		Box Drain	Construction of Box Drain	Details of the proposed Box Drain are in Table 13 .	

However, the typical section for the roadways design with their cross-sections are exhibited in **Appendix 17**.

5. Scheme no. 5: Improvement of Road from Changutia Bazar to Mistry para (Ch.0-1010m)

70. Proposed interventions planned for the Existing Road from Changutia Bazar to Mistry para (Ch.0-1010m) 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 RCC carriageways of width 4.2m according to design, the side/s of the carriageway will have soft shoulders depending on the availability of vacant road width;
- (iii) Concrete Pavement works comprising construction of 175mm concrete pavement over single layer polyethylene sheet over 100mm CC over 250mm improved subgrade existing BC road .
- (iv) Road improvement based on design that considers the road safety requirements per LGED published guidelines and standards. This includes planning of cross section, bus and truck stand; and

71. The existing status with the proposed development interventions of the subproject road is summarized in **Table 12**. Site photograph of the cross-drainage structure at Ch. 990m is presented in **Figure 10** and the cross section of this cross-drainage structure is presented in **Appendix 17**.

Table 12: Summary of Proposed Improvement of Road from Changutia Bazar to Mistry para (Ch.0-1010m).

Scheme Name of Subproject	Length / Area	Subproject Components	Details of Proposed Works	Existing condition	Location
<u>Scheme no. 5</u> Road 4-Improvement of Road from Changutia Bazar to Mistry para	1.010 km	RCC Pavement Road, 1 No. Cross Drain	Road: 4.2m carriageway RCC Road from Ch. 00-1010m. Cross Drain: 1 No. 1.50m X 1.50m Cross Drain at Ch. 990m.	Road: 4.2m carriageway BC Road from Ch. 00-1010m. U-Drains: (1) 4 Nos. U-Drain at Ch. 320m, Ch. 647m, Ch. 842m & Ch. 990m	Start at Changutia Bazar & Ended at Mistry para
Drain-5	1.010 km	Box Drain	Construction of Box Drain	Details of the proposed Box Drain are in Table 13	

However, the typical section for the roadways design with their cross-sections are exhibited in **Appendix 17**.

Figure 10: Site photograph of the cross drainage structure at Ch. 990m



D. Proposed Re-construction of Drains

72. Re-construction details of proposed one discrete and four roadside drains are given below in **Table 13**.

Table 13: Summary of Proposed Drains to be re-constructed under the subproject schemes

Scheme no. (Road/Drain)	Scheme Name of Subproject	Length / Area	Scheme Components	Details of Proposed Re- construction of Drains	Outfall location of drains	Existing condition
Scheme no. 1 (Discrete Drain)	Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work.	3543m	RCC Box Drain & Pipe Drain	<u>L/S: Left side of Road alignment</u> <u>R/S: Right side of Road alignment</u> <ul style="list-style-type: none"> L/S RCC Box Drain (1735m): 1540mm (Ch.00-1490m) & 2200mm (Ch.00-245m Link). L/S Pipe Drain (1808m): 1400mmØ (Ch.1493-1925m), 1200mmØ (Ch.1925-2325m), 1000mmØ (Ch.2325-2725m) & 900mmØ (Ch.2725-3301m) 	<u>Box Drain</u> <ul style="list-style-type: none"> At Ch. 0+000km (Figure 11) <u>Pipe Drain</u> <ul style="list-style-type: none"> At Ch. 5+610km (Figure 12) 	There is no functional drain
Scheme no. 2 (Roadside Drain)	Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road.	1270m	RCC Box Drain	<ul style="list-style-type: none"> L/S (1080m): 850~950mm (Ch.00-250m), 950~1050mm (Ch.250-500m), 1050~1100mm (Ch.500-650m), 1150mm (Ch.650-900m), 800mm (Ch.00-180m Link) R/S (190m): 1100~1150mm (Ch.900-1090m) 	<u>Box Drain</u> <ul style="list-style-type: none"> At Ch. 1+090km (Figure 13) 	There is no functional roadside drain
Scheme no. 3 (Roadside Drain)	Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement.	900m	RCC Box Drain	<ul style="list-style-type: none"> R/S (900m): 850~950mm (Ch.00-625m) & 950~1000mm (Ch.625-900m) 	<u>Box Drain</u> <ul style="list-style-type: none"> At Ch. 0+850km (Figure 14) 	There is no functional drain
Scheme no. 4 (Roadside Drain)	Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.	470m	RCC Box Drain	<ul style="list-style-type: none"> L/S (175m): 850~950mm (Ch.00-175m) R/S (295m): 950~1000mm (Ch.175-350m) & 1000~1050mm (Ch.350-470m) 	<u>Box Drain</u> <ul style="list-style-type: none"> At Ch. 0+470km (Figure 15) 	There is no functional roadside drain
Scheme no. 5 (Roadside Drain)	Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m)	1010m	RCC Box Drain	<ul style="list-style-type: none"> R/S (1010m): 950mm (Ch.00-320m), 1150~1100mm (Ch.320-500m), 1100~1050mm (Ch.500-675m) & 1050~900mm (Ch.675-1010m) 	<u>Box Drain</u> <ul style="list-style-type: none"> At Ch. 0+320km (Figure 16) 	There is no functional roadside drain

Figure 11: Photograph of the outfall location at Ch. 0+000km (Drain 1 - Box drain)



Figure 12: Photograph of the outfall location at Ch. 5+610km (Drain 1 - Pipe drain)



Figure 13: Photograph of the outfall location at Ch. 1+090km (Drain 2 - Box drain)



Figure 14: Photograph of the outfall location at Ch. 0+850km (Drain 3 - Box drain)

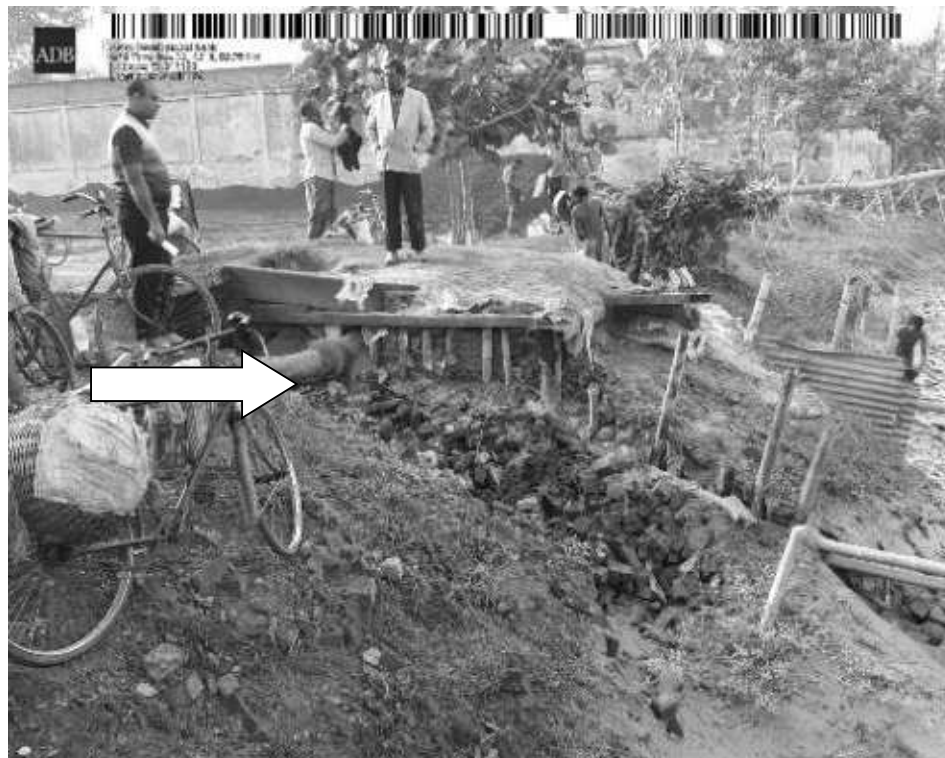


Figure 15: Photograph of the outfall location at Ch. 0+470km (Drain 4 - Box drain)



Figure 16: Photograph of the outfall location at Ch. 0+320km (Drain 5 - Box drain)



- No private land is impacted due to these outfalls . The proposed drain has been designed for storm or rain water flows and it is the responsibility of the Pourashava to ensure prevention of untreated wastewater discharge in the drains.

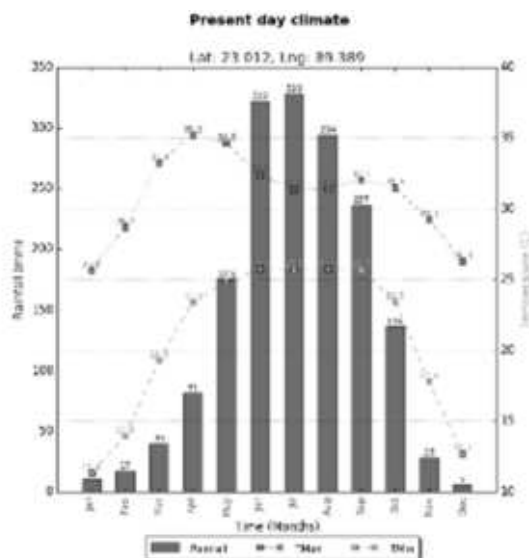
IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

73. **Location and Extent:** The proposed subproject is located in Nowapara Pourashava of Nowapara Upazila, and located in between 23°07' and 23°15' north latitudes and in between 89°18' and 89°34' east longitudes. It is bounded by Jashore Sadar and Narail Sadar upazilas on the north, Khan Jahan Ali thana, Dumuria, Dighalia and Phultala upazilas on the south, Narail Sadar and Kalia upazilas on the east, Jashore Sadar and Monirampur upazilas on the west. Although in administrative record this region is named Abhaynagar, locally it is mostly known as Nowapara. The total area of the Nowapara Upazila is 247.21sq km; of which, the area pf Nowapara Pourashava/Municipality measures about 25.21 sq km.

74. **Topography, Soil and Geology:** The Nowapara municipality area is between 0.5m and 4m higher than the mean sea level, and the elevation of the area decreases from east to west. The area is flat and poorly drained. Soil consists of grey floodplain soils. It is subjected 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 rivers Bhairab and Chitra (*Source: Land Resources Appraisal of Bangladesh for Agricultural Development Report 2: Agro-ecological Regions of Bangladesh, FAO/UNDP, 1988*).

75. **Climate:** As per figure below (from Marksim Weather Generator), present day climate data exhibits that the temperature maximum (Tmax) at Nowapara region ranges from 25.6° C (in January) to 35.2° C (in April), and temperature minimum (Tmin) ranges from 11.4° C (in January) to 25.7° C (in June), and annual rainfall is 1,672mm. Data generated from World Bank Climate Portal, also shows that the average monthly temperature ranges from 18.8° to 30.2° C (65.84 to 86.36° F). The annual rainfall is 1,642mm (64.65 in).



76. **Surface Water:** The Bhairab and Chitra are the two main rivers pass through the Subproject area and serves as the major drainage Channels of the subproject region. Besides, there are few canals and river channels, large numbers of ponds, ditches, low-lying lands as low pockets, and few notable beels namely, Dakatia, Singra and Kurakhali and Majul canal; and these water bodies act as retention basin to hold monsoon floodwater. Prior to subproject construction, the contractors will conduct surface water quality test as baseline; and during post-construction, contractors will be required to conduct surface water quality test and ensure that the subproject does not cause deterioration to the quality of surface water. This is included in the environmental management plan.

- **Drainage.** There are no functional roadside drains/culvert along the alignments of the subproject road. Currently, rain water accumulates at sections along the sides of the subproject road during monsoon, and the areas remain wet/water logged for a considerable period of time after the rainy season. Under the condition of such seasonal water stagnation, major parts of the subproject roads suffer wear and tear with cracks, pot-holes, broken edges and depressions, and ultimately it makes vehicular/pedestrian movement difficult. In order to avert such waterlogging and consequent drainage congestion; construction and reconstruction of roadside drains have been proposed (**Table 13**).

- **Erosion and Deposition.** The subproject area is generally medium highland to medium lowland to lowland, and poorly drained. The subproject roadside area commonly suffers from intermittent seasonal flooding. Further the area suffers from shallow water stagnation resulting from accumulation of rainwater during wet season. Under the conditions, commonly erosion is taking place at 1 (one) segment (**Tables 10 & 11**) adjacent to the subproject road alignment where slopes are either unstable or road edges sliding. These eroded materials eventually get deposited at the roadside khals/canals and lowlands of the subproject area. Consequently, protection works (palisading) have been proposed in those erosion-prone areas to protect the road edges from being eroded or sliding. Additionally, heaps of earth, from excavations of drainage and road works, standing at the road embankment side for periods of longer time have a potential for erosion and sedimentation at the road adjacent ponds, ditches and low-lying lands during rains

77. **Groundwater:** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The water table at Abhaynagar Upazila is shallow. However, the main aquifer, which is the source of water supply, is found at a depth of greater than 50 m. The Maximum ground water level varies 5.1 to 9.35m at the month of April to May where minimum ground water level varies 1.15 to 4.88m at October to November. Though WHO findings demonstrate 10 times higher concentration of arsenic than the recommended level in the groundwater of Jashore, arsenic contamination is generally not present in the Nowapara subproject area (located at about 40km SW of Jashore). A very recent finding of Soil, Water and Environment Department of Dhaka University (Arsenic: 8.18 ppb in Groundwater and 5.58 ppb in surface water) which are much lower than the recommended level (50 ppb). Also, the study on “Seasonal water quality monitoring of the Bhairab River at Noapara industrial area in Bangladesh” (Ref. *SN Appl. Sci.* **1**, 586 (2019). <https://doi.org/10.1007/s42452-019-0583-4>) demonstrated average arsenic concentration in the range 8.0 to 14.4 ppb in the water of Bhairab River, which is well below the permissible level of 50 ppb. Prior to subproject construction, the contractors will conduct ground water quality test as baseline; and during post-construction, contractors will be required to conduct surface water quality test and ensure that the subproject does not cause deterioration to the quality of ground water. This is included in the environmental management plan. However, the test results will be documented in the relevant SEMR

78. **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. To evaluate the existing condition of air quality, contractor will perform the air quality test prior to construction, and also at the end of construction for comparing with the base situation and to ensure that the subproject does not cause deterioration of ambient air quality. This is included in the environmental management plan hereof.

79. **Acoustic environment:** Subproject components are in the built-up part of Nowapara 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 post-construction, contractors will be required to conduct air quality measurements and ensure that the subproject does not cause deterioration of ambient noise level. This is included in the environmental management plan.

B. Ecological Resources

1. Terrestrial Ecosystem

80. **Terrestrial floral:** 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 inside the subproject area. There is no natural forest located alongside the subproject roads of Nowapara Pourashava. Only roadside trees are found which are largely maintained by the community or social forestry program. A large number of multipurpose fruit trees namely, mango, Jack fruit, lemon, palm, blackberry etc. are found in the subproject area. Main crops grown inside the subproject area include Paddy, jute, wheat, potato, garlic, onion, mustard, betel nut, brinjal, vegetables.

81. **Terrestrial fauna:** The diversified habitat and ecosystem in the proposed subproject area support various types of animals and local birds. 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 the subproject area. No rare and endangered species of flora and fauna have been reported in the subproject. No wild animals inhabit the area.

2. Aquatic Ecology

82. **Aquatic flora:** 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.

83. **Aquatic fauna:** The temporary aquatic habitats of the khals/canals and beels usually contain aquatic fauna like 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.

C. Economic Development

84. **Land Use:** Most of the area of the Nowapara Pourashava is used for agriculture, but alongside the Bhairab river there are jute mills, textile mills, rice mills, paper mills, leather factories and cement factories. There are 38 industries – 26 are large, 5 medium and 7 small. Of total 1705ha agricultural land, 1395ha is double cropped land, 155ha is triple cropped land and another portion of 155ha is single cropped land. Of the total land of the Pourashava, agricultural land constitutes about 70%, residential area about 15%, industrial zone and commercial area about 10% and others (fallow land, restricted area, water bodies etc.) represent 5% (**Source:** Local information and Land use map of Nowapara Municipality; Nowapara Pourashava – at a glance).

85. **Industry and Agriculture:** Because of its locational advantages and spatial characteristics, Noapara has the potential to develop as a trade and industrial hub. There is an Export Processing Zone in Nowapara Pourashava. There are in total 38 industries of different categories – 26 are large, 5 medium and 7 small, and these include jute mills, textile mills, rice mills, paper mills, leather factories and cement factories (**Source:** An article titled “Building Climate Resilience to Noapara Town” authored by Sarder Shafiqul Alam, A. T. M. Jahangir Alam, M. Feisal Rahman, Sowmen Rahman & Niaz Rahman). As observed from field visit at proposed subproject sites, no industries were found to encroach the ROW for the proposed development. The main agricultural crops of this area are paddy, jute, wheat, potato, garlic, onion, mustard, betel nut, brinjal, vegetables. Extinct or nearly extinct crops of this area are linseed, sesame, barley, arahar. Main fruits of the area are mango, jackfruit, banana,

litchi, blackberry, papaya, watermelon, coconut. Further, this Upazila has a number of fisheries, dairies and poultryes. (**Source:** *Banglapedia-Nowapara Upazila*).

86. **Infrastructure, Transport and Communications:** Existing infrastructure in Nowapara Pourashava includes many roads that are poorly maintained, degraded in condition and often impassable except at very slow speeds. Total length of these roads measures 244.47km - itemized these include i) BC road 114.5, ii) CC road 2.3km, iii) HBB road 12.37km, iv) BFS road 75.1km, v) Earthen road 40.7km. Total number of bridges and culverts of the subproject Pourashava are 7 and 227 respectively. Total length of drain and khal is 485.95km (brick drain 11.85km, RCC drain 8.3km, katcha drain 295km and natural drain 171km) (**Source:** *Nowapara Pourashava – at a glance*). Regular bus services are available to travel other areas of Bangladesh. Internal movements take effect with rickshaw, auto-rickshaw, easy-bike, maxi (laguna) and rickshaw van. Extinct or nearly extinct transports noted in the subproject area are Palanquin, horse-carriage and bullock cart.

D. Social and Cultural Resources

87. **Demography:** According to the *Bangladesh Population and Housing Census 2011*, the total population of Noapara Pourashavais 85,856 (BBS, 2012). About 50.56% is male and 49.44% is female, compared with the national population, which is 50.66% male and 49.94% female (BBS, 2012). Of the total population, Muslim constitutes about 80%, Hindu 19.9%, Buddhist, Christians and others 0.1%. The population density of Noapara Pourashava is 3,314 people per km², and total number of households is 18665 with average household size is 4.6 persons.

88. **Local Market and Bazar:** As regards the Poura Market, there are 7 wholesale markets, 19 retail markets, 2 shopping centers, and 1 fish market. (**Source:** *Nowapara Pourashava – at a glance*). It is noteworthy to point out that none of the above markets fall within the proposed subproject road alignment.

89. **Health and Educational Facilities:** There are numerous health facilities, educational and religious institutions within the Pourashava. The Pourashava has 1 Govt. hospital, 1 Private hospital, 1 Maternity & child clinic, 3 Family planning center and 1 Veterinary hospital. As regards the Educational institutions, there are 5 Colleges, 18 Secondary high schools, 26 Primary schools (14 Govt and 12 Non-Govt.) and 8 Madrasa. Average literacy rate is 56.1% (male 59.5% and female 52.1%). There are a few Religious institutions: Mosque 130, temple 19, church 4. Besides there are 61 Eidgah, 4 Graveyard and 4 Crematorium (**Source:** *Nowapara Pourashava – at a glance*).

90. **Water Supply and Sanitation:** The Pourashava contains 13.552km water supply line (of which, 0.571km pipeline of Ø 200-250mm, 4.361km Pipeline of Ø 150-160mm, and 8.62km pipeline of Ø 100-110mm). There are a few numbers of privately-owned hand tube-well and shallow deep tube-well as the sources of drinking water supply inside the Pourashava area. As regards the sanitation facilities, the dwelling households of the Pourashava use sanitary latrines, and their total number is 18,155. None of the dwelling households use non-sanitary latrine. (**Source:** *Nowapara Pourashava – at a glance*).

91. **Access to electricity:** All the wards of the Pourashava are under rural electrification network, and most of the dwelling households have access to electricity. As regards the electric supply, there are 106km electric supply line, 5 electric sub-stations, 162 transmitters, 16 switches and 2388 electric poles (**Source:** *Nowapara Pourashava – at a glance*).

92. **Pollution and Road Safety:** People are concerned about increasing pollution in the subproject area as well as safety of people while crossing the roads. In connection to the municipal solid waste management of the Pourashava, there are a total number of 12 dustbins but no designated place for end disposal of generated municipal solid wastes, and thus Indiscriminate dumping of municipal wastes creates environmental nuisance and pollution. Industries alongside the subproject road were found discharging the untreated effluent to local drains, which may result in contamination of the land area and water bodies. Accident is

reported to take place quite often on the subproject road due to rough driving as well fast speed and non-availability of safe passage for crossing the road. To address these issue safe crossings, road safety signs and speed bumps have been designed based on the field condition and the design of this Package has been vetted by the LGED design unit. Specific information on road safety measures (structural and non-structural) are shown and described in figures in Appendix 10-Item 17 of this revised IEE. The costs for safe crossings, road safety signs and speed bumps have been included in the BoQ (Table 21-Row 10) of this revised IEE.

E. History, Culture and Tourism

93. **History:** *During the War of Liberation*, On 27 March 1970, the Pak Army killed a number of railway staff in the office room of Nowapara Railway Station. Besides, 17 freedom fighters including Nazibor Rahman, Assistant Secretary of Bangladesh Awami League, were killed by the Pak army during the War of Liberation. **Cultural organisations:** Library 2, club 22, theatre stage 1, cinema hall 3, literary society 3, theatre group 7, playground 32. **Tourist spots and Archaeological heritage and relics:** Nowapara Port Khan Jahan Ali Jami Mosque (Subha Para), Noapara Kali Temple, Siddhipasha Rajbari, tank and temple, 11 Duari Mandir, Madhayapur Neelkuthi, Sreedharpur Zamindar Bari, Khan Jahan Ali Dighi (Basuari), Rupsonatan Dham (Ramsara). **Figure 17** below shows the nearest physical cultural resources are located outside the right-of-ways of the road alignment, and these are unlikely to be impacted by the subproject road and drainage improvement works (*Source: Abhaynagar Upazila-Banglapedia*).

Figure 17: Aerial Map Showing the Locations of cultural Heritage sites Relative to the Subproject Alignment



F. Socio-economic benefits from the Road Improvement Schemes

94. 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.
95. **Summary of Environmental Features around the Road Alignments.** To understand the effect of the proposed subproject to receptors, information on some important environmental key features for the subproject road has been collected and analyzed. **Table 14** summarizes these environmental features.

Table 14: Summary of environmental features around road alignments

Sl. No.	Environmental Features	Within 100 m core zone	Within 5 km buffer zone
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
d)	Migratory route for wild animals	No	No
e)	Migratory routes for birds	No	No
f)	Migratory routes for fishes	Yes (during rainy season)	Yes (during rainy season)
g)	Presence of Dolphin	No	No
h)	Tree/vegetation cover	Yes moderate tree & vegetation. No threatened or endemic tree	Yes moderate tree & vegetation. No threatened or endemic tree
i)	Birds Nesting	No	No
2.	Archaeological Monuments	No	No
3.	Groundwater	Available in good quality at low depth	Available in good quality at low depth
4.	Land Use of up to 5 Km radius	Pattern similar to Land use of up to 5 Km radius land use	Water (20%), Forests (15%), Seasonal Fallow (25%), Agriculture (5%), Rural Settlement (10%), Urban Settlement (5%), industry (5%)
5.	Physical Cultural structures (mosque, madrasha, temple, church etc.)	Road passes through urban and peri-urban area. Few religious structures around.	Road passes through urban and peri-urban area. Few religious structures or graveyard around.

Source: PMCU/LGED field surveys conducted in 2018 and 2019

G. Baseline and Projected Climate

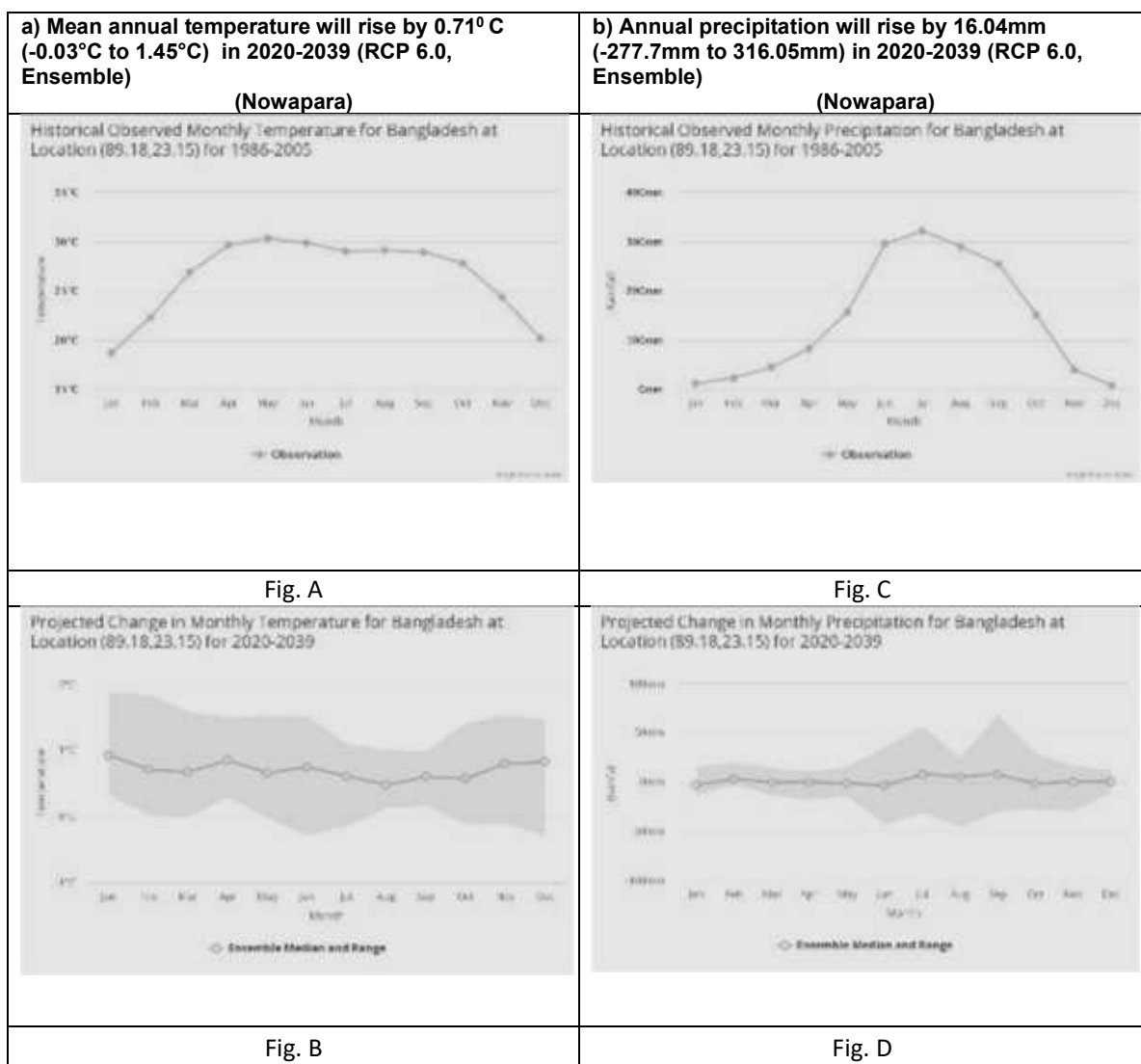
96. For roads, the critical climate parameter is precipitation in terms of volume and intensity, and their impact on occurrences of flooding depending on location. In combination with geology and geography, a related variable is soil moisture as it affects road foundation stability.

97. 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 above 32°C. For concrete roads, the range of temperature variation determines the proper width of joints, including the composition of the joint sealants.

98. 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.

99. 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 CO₂ concentration doubles by end-century with reference to mid-1800s (roughly equivalent to RCP 6.0).¹⁴ The Figures here below exhibit the historical observed monthly temperature and projected change in monthly temperature (**Figs. A & B**) and the historical observed monthly precipitation and projected change in monthly precipitation (**Figs. C & D**) compared to the reference period (1968-2005). From analysis with the use of World Bank Climate Portal, it can be noted that a) Mean annual temperature will rise by 0.71°C (-0.03°C to 1.45°C) in 2020-2039 (RCP 6.0, Ensemble) and b) Annual precipitation will rise by 16.04mm (-277.7mm to 316.05mm) 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.

¹⁴ CCM3 stands for the Community Climate Model developed by the US National Centre for Atmospheric Research.



V. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Compliance with subproject selection criteria

100. The subproject was selected based on the selection criteria in the environmental assessment and review framework (EARF) of Second CRDP. **Table 15** below is a summary of the assessment of compliance with the subproject selection criteria under Second CRDP.

Table 15: 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.

Criteria	Remarks
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) Ensures detailed designs and environmental safeguards conditions are included in the planning.	Complied. Included in the EMP.

B. Anticipated Impacts and Mitigation Measures - Planning, Location and Design Phase

101. **Impacts due to location.** These Impacts are associated with planning particularly on the site selection. They include impacts due to encroaching on sensitive areas and impacts on the people who might lose their homes or livelihoods due to the development of the proposed site. However, in the case of the road subproject, no significant impacts are anticipated since the road construction and/or rehabilitation works will be done on existing road alignments with ROW and located in built up areas. There will be no road widening works that will encroach any private property. The road shoulders or footpaths to be constructed and/or rehabilitated are also within existing ROW.

102. **Impacts due to Climate Change.** The impact of climate change is high for the road subproject. The design of the roads and other related 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, salinity, and acidity, including drainage aspects; and
- (ii) Likely impacts on road surfaces and runoff due to climate change-induced heavier and more erratic rainfall.

103. **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, the bridge clearance will be lower. Therefore, consideration of increase bridge height is required;
- (ii) The differences in water level between base and future time should be computed as it is needed to estimate the additional road embankment height required in making the roads safer against climate change-induced flooding;
- (iii) The proposed road area might have to drain a significant additional discharge due to climate change-induced higher rainfall during extreme events. Therefore, adequate number of drainage facilities along with comparatively larger openings should be considered in structure for the proposed road; and
- (iv) Maximum possible efforts have to be made for minimizing cutting of trees while designing widening option for the proposed road.

104. 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 16** below.

Table 16: Issues, Concerns and Mitigation Measures During Design Phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed design			
Incorporation of sloped areas in subproject design	Soil erosion and slope instability	<ul style="list-style-type: none"> • Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design 	PMCU, PDSC
Incorporation of community health and safety measures in the design	Road accidents	<ul style="list-style-type: none"> • Ensure to include in the design the following: (i) road signages in critical areas or curves, (ii) speed limiters such as humps, (iii) barricades or similar structures in accident-prone areas, and (iv) pedestrian crossing lanes, among others. 	PMCU, PDSC
Location trees, utilities and other infrastructures before construction.	<p>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</p>	<ul style="list-style-type: none"> • Avoid alignments that will run over trees and utilities such as electric poles, etc. • Innovate and design footpaths that will avoid cutting of trees. • Provide budget for restoration/replacement of damaged utilities • Provide budget for tree planting as replacement activity for cut trees, if any. • Avoid placing alignment near heritage buildings and religious structures. • Photograph all sites within heritage areas to enable before and after comparison (note: all roads are to be reinstated to original character especially in heritage areas) • Ensure compliance with any Department of Archaeology rules during design. 	PMCU, PDSC
Construction in the vicinity of residential areas	<p>Nuisance to nearby receptors.</p> <p>Impacts to qualities of ambient air, surface water, groundwater, and land.</p>	<ul style="list-style-type: none"> • 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 	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
	Impacts to health and safety of community and workers.	finalized have copy of the IEE as attachment.	
O&M Manual preparation	Impacts to health and safety of community.	<ul style="list-style-type: none"> Prepare a comprehensive O&M manual to include periodic inspection and maintenance of roads, conduct of road repairs, etc. 	PMCU, PDSC
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.	<ul style="list-style-type: none"> 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.	<ul style="list-style-type: none"> Identify designated disposal sites approved by the upazila. A spoil management plan will be developed. A sample spoil management plan is in Appendix 4. 	PMCU, PDSC
Construction camps	Inappropriate location for construction camps will impact the general welfare and health and safety of the workers.	<ul style="list-style-type: none"> 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

C. Anticipated Impacts and Mitigation Measures – Construction Phase

105. 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 straightforward 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.

1. Construction Method

106. The civil works for road 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 segmentation or chainage-wise planning with around 100m – 200 m per segment or stretch. This will ensure that impacts can be easily managed by the contractor. The contractor will provide detail information for labour requirement, construction materials, and construction equipment and implementation schedule before commencement of the work.

Reuse of scarified existing top bituminous surface: For resurfacing the bituminous carpeted road, hard bed is prepared by scarifying and loosening of existing top bituminous surface including base/sub-base materials up to the depth of minimum 75mm using mechanical means, breaking dismantled materials into specified sizes (<40mm), and then mixing with extra fresh base course materials of required specification

107. **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.

108. 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.

2. Impact on Physical Resources

109. **Topography, Soils & Geology.** Subproject activities are not large enough to affect these features; so there will be no impacts.

110. **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.

111. **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 (CO), sulphur oxides (SOx), particulate matter, nitrous oxides (NOx), and hydrocarbons (HC), and (vi) burning of firewood for cooking and heating in work and labor camps. At this point, it is relevant to point out that no rock crusher and concrete mixing Plant will be established in the subproject area.

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

- (i) follow World Bank's Environmental Health and Safety (EHS) Guidelines on Construction and Decommissioning Activities;¹⁵

¹⁵ IFC World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Construction and Decommissioning*.

¹⁶ IFC World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines – General EHS Guidelines: Environmental – Noise Management*.

- (ii) confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP);
- (iii) prepare and implement a dust management plan that should be part of the SEMP;
- (iv) consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials (ideally about 500 m from residential areas);
- (v) bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites;
- (vi) damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- (vii) if re-surfacing of disturbed roads cannot be done immediately, spread crushed gravel over backfilled surfaces;
- (viii) during demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris;
- (ix) place signage at active work sites in populated areas;
- (x) require trucks delivering aggregates and cement to have tarpaulin cover;
- (xi) clean wheels and undercarriage of vehicles prior to leaving construction sites;
- (xii) limit speed of construction vehicles on access roads and work sites to a maximum of 30 km/h;
- (xiii) prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes);
- (xiv) use vehicles that have government-issued permits and registrations; and
- (xv) prohibit open burning of solid waste.

113. **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.¹⁶ The comparative illustration of national standards versus WHO guidelines is in **Table 4** of Section II.

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

- (i) follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 15);
- (ii) if applicable to subproject alignment, prepare and implement a noise and vibration management plan that should be part of the SEMP;
- (iii) provide prior information to the local public, including institutions such as schools and 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.

115. **Surface Water Quality.** Some sections of the road alignments are located along or cross water bodies, exposing these water bodies 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 water bodies.

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

- (i) follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 15);
- (ii) dispose excess spoils per the Spoil Management Plan attached in **Appendix 4**;
- (iii) locate temporary storage areas on flat grounds and away from main 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.

117. 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 15);
- (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, mobile, burnt oils, etc. at the construction site; and
- (v) consultation with PIU on the proper disposal of all residual wastes.

118. **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 will not be impacted by the subproject. Further, the subproject is located in a low-lying area with a good number of community canals, beels and baor. These waterbodies contain plentiful of water. With permission from the concerned authority, required amount of water from the said waterbodies will be drawn for the purpose of the subproject construction works.

119. 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 15);
- (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; and
- (iii) no toilets shall be put up within 500 m from groundwater wells, if any.

120. **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.

121. 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 4**;
- (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;

3. Impact on Ecological Resources

122. Subproject sites are located near and within the town area. There is no biodiversity or natural habitat in these sites. As such, no impact on ecological resources is envisaged.

123. **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.

124. 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 5** 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.

125. **Impacts on Aquatic Ecology.** Some of the subproject sites are near or adjacent to ponds of khals (canals) that have been formed as water bodies and serve as catchment of rainwater during monsoon season. Through the years, these ponds and khals are utilized as fish ponds of the local communities. All aquatic animals in these ponds are not protected species and are grown for livelihood and income purposes by the local communities. Nevertheless, the construction of the subproject may affect these ponds due to siltation and therefore may impact the quality of the water and eventually the productivity and harvest of these aquatic resources.

126. 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) store spoils away from these ponds to avoid being washed down the ponds or khals; and
- (iii) undertake no construction works near these sites during the spawning and breeding period between June and September.

127. **Impacts on physical cultural resources.** The subproject will not encroach into or run over any physical cultural resources. Strip maps showing alignments with physical cultural resources, specifically religious establishment, are shown in **Appendix 6**. 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

128. **Impacts to traffic flow.** During construction, few disturbances will occur. Mitigation measures include the preparation and implementation of a traffic management plan in coordination with local authorities and PIU. The traffic management plan shall include the following: (i) installation of clear signages; (ii) barricades; (iii) lightings at night; and (iv) markers to direct traffic movement in sites, among others. A site-specific TMP to be prepared by the contractor and approved by PMU before commencement of construction.

4. Impacts on the socioeconomic, environment and resources

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

130. 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) avoid full road closures by applying section-wise and/or chainage-wise approach during excavation, concreting and/or curing periods;
- (iv) if full road closure is not possible especially on very narrow roads, ensure that alternate routes are identified and that affected residents and establishments are informed prior to conducting the construction activities;
- (v) provide appropriate compensation to qualified affected people or businesses per approved resettlement plan for the subproject;
- (vi) manage stockpile;
- (vii) manage pumped water from excavations either to drains or drums for later use;
- (viii) relocate the affected power supply poles, and
- (ix) advise the concerned authority during accidental damage to utilities.

131. **Community health and safety hazards.** The civil work for road construction or rehabilitation include earth excavation or opening of trenches, and such activities may lead to short-term negative impact to community health & safety. For consequential mitigation measures, excavation and construction activities will be done through segmentation planning with around 100m-200m per segment or stretch. This will ensure that impacts can easily be managed by the contractor. The contractor will provide detail implementation schedule before

start of the work. However, to mitigate the impacts on mobility of people, goods, and services; accesses to properties, economic activities, and social services, the contractor will be required to implement its approved site-specific EMP (SEMP) which includes a community health and safety plan. Besides SEMP, Environmental Management Plan Matrix (Table 16) may be consulted as it also includes impacts and mitigation measures for community health and safety. The indicative cost for mitigation measures related to community health & safety has been included in the Tentative EMP Budget for BOQ (Item 16 of Table 21).

132. 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 (Footnote 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
- (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.

133. **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 A sample outline of the OHS including Emergency Response Plan including Disaster Management and COVID HS plan is given in the **Appendix 15**. Here is relevant to mention that The Bangladesh Labour Act (2006) is the key labour legislation that sets Occupational health and Safety standards, and compensation for injury and accidents in the workplace. In 2013, significant amendments were made to the BLA (2006), regarding occupational health and safety (OHS). OSH related policies and laws can be summarized under the categories:

a) Occupational Accidents, Hazards and Diseases: The key provision on occupational accidents, hazards and diseases relates to accident prevention regulations (prevention from workplace hazards; disease prevention and safeguards; record keeping and planning; rehabilitation and building awareness of OHS. Details of these are outlined in the National OSH Policy, 2013/2015);

b) Safety Equipment/Tools and Facilities: The safety equipment/ tools and facilities include firefighting apparatus and the emergency fire exit, protective kits and the safety of buildings/machineries. The BLA Section 78A sets clear guidance on using safety appliances for personal safety at work.

c) Workplace Safety: The National OSH Policy it obligates to identify all of the risks regarding OHS and orients all persons of the workplace on possible accidents and OHS risks (Clause 4.d.2). It also suggests developing a safe work plan and ensuring its effective practice (Clause 4.d.8).

The Bangladesh Labour Rules (2015) set implementation procedures to corresponding sections of BLA (2006).

Further to mention in connection OHS 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

134. 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 15). As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

A. 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;

B. 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;

C. 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. Anticipated Impacts and Mitigation Measures - Operation and Maintenance Phase

135. **Impacts to community health and safety.** Once in operation, the improved roads may result to elevated noise level and air emissions from increased vehicular traffic. Increase in carbon monoxide (CO), sulphur oxides (SOx), particulate matter (PM), nitrous oxides (NOx), and hydrocarbons (HCs) in the air is expected. The construction and rehabilitation of the roads will give way to much faster vehicle speeds which could endanger people and households along the road alignments. Damage to the roads, may also cause accidents to passing vehicles and may inflict harm to the local people.

136. To mitigate these impacts, the PIU will be required to:

- (i) Conduct regular inspection of the roads to check for damages, and undertake rehabilitation measures for any damages found;
- (ii) Inspect and maintain the integrity of road barriers, especially at critical curves or locations that are prone to vehicular accidents;
- (iii) Inspect and maintain speed limiters such as humps installed on road sections near residential areas, schools, and religious establishments;
- (iv) Inspect and maintain all road signages, including appropriate warning signages at silent zones, and ensure that these are reflectorized and visible even during night time;
- (v) Ensure pedestrian crossings are maintained; and
- (vi) Regular cleaning and maintenance of drains and proper solid waste management

VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Consultation

137. 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. In order to address the issues raised by the participants, project consultants provide them an overall understanding about the subproject schemes and their implementation, impacts (positive and negative) thereof and subsequent environmental management plan and monitoring. However, the raised site-specific environmental and social problems/issues are being addressed through discussion sessions and interactions among the participants and consultants.

138. **Preliminary Consultation.** Public consultations were conducted in 23rd December 2019 which was attended by various stakeholders. The summary of consultation meeting is attached as **Appendix 7**. The following are some of the concerns discussed:

- (i) Local people will support the project activities;
- (ii) The main issue arising from the consultation is that the people of this area suffer huge traffic congestion due to movement of heavy container truck. They cannot easily move to the school, hospital, and working places from their residences due to congestion. Hence, the people will benefit from the subproject, especially those who are residing alongside the roads;
- (iii) The area is dominated by businesses and is about 70%. The people in this area depends largely on these businesses, while the rest on services and agricultural cultivations;
- (iv) 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;
- (v) 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;
- (vi) It was confirmed with the local stakeholders that there is no protected areas in and around the project areas;
- (vii) The project will never impact on natural water body and not contaminate the soil resources. It was explained that the project will implement appropriate mitigation measures to ensure the natural water bodies in the area will not be negatively impacted; and
- (viii) The participants assured that they welcome the project, and will support / cooperate in all stages of the project works.

139. **Future consultations during final detailed design stage.** The stakeholder consultations for the final detailed design stage is not required since no change has been taken place in the final detailed design. Further to mention, consultations are being carried out in instances with relevant authorities such as, Pourashava, Department of Environment, Department of Forest, Telecommunication, Electricity Supply, Gas supply etc. to obtain NOCs (if required).

B. Information Disclosure

140. 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:¹⁷

- (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.

141. 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.

142. 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 Nowapara PIU. Hard copies of the IEE will be available in the PMCU and Saar 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 Nowapara 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 Nowapara 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

143. The project 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. Also, the GRM welcomes all kinds of technical and safeguards-related queries, comments, suggestions and complaints from anyone. 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. It is noteworthy to mention that If any grievance is raised with respect to environmental safeguards, the contractor will bear the cost to resolving the grievances raised with respect to environmental safeguards.

144. Affected people are to be informed about the mechanism through information caravan and orientation in the community to be conducted by the project officers and staff, printing of pamphlets and brochures, media and public outlets. To ensure wider coverage, complaints or

¹⁷Per 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."

grievances can be reported through but not limited to: letters, e-mails, text messages, verbal narration from walk-in complainants, phone calls, fax, online grievance registration form (in local dialects) through the project website, installation of Grievance Intake Box at the project area and other mode of filing that the affected people have access to. For those affected people who cannot read and write, a community leader/volunteer will be identified in every project area. The community leader/volunteer will serve as the focal person who will assist the affected people in filing the complaints. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. The GRM will be implemented in three levels. See **Figure 18** for the outline.

145. **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 registration form that may be used is in **Appendix 8**. The suggested format for record-keeping of grievance is in **Appendix 9**.

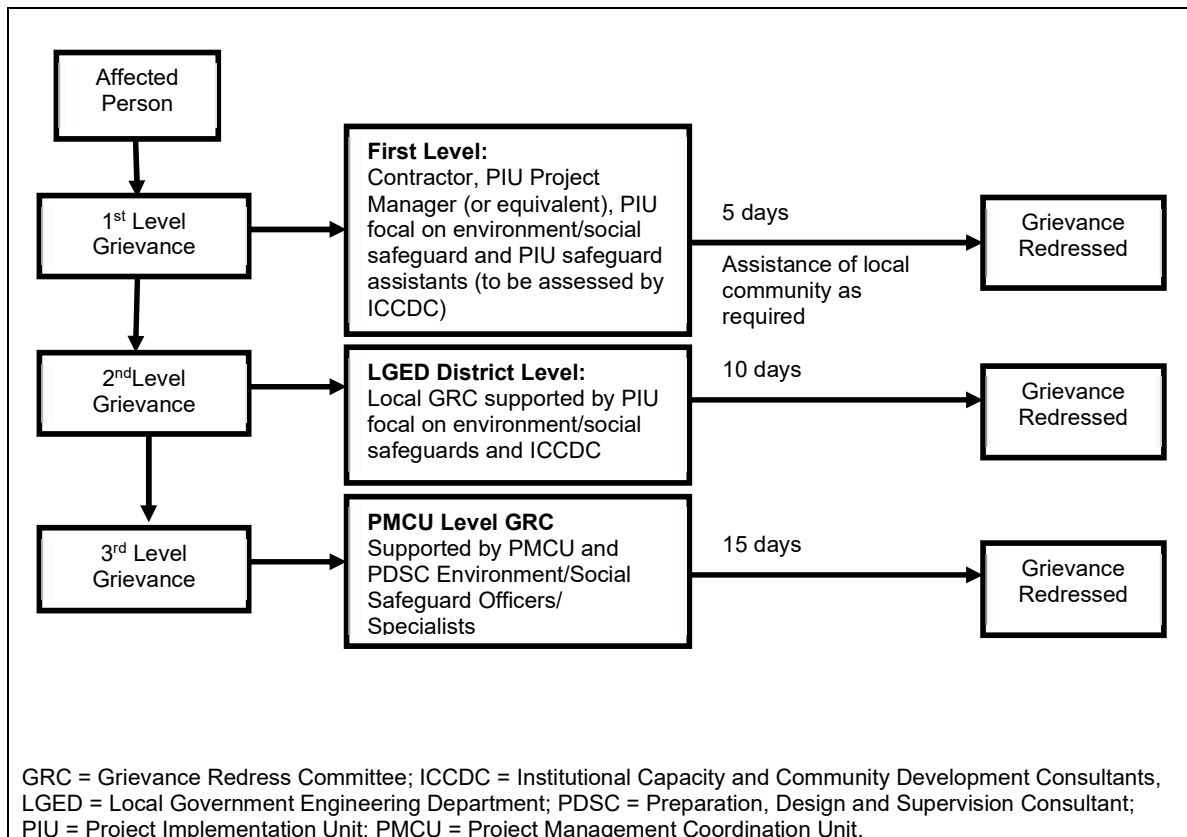
146. **Second Level.** Should the grievance remain unresolved, the PIU Project Manager (or equivalent), will activate the second level of the GRM by referring the issue (with written documentation) to the local Grievance Redress Committee (GRC) of the Pourashava or City Corporation, who will, based on 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 Pourashava or City Corporation (GRC Chair); (ii) representative of the mayor of the Pourashava or City Corporation; (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 Pourashava or City Corporation; 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.

147. 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.

148. **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.

149. 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 18: Project Grievance Redress Mechanism¹⁸



150. 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.

151. 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.

¹⁸Outline adopted from GRM of CRDP, and revised to conform with new arrangements and nomenclatures of Second CRDP.

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

152. **Project Management Coordination Unit.** LGED is 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 is responsible¹⁹ 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 is primarily 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 are to assist the PMCU in this regard.

153. **Project Implementation Unit.** The Nowapara PIU is responsible for the day-to-day activities of project implementation in the field and have direct supervision to all contractors at subproject sites. Nowapara PIU has already 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 are to ensure compliance with government and ADB requirements on environmental safeguards. The Nowapara PIU are to prepare quarterly progress reports on all aspects concerning environmental assessment, management, monitoring, and report to the PMCU.

154. **Preparation, Design and Supervision Consultants.** The Preparation, Design and Supervision Consultants (PDSC) team includes 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 provide technical support to the PMCU and Nowapara 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 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 also provide needed training and capacity building support to the PMCU and Nowapara PIU.

155. **Contractors.** The contractors of subprojects have specific roles in the implementation of the EMPs. Each contractor has at least one environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. All these specific roles and responsibilities are defined in the IEE reports, which shall form part of the contract documents. Nowapara PIU will monitor contractors' environmental performance.

¹⁹ 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 17 summarizes the overall roles and responsibilities of PMCU, Nowapara PIU, and ADB.

Table 17: 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 Daily monitoring reports (Appendix 14) to	Contractors to conduct environmental monitoring and	ADB to review the reports and provide

PMCU	PIU	ADB
ensure that all 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.	implement EMPs. PIU with 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	necessary advice/guidance needed to the PMCU.
Operation Stage		
LGED and Nowapara PIU 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

156. An environmental management plan (EMP) has been developed to provide mitigation measures to reduce all negative impacts to acceptable levels. The Environmental Management Plan Matrix is presented in **Table 18**.

157. The EMP will guide the environmentally-sound construction of the subproject and ensure efficient lines of communication between PMCU, Nowapara 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.

158. 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.

Table 18: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Design and Pre-Construction Phase					
1. Consents, permits, environmental clearances, etc.	Failure to obtain necessary consents, permits, and other appropriate regulatory clearances can result to design revisions and work stoppage	<ul style="list-style-type: none"> - 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, Nowapara PIU, PDSC	Incorporated in final design and communicated to contractors	Before award of contract
2. Existing utilities such as electric poles, water supply lines, sewerage lines, telephone cables, etc.	Disruption of services	<ul style="list-style-type: none"> - Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction - It is to note that the subproject roads are single lane road; and hence, no utilities will be affected/disrupted - Require construction contractors to prepare a contingency and spoil management plan 	PMCU, Nowapara PIU, 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)
3. Storm water runoff and conveyance of pollutants.	Besides stormwater runoff and particularly removal of local drainage congestion from roadsides, silts, solid wastes, domestic wastewater and septic tank effluents from within the residential and commercial establishments may enter the subproject drains and eventually their outfall ends-up	<p>The design to consider the following:</p> <ul style="list-style-type: none"> • The inlet design to ensure that only storm or rain water flows (no other untreated wastewater) into the drainage system; • As per local government ordinance, concerned Pourashava shall ensure no untreated wastewater discharge to the drain. 	PMCU, PDSC, NOWAPARA PIU	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 (NOWAPARA PIU will bear the cost)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	to Bhairab River and pollute the river water. Also, the silts and solid wastes may be washed down to the subproject drains, which could result to heavy siltation of the drains and obstruct the drainage flow along the drain in the medium to long term.	<ul style="list-style-type: none"> • Prevent households from connecting outlets of septic tanks and grey water to the community canals; • Provide siltation or sedimentation chambers (or similar structures) at all outlets of subproject drain/community canals along the Subproject drain to prevent accumulation of silts and solid wastes in the said drain. • This will also prevent potential pollution of the Bhairab River; and provide space for the provision of accessibility during operation and maintenance (O&M) phase 			
4. Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	- Determine locations beforehand of construction contracts	PMCU, Nowapara PIU, PDSC	<p>List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.</p> <p>Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land</p>	During detailed design phase
5. Construction Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	<ul style="list-style-type: none"> - Follow the principle of "Reduce, Reuse, Recycle, and Recover" - Prohibition of unwanted littering and discharge of waste. 	Contractor	Contractor's records. Visual inspection.	Visual inspection by PIU on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> - Solid waste is managed and disposed through the municipal collection system. - Develop a plan for waste management prior to commencing of construction and get approval from PIU. 			
6. Sources of 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	<ul style="list-style-type: none"> - Prepare list of approved quarry sites and sources of materials 	PMCU, Nowapara PIU, PDSC	List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of quarry sites	During detailed design phase, as necessary with a discussion with detailed design engineers and Nowapara PIU suitability of sources and permit for additional quarry sites if necessary.
7. EMP Implementation Training	Without training, the EMP may not be implemented efficiently. Hence, will have impact to the environment, workers, and community	<ul style="list-style-type: none"> - Project manager and contractors should be trained on EMP implementation, spoils management, standard operating procedures (SOP), health and safety (H&S), applicable regulatory compliance. 	PMCU, Nowapara PIU, PDSC, Contractor's Environmental Supervisor	Record of completion (Safeguards Compliance Orientation) Contractor records for EMP implementation at worksites	During the detailed design phase before the mobilization of workers to site
8. 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	Contractor, PIU, and PDSC	Testing of Ambient air quality; Surface water quality; Ground water quality and Noise level	Once before start of the construction works. (Sampling will take place before start of subproject works).

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		quality (pH, DO, Cl-, EC, As, NO3 BOD5d, COD,);and Noise level			
2. During Construction Activities					
A. Physical Characteristics					
9. Topography landforms, geology, and soils and river morphology and hydrology	Sand, gravel or crushed stone will be required for this town project. 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).	<ul style="list-style-type: none"> - Utilize readily available sources with environmental clearance and license - Borrow areas and quarries comply with environmental requirements. - Coordinate with local authorities such as the Bangladesh Water Resources Development Board for quarrying from rivers. Alternative sources should be identified. 	Contractor	Records of sources of materials	Monthly by Nowapara PIU
10. Construction of component of the subproject (Road, RCC pipe/box drain, box culvert etc.)	Construction related impact: <ul style="list-style-type: none"> • Dust emission • Noise pollution • Pedestrian and vehicle movement • Generation of construction wastes 	<ul style="list-style-type: none"> • 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. • Operate the hydraulic excavator carefully; • Maintain adequate moisture content of soil and sand during transportation, and handling; 	Contractor	Contractor records for EMP implementation at worksites.	PIU on a monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> • 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. 			

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
11. Water quality	Pollution of Bhairab River due to: (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.	<ul style="list-style-type: none"> • Dispose excess spoils as per the sample Spoil Management Plan (Appendix 3). • Locate temporary storage areas on flat grounds and 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, cleanup of equipment, and response measures in case spills or emergencies. • Ensure no refueling within 100m from surface water. 	Contractor	<p>Areas for stockpile storage of fuels and lubricants and waste materials.</p> <p>Number of silt traps installed along trenches leading to water bodies.</p> <p>No visible degradation to nearby drainage, water bodies due to construction activities.</p> <p>Results of river water quality testing.</p>	<p>Visual inspection by Nowapara PIU and/or PDSC on weekly/monthly basis</p> <p>Frequency and sampling sites to be finalized.</p>
12. Groundwater quality	Pollution of groundwater resource due to potential seepage of construction chemicals such as fuels and temporary latrines at construction camps.	<ul style="list-style-type: none"> - 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	<p>Areas for stockpile storage of fuels and lubricants. Availability of sanitary latrines at construction camps.</p>	Visual inspection by PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> - Provide portable toilets at construction camps and ensure handling of the septic waste will be done by authorized transporters. If pit latrine 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. 			
13. Air quality	Work at the dry season and transporting construction materials may increase dust, carbon, monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons in air environment	<ul style="list-style-type: none"> - Use of physical controls, sprays, covers, compaction, screening, enclosure, windbreakers, binders and road surfacing - Cover delivery trucks during transport. - Construction vehicle's speed limited to 30kph. - Use of vehicles with government registration and complying with Bangladesh vehicle emission standards. - Prohibition of open burning of solid waste. - Minimize stockpile height. 	Construction 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 Bangladesh vehicle emission standards. Ambient air quality tests.	Visual inspection by Nowapara PIU and/or PDSC on monthly basis Ambient air quality testing will be conducted consistent with the monitoring plan, or increase frequency as may be needed.
14. Acoustic environment	Noise/vibration level at the construction sites and their vicinities may be elevated due to construction activities. This will	<ul style="list-style-type: none"> - Provide prior information to the local public, including institutions such as schools and hospitals, about the work schedule. 	Contractor	Number of complaints from sensitive receptors;	Acoustic environment

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	impact vibration risk structures, construction workers and community people near the construction sites, especially in noise and vibration-sensitive areas such as near health care facilities, educational institutions and places of worship.	<ul style="list-style-type: none"> - use equipment that emits the least noise/vibration, well-maintained and with efficient mufflers. Install silencers if necessary and practical; - restrict noisy activities to day time; - avoid use of noisy/vibration emitting 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. 		<p>Use of silencers in noise-producing equipment and sound barriers;</p> <p>Results of ambient noise level measurements.</p>	
15. Aesthetics	Interference with the enjoyment of the area and creation of unsightly or Offensive conditions	<ul style="list-style-type: none"> - Prepare a debris disposal plan. - Minimize stock pile size - Clear wastes regularly - Avoid stockpiling of excess spoils. - Cover delivery trucks during transportation. - Clean roads. - Use screening enclosure shade cloth, temporary walls - Clean site regularly. - Follow the principle of "Reduce, Reuse, Recycle, and Recover" 	Contractor	<p>Number of complaints from sensitive receptors;</p> <p>Worksite clear of all types of wastes</p> <p>Worksite clear of any wastes unutilized materials, and debris</p>	Visual inspection by Nowapara PIU and/or PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				Transport route and worksite cleared of dirt	
B. Ecological Resources					
16. (Biodiversity) Terrestrial ecology including terrestrial biodiversity	<p>Removing and damaging flora particularly trees and fauna by the construction workers</p> <p>Threat to animals due to poaching or leisure catching by workers in the subproject areas</p>	<p>Prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites;</p> <p>Prohibit employee and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.</p>	Contractor	Complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	Visual inspection by PIU and PDSC on monthly basis
17. Aquatic ecosystem	Construction and rehabilitation work at the subproject road/drain can degrade the quality of water flowing to the Bhairab River. As such, aquatic species particularly fishes found at the Bhairab river likely to be affected.	<ul style="list-style-type: none"> • avoid excavation and other civil works during monsoon season; • not undertake construction works near these sites during the spawning and breeding period of fish between June and September. 	Contractor	Reports of Contractors to PIU.	Visual inspection by PIU and PDSC on monthly basis
18. Slope erosion and canal sedimentation	<p>Sedimentation of surface drainage networks, biological systems disruption</p> <p>The silts and solid wastes from the community canals may be washed down to the subproject drain/khals, which could result to heavy siltation and obstruct their drainage flow in the medium to long term.</p>	<p>The design to consider the following:</p> <ul style="list-style-type: none"> • The inlet design to ensure that only storm or rain water flows into the drainage system; • Provide siltation or sedimentation chambers (or similar structures) at all outlets of drain/community canals along the Subproject Khal to prevent accumulation of silts and solid wastes in the said canal • Retaining the existing plants and vegetation at slopes of road/ canal bank and palisading, 	Contractor	Visual Inspection	Monthly in the segment of construction.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> • Scheduling to avoid heavy rainfall periods • Contouring and minimizing length and steepness of slopes • Mulching to stabilize exposed areas • Re-vegetating bank slope areas promptly • Designing the subproject drains for post-construction flows • Lining steep channel and slopes (e.g. use jute matting) 			
19. Disposal of excavated spoil	Indiscriminate disposal of excavated spoil may affect the landscape and aesthetics of local environment and also may cause pollution and nuisance to surrounding environment	<ul style="list-style-type: none"> • The negative impacts of indiscriminate disposal of excavated spoil may be mitigated by adopting the following measures: • dispose excavated spoils as per the Spoil Management Plan attached in Appendix 4; • avoid stockpiling of excess excavated spoils as far as possible; • avoid disposal of excavated spoil/soils in or near water course bodies/watercourses/; • Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints; and • 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 	Contractor	Visual Inspection	Visual inspection by PIU and PDSC on monthly basis.
C. Socioeconomic Characteristics					

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
20. Traffic and disturbance to community	Construction and rehabilitation work under the subproject will impede the flow of traffic. These activities may also cause damage to community facilities and utilities that could result to inconvenience of the local people.	<ul style="list-style-type: none"> • Contractor to prepare traffic management plan (TMP) with approval from PD, and its implementation in collaboration with local authorities; • where traffic congestion will likely occur, place traffic flagmen during working hours; • complete the work quickly nearby institution, place of worship, business, hospitals, and schools. • Consult with business and institutions for work schedules. 	Contractor	<p>Traffic route during construction works, including number of permanent signs, barricades, and flagmen on worksite;</p> <p>Number of complaints from sensitive receptors;</p> <p>Some signages</p>	Visual inspection by Nowapara PIU and PDSC on monthly basis
21. Socio-economic status	Opportunity for increasing local revenue.	<ul style="list-style-type: none"> -Engage the local workforce. -Secure construction materials from local market. 	Contractor	<p>Employment records;</p> <p>Records of sources of materials</p> <p>Records of compliance to Bangladesh Labor Act 2006</p>	Visual inspection by PIU and PDSC on monthly basis
22. 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	Contractor	The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (Appendix 10);	<p>Visual inspection by PIU and PDSC on weekly basis</p> <p>Frequency and sampling sites to be finalized</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> - 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 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 		<p>Number of complaints from sensitive receptors;</p> <p>Number of walkways, signs, and metal sheets placed at the subproject location;</p> <p>Agreement between landowner and contractors in case of using private land as work camps, storage areas, etc.</p>	
23. Workers Health & Safety	<ul style="list-style-type: none"> - There is invariably a safety risk when construction works such as excavation and 	<ul style="list-style-type: none"> - Implement the occupational health and safety plan in the SEMP, which follows international best practices on 	Contractor	Equipped first-aid stations; Medical insurance	Visual inspection by PIU and PDSC on a weekly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	<p>earthmoving are conducted in urban areas.</p> <ul style="list-style-type: none"> - 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 	<p>occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities</p> <ul style="list-style-type: none"> - 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. - 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; 		<p>coverage for workers;</p> <p>Number of accidents;</p> <p>Records of supply of uncontaminated water;</p> <p>Condition of eating areas of workers;</p> <p>Record of health and safety orientation training;</p> <p>Availability of personal protective equipment at construction site;</p> <p>Number of moving equipment outfitted with audible back- up alarms;</p> <p>Signage for storage and disposal areas;</p> <p>Condition of sanitation facilities for workers; and</p> <p>Records of results of noise</p>	<p>Frequency and sampling sites to be finalized</p>

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<ul style="list-style-type: none"> - 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 & safety 		level measurements.	
- D. Historical, Cultural, and Archaeological Characteristics					
24. Physical and cultural heritage	<p>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.</p> <p>There are no archaeological, paleontological, or architectural sites of significance listed by Bangladesh Department of Archaeology.</p>	<ul style="list-style-type: none"> - However, as a precautionary approach, the contractor will be required to: - strictly follow the protocol by coordinating immediately with PIU and Bangladesh Department of Archaeology for any suspicion of chance finds during excavation works; - stop work immediately to allow further investigation if any finds are suspected; and - request authorized person from the Bangladesh Department of Archaeology to observe when excavation resumes for the identification of the potential chance find, and comply with further instructions. 	Contractor	Records of chance finds	Visual inspection by PIU and PDSC on monthly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
E. Others					
25. Submission of EMP implementation Report	Unsatisfactory compliance to EMP	<ul style="list-style-type: none"> - Appointment of EMP supervisor - Timely monitoring reports with field photographs 	Contractor	Availability and competency of appointed supervisor Daily monitoring sheets by Contractor EHS supervisor Monthly monitoring reports by Contractor to Nowapara PIU.	Monthly monitoring report to be submitted by contractors to Nowapara PIU and Nowapara PIU submit quarterly reports to PMCU. PMCU to submit semi-annual monitoring report to ADB
3. Post Construction Activities and Operation and Maintenance					
26. Post construction site clearing activities	Damage due to debris, spoils, excess construction materials	<ul style="list-style-type: none"> - Remove spoils wreckage, rubbish, or temporary structures no longer required; - 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 or PIUs in writing that worksites and camps are 	Contractor	PMCU / Nowapara 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) work site cleanup is satisfactory.	Before turnover of completed works to Nowapara PIU

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		already vacated and restored to pre-project conditions			
27. Environmental legislation compliance	Lack of awareness in PIU about legislations and IEE requirements	Strengthen capacity of PIU staffs	PMCU, PIU, PDSC	Monitoring reports and checking operations against O&M manuals and permits/clearances	PIU - after completion of the subproject
28. Domestic wastewater discharge	Illegal entry of waste water from buildings or households; Solid Waste disposal to the drains resulting to water pollution and clogging.	<ul style="list-style-type: none"> 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 to prohibit domestic wastewater discharge, septage and solid wastes into the subproject drains.with proposed outlet to a khal which has ultimate connection to River. 	PIU	Water quality of discharge at outfalls	PIU - Quarterly depending on the situation and capacity PIU
29. Solid waste generation	Generation of solid waste from the community may cause clogging of the drain/canal/pond/ khal	<ul style="list-style-type: none"> Nowapara (PIU) shall undertake the following actions to ensure that 	PIU	Visual Inspection	Visual inspection by PIU, and cleaning on

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		<p>the subproject operates sustainably:</p> <ul style="list-style-type: none"> • Establish a program of regular visual inspection to identify problems early, before they become critical (plugging, clogging, blockage etc) • Prohibition of unwanted littering and discharge of waste into the drain/canal/khal. • Solid wastes are managed and disposed through the municipal collection system; • Ensure that all remedial action is implemented promptly, including clearing, sediment and other material that could cause blockage, 			semi-annually or as and when situation demands.

C. Environmental Monitoring Program

159. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist.

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164. **Table 19:** shows the proposed Environmental Monitoring Plan for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring and responsibility.

Table 19: Environmental Monitoring Program

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PRE-CONSTRUCTION					
1. Secure Environmental Compliance Certificate from Department of Environment	PMCU office	PMCU, PDSC	Copy of approved ECC	Before construction activities	PMCU, PDSC
2. 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
3. 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
4. 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
5. Traffic Management Plan (TMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PMCU, PDSC
6. Occupational, Health and Safety Plan (OHSP) and COV-19 H&S Management Plan submitted by Contractor for approved by PIU	PIU office	Contractor	Copy of approved OHSP and COV-19 H&S Management Plan	Before construction activities commence	PMCU, PDSC
7. Waste Management Plan (WMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved WMP	Before construction activities commence	PMCU, PDSC
8. Baseline environmental data gathering: Sampling & measurement of Ambient air quality (PM10, PM2.5, 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,	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	PMCU, PIU, PDSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
As, NO ³ BOD ^{5d} , COD,);and Noise level				start and end part of the roads)	
9. Secure all other necessary permits and licenses from relevant government agencies		Contractor	Copies of permits and licenses	Before construction activities commence	PMCU, PIU, PDSC
CONSTRUCTION					
10. 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	PIU, PDSC
11. Implementation of SMP, Implementation of SMP, which include disposal of spoil material at a location approved to by 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	PIU, PDSC
12. 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	PIU, PDSC
13. Implementation of Occupational, Health and Safety Plan (OHSP)	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	PIU, PDSC
14. Waste Management Plan (WMP) submitted by Contractor for approval by PIU	PIU office	Contractor	Copy of approved WMP	Before construction activities commence	PMCU, PDSC
15. Occupational, Health and Safety Plan (OHSP) and COV-19 H&S Management Plan submitted by Contractor for approved by PIU	PIU office	Contractor	Copy of approved OHSP and COV-19 H&S Management Plan	Before construction activities commence	PMCU, PDSC
16. Conduct of analytical tests of Ambient air quality (PM ₁₀ , PM _{2.5} , NO _x , SO _x & CO); Surface water (pH, DO, Cl ⁻ BOD ^{5d} , COD,	Subproject sites	Contractor	Contractor records, Results of laboratory analyses	Semi-annually (sampling will take	PMCU, PIU, PDSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
NH ⁴ /NO ³ , TSS, TDS & total coliform); Ground water quality (pH, DO, Cl ⁻ , EC, As, NO ³ BOD ^{5d} , COD,);and Noise level				place at the start and end part of the roads)	
17. Develop and apply archaeological protocol to protect chance finds	All subproject sites	Contractor, PMCU, PIU, PDSC	Contractor records	Once until protocol is approved	PMCU, PIU, PDSC
18. Provide EHS training for all personnel	All subproject sites	Contractor	Contractor records; Interviews to workers	Monthly	PIU, PDSC
19. Keep accident reports and records	All subproject sites	Contractor	Contractor records; Interviews to workers and community people	Monthly	PIU, PDSC
20. Employ workforce from communities near sites	All subproject sites	Contractor	Contractor records	Monthly	PIU, PDSC
21. Implementation of EHS measures at construction camps	Construction camp sites	Contractor	Site visits; Interviews to workers at camps	Monthly	PIU, PDSC
22. Management of wastes, aquatic ecosystem, slope erosion, canal sedimentation and reinstatement of sites	All subproject sites	PIU	Site observation	Monthly	PIU
OPERATION AND MAINTENANCE					
23. Implement local ordinance that prohibit illegal connection for discharging domestic wastewater and septic tank effluent into subproject drains.	All subproject sites	PIU	Site observations	Start of O & M Phase	PIU
24. Maintain safe passage for vehicles and pedestrians during maintenance activities	All subproject sites	PIU	Site observations	Monthly	PIU
25. 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.	at subproject sites	PIU	Site observations	Monthly	PIU

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
26. Provide signboards informing nature and duration of maintenance activities	at subproject sites	PIU	Site observations	Monthly	PIU
27. 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	at subproject sites	PIU	Site observations	Monthly	PIU
28. Dispose of material from blocked drain in location away from roadway and drain	at subproject sites	PIU	Site observations	Monthly	PIU
29. A proper traffic management plan can be introduced and strictly follow the BRTA rules;	at subproject sites	PIU	Site observations	Start of O&M Phase	PIU
30. 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 subproject sites	PIU	Site observations	Start of O&M Phase	PIU
31. Culvert/cross-drain site should be clean properly after completion of the construction activities so that the natural drainage system may not hampered	at subproject sites	PIU	Site observations	Start of O&M Phase	PIU
32. Proper removal of construction camp facilities and construction wastes from the sites after completion of the construction works	at subproject sites	PIU	Site observations	Start of O&M Phase	PIU
33. Ensure no throwing of trashes (empty soft drink cans/bottles and any kind of solid wastes into the drain/khal by installing/hanging trash cans/bins	at subproject sites	PIU	Site observations	Weekly	PIU

D. Capacity Development Training

165. The PMCU safeguards experts (environmental and social) with support from PDSC Environment Specialist and Social Safeguard Specialist will be responsible for training the Nowapara 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 safeguard policy 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) community and occupational health and safety considerations;
 - e) consultation and participation requirements;
 - f) project GRM and ADB's Accountability Mechanism;
 - g) improved coordination within nodal departments; and
 - h) 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.

The proposed training programme along with the frequency of sessions is presented in **Table 20:20**.

Table 20: 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	<p>Module 1: Orientation ADB Safeguards Policy Statement Government of Bangladesh Environmental Laws and Regulations</p> <p>Module 2: Environmental Assessment Process ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts</p> <p>Module 3: COVID-19 H&S training</p>	<p>Roles and responsibilities of officials/contractors/consultants towards protection of the environment</p> <p>Environmental issues during construction</p> <p>Implementation of EMP</p> <p>Monitoring of EMP implementation</p> <p>Reporting requirements</p>	<p>Experiences on EMP implementation – issues and challenges</p> <p>Best practices followed</p>
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 & Monitoring Plan Implementation Cost (Indicative)

166. 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 167.

168. **Table 21:21** 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 21: 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			6,00,000.00	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			30,000.00	
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 (NOWAPARA 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.	Nos	4			Contractor (NOWAPARA Clause 29.2 of General Conditions of Contract)
9	Providing and maintaining adequate sanitation facilities (both for male and female) at camp site and work site to the entire satisfaction of engineer-in-charge.	Nos	4			Contractor (NOWAPARA Clause 29.2 of General Conditions of Contract)
10	<u>Traffic Management</u> 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 (NOWAPARA Clause 27.1 (b) of General Conditions of Contract)
11	<u>Installation of signboards/billboards</u> Precautionary signboards/billboards/danger signals in appropriate places to notify people about the project	sqm	10.80			Item included in the BOQ (Road Item No. 32)
12	<u>Working labour shed:</u> 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 (NOWAPARA Clause 29.2 of General Conditions of Contract)
13	<u>Personal Protection Equipment for Workers</u> Providing and maintaining appropriate (safe design, fit and comfort) personal protection equipment (PPE) to ensure the highest possible protection for employees in establishing and					Contractor (NOWAPARA Clause 27.1 (a), 29.1 of Particular Conditions of Contract)

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
	maintaining a safe and healthful working environment at workplace.					
14	<u>Removal of equipment/ surplus materials/ rubbish/temporary structures/fully reinstate</u> 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 (NOWAPARA Clause 27, 40.3, 80.2 of Particular Conditions of Contract)
15	<u>Occupational Health and Safety</u> 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 (NOWAPARA Clause 27, 29.1 of Particular Conditions of Contract)
16	<u>Community Health and Safety</u> To ensure safety of health and hazards on local resources and infrastructures of nearby communities					Contractor (NOWAPARA Clause 27 of Particular Conditions of Contract)
17	<u>COVID-19 Health and Safety</u> 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 (NOWAPARA Clause 27.1 (d) of Particular Conditions of Contract)
18	Training on Environmental Management Plan, Health& Safety and COVID-19 related threat for the contractor's workforce					PDS-2 Consultants under CRDP-2

The cost for Environmental Quality Tests of Various Components –Water (surface and underground), Ambient air and Noise level, and Soil quality is given in **Table 22** below.

Table 22: 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	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	40,000x6=2,40,000
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)	10,000	12 times / (Once at two locations for day and night time during pre-construction and semi-annually at two locations for day and night time during construction phase)	10,000x12=1,20,000
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	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	20,000x6=1,20,000
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	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	20,000x6=1,20,000
Total Cost:					6,00,000.00

VIII. MONITORING AND REPORTING

163. 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.

164. 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 11**. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

165. 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 12**. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

166. PMCU shall consolidated quarterly reports from the PIUs including Nowapara 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.

167. 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.

168. ADB's monitoring and supervision activities are carried out on an on-going basis until a project completion report is issued. ADB issues a PCR within 1-2 years after the project is physically completed and in operation.

IX. CONCLUSION AND RECOMMENDATIONS

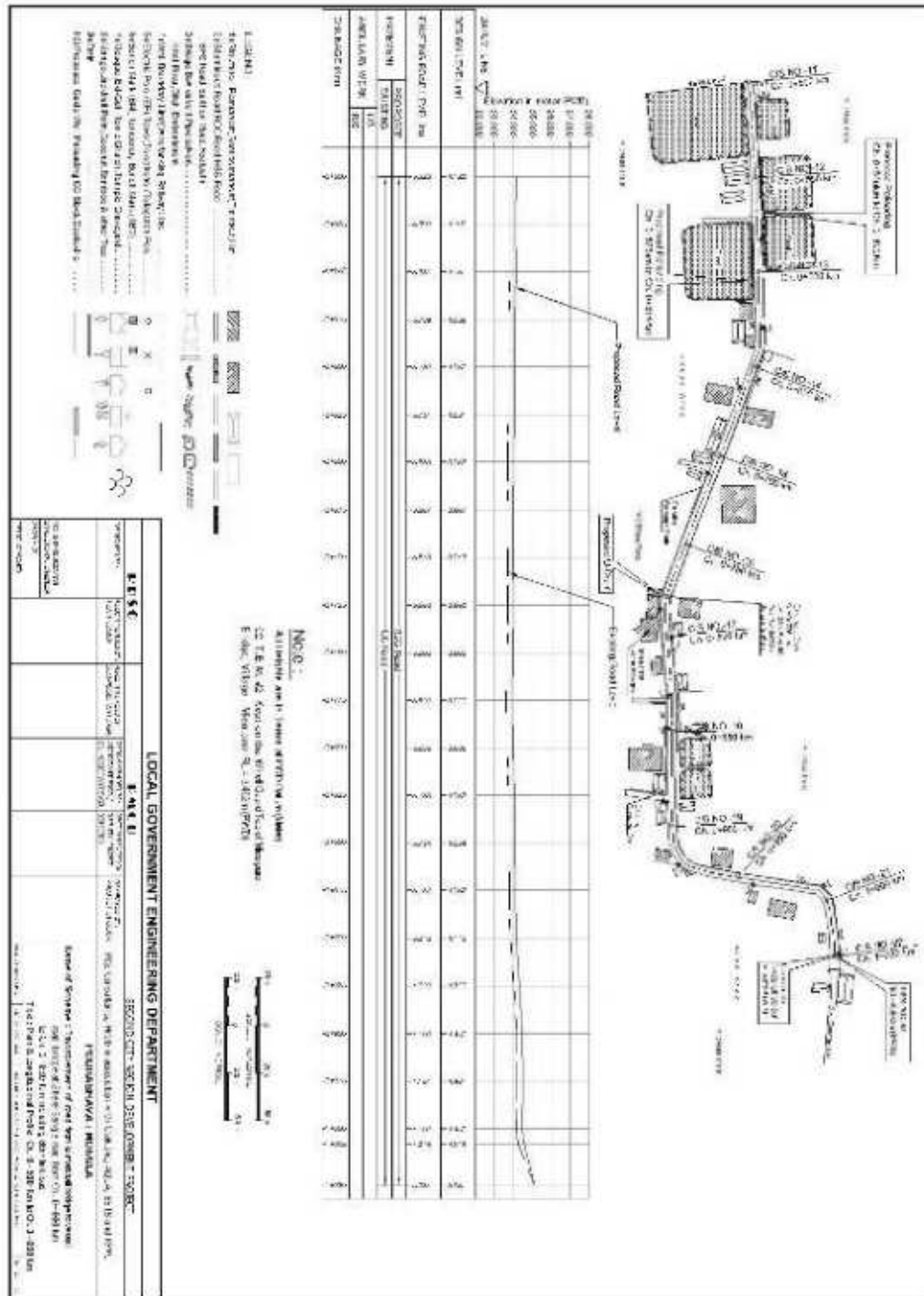
169. The proposed subproject is not an environmentally critical undertaking. IEE indicates that the proposed subproject, and its components, is not located within or adjacent to environmentally sensitive areas.

170. 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.

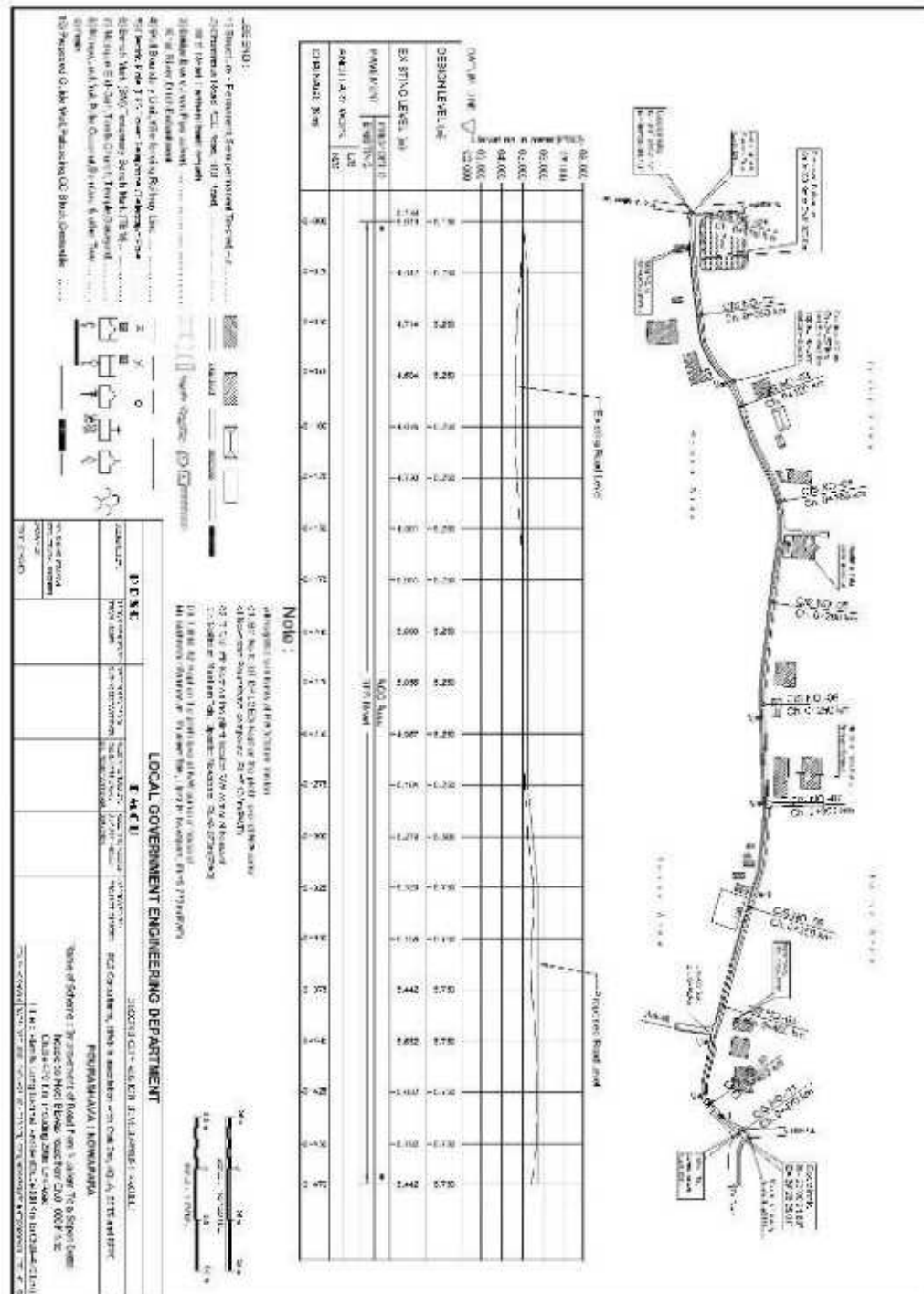
171. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally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

172. Based on the above findings, the classification of the subproject under Package No. **CRDP-II/LGED/NOWAPARA/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. The approved final IEE 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 Nowapara 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.

Appendix 1: Strip Maps of Subproject Road Alignments of Road from Nowapara link road to model college (Ch.0-1090m) including 180m link road.



Appendix 2: Strip Maps of Subproject Road Alignments of Road from Muallem Tola Sapon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road.



Appendix 4: Sample Spoil Management Plan

Purpose and application: 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) Manage 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 reused shall 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 client 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

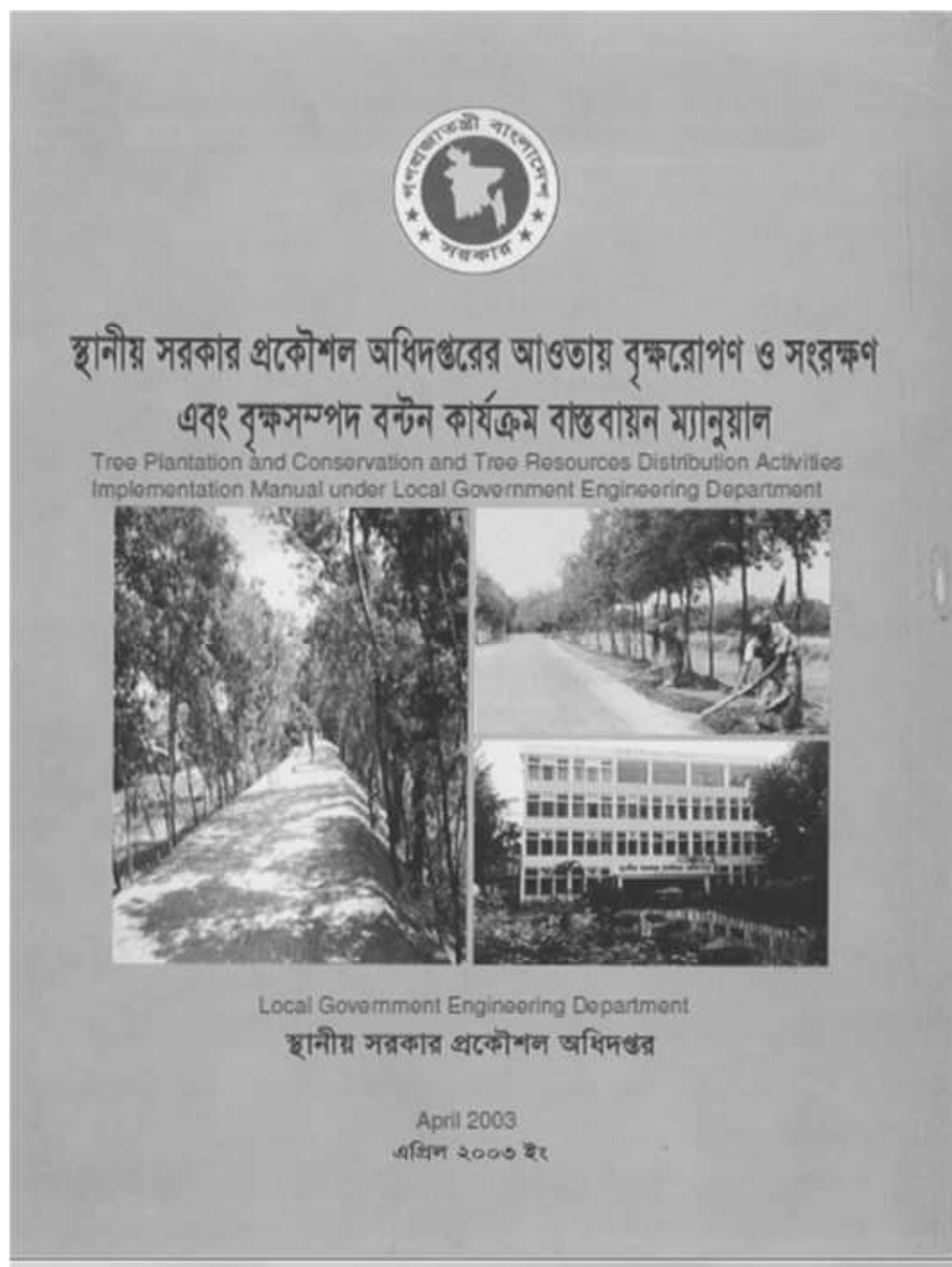
Based on the above, the contractor will prepare a SMP as an integral part of EMP and submit to the PDSC for their review and approval.

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

- 1. Tree Plantation and Conservation in the LGED's Premises and Fallow Land**
 - 1.1 Availability of Land
 - 1.2 Estimate Preparation of Schemes
 - 1.3 Implementation
 - 1.4 Tree Resources Distribution
 - 1.5 Financing
 - 1.6 Implementing Office and Designated Officer
 - 1.7 Responsibility of the Implementing Office's Designated Officer
- 2. Roadside Tree Plantation and Conservation**
 - 2.1 Road Maintenance
 - 2.2 Tree Plantation and Caring
 - 2.3 Road Maintenance , Tree Plantation and Conservation Activities Implementation
 - 2.3.1 Road Maintenance, Tree Plantation and Conservation Scheme Identification, Scheme Preparation, Approval, Financing and Implementation Process
 - 2.3.2 Implementation adopting Lenthperson Process by Organized Women Group
 - 2.3.3 Worker Selection
 - 2.3.4 Worker Selection Policy
 - 2.3.5 Formation of the Interview Board
 - 2.3.6 Campaign
 - 2.3.7 Interviewing and Selection
 - 2.3.8 Team Formation
 - 2.3.9 Responsibility of Women Worker
 - 2.3.10 Responsibility of Co- women group Leader
 - 2.3.11 Responsibility of Women group Leader
 - 2.3.12 Recruitment of Supervisor
 - 2.3.13 Provide Appointment Letters
 - 2.3.14 Provide Equipments among Worker Women for Maintenance Work
 - 2.3.15 Initiation of Implementation of Scheme
 - 2.4 Training
 - 2.4.1 General Awareness Training for Women Workers on Road Maintenance, Plantation and Conservation
 - 2.4.2 General Awareness Training for Women Workers on Primary Health Care and Income-generating Activities
 - 2.5 Inspection and Monitoring
 - 2.5.1 Inspection and Monitoring System of Road Maintenance, Plantation and Conservation Program

- 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

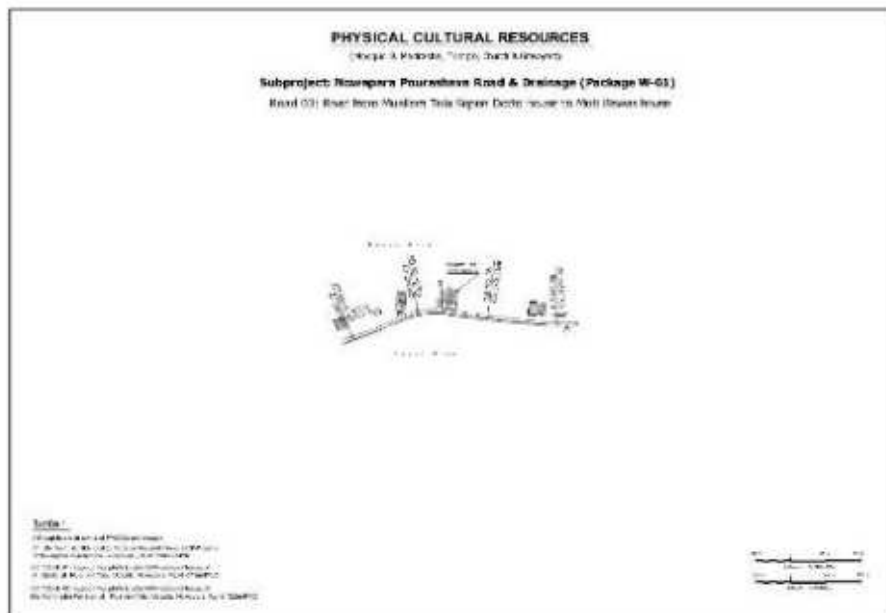
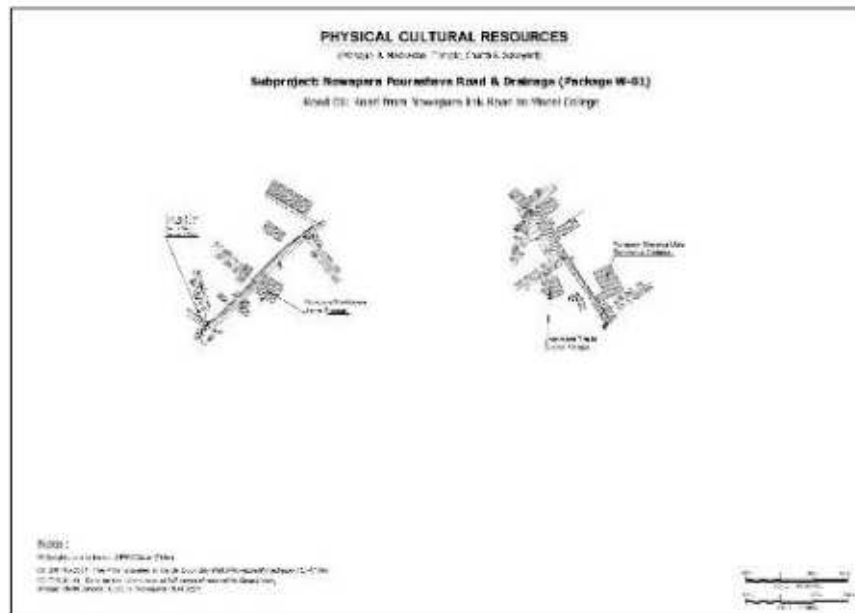
A) Road

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 Progress Report

Appendix 6: Strip Maps Showing PCRs (Religious Establishments) Along the Road Alignments



Appendix 7: Public Consultation

Consultation was undertaken with key stakeholders on the following scheme in relation to environmental and social safeguard issues.

1	Scheme no. 1 (Discrete Drain)	Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work
2	Scheme no. 2 (Road-1) + (Roadside Drain-2)	Improvement of road from Nowapara link road to model college (Ch.0-1090m) including 180m link road. Re-construction of drain from Nowapara link road to model college (Ch.0-1090m) including 180m link drain.
3	Scheme no. 3 (Roadside Drain-3) + (Road-2)	Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement. Re-construction of drain from Akterpur Jamdarbari to the rail line culvert (Ch.0-900m) including 255m road improvement.
4	Scheme no. 4 (Road-3) + (Roadside Drain-4)	Improvement of road from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m) including 290m link road. Re-construction of drain from Muallem Tola Sopon Dotto house to Moti Biswas house (Ch.0-470m)
5	Scheme no. 5 (Road-4) + (Roadside Drain)	Improvement of road from Changutia Bazar to Mistry para (Ch.0-1010m) Re-construction of drain from Changutia Bazar to Mistry para (Ch.0-1010m)

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

Sl. No	Date of Consultation	Place of consultation	Objective/Number & Type of Participants	Issues Discussed
01	23.12.2019	Venue: Nowapara Pourashava Meeting Hall	<p>Objectives of Consultation:</p> <ul style="list-style-type: none"> 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 <p>Number /Type of Participants: 26 (Male 18+Female 8) - (Mayor, elected ward councillors including women councillors, pourashava and other professional and technical staff, representatives from Mosques and Temples, schools and president of CNG owners association; shop owner association, local businesses, etc.)</p>	<p>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:</p> <ul style="list-style-type: none"> 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 dwelling places 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% area depends on business and the rest on 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.

Photograph of Public Consultation



Consultation for Nowapara Pourashava Package W-01 schemes



Consultation for Nowapara Pourashava Package W-01 schemes

LIST OF PARTICIPANTS

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিসি ভবন
আগার গাঁও শের-এ-বাংলা নগর
ঢাকা-১২০৭

প্রকল্পের নামঃ- নওপাড়া

উপজেলা/সিটি কর্পোরেশন/পৌরসভা







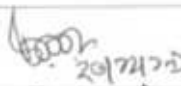
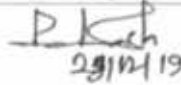
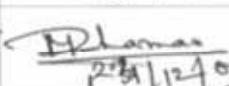
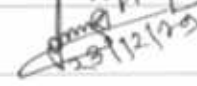
Name of Sub-project: Noapara Pourashava Drainage Master Plan.

ফোকাস গ্রুপ আলোচনায় অংশগ্রহনকারীর হাজিরা

তারিখঃ- ২৩.১২.১৭

Attendance of FGD participants

Date:

ক্রমিক নং Sl. no	নাম, ঠিকানা মোবাইল নম্বর Name, address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১	সাদিয়া সানোয়ার ০২৭৫৩৮৫২৮	স্বাহনী	
২	তাইয়ুন নারায়ণ ০১৩৩২৮৭৪৭ চন্দা নগর	শিক্ষিকা	
৩	০১৭৪৫৪৩৭১৭৭	সেবিকা	
৪	Ashim Kr. Shome Executive Engineer, PWD ০১৭১৫-২৬০৭২৩	Service	
৫	Md. Kabir Hassan Asstt. Engineer, Noapara Pourashava ০১৭১২-১২০৭৪০	Service	 ২৩.১২.২০১৭
৬	Shadon mukherjee ০১৭১৬-৪৫৭৭৭৭	Service	 ২৩-১২-২০১৭
৭	রিজা ওয়াকিল ০১৭৩৭-৭১২৭৩২	সকরারী	 ২৩/১২/১৭
৮	মিঃ মজিবুর রহমান ০১৭১১-২৪৪০২৭	সকরারী	 ২৩/১২/১৭
৯	M.L. Mizanur Rehman ০১৭১৭-৪১৩৭২৭	Panel Mayor	 ২৩/১২/১৭
১০	শ্রী. মুন্সিফ রহমান ০১৭২০১১০০৩২	সকরারী	 ২৩/১২/১৭


২৩.১২.১৭

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগার গাঁও শের-এ-বাংলা নগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-

উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project:

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা

তারিখঃ ২৬/১২/১৯

Attendance of FGD participants

Date:

ক্রমিক নং Sl. no	নাম, ঠিকানা মোবাইল নম্বর Name, address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১	মোঃ মিজাবুর রহমান ০১৭১৩৪৩৬৭১৩	কাউন্সিলর	
২	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	
৩	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	
৪	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	
৫	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	
৬	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	
৭	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	
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১০	মোঃ আব্দুল হাফিজ ০১৭১৪-৫৩১৬৩৪	কাউন্সিলর	

২৬/১২/১৯

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগার গাঁও শের-এ-বাংলা নগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-

উপজেলা/সিটিকর্পোরেশন/দৌরসভা

Name of Sub-project:

কোম্পানি গ্রুপ আলোচনার আশেপাশেরকারীর হাজিরা

তারিখঃ-

Attendance of FGD participants

Date:

ক্রমিক নং Sl. no	নাম, ঠিকানা মোবাইল নম্বর Name, address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।	মুহম্মদ মুহম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
২।	মুহম্মদ মুহম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
৩।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
৪।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
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৬।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
৭।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
৮।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
৯।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯
১০।	মেসার মোহাম্মদ হাম ০১৭১৬৪২৬৭৬	মেসার	২০/১২/১৯

২০/১২/১৯

Appendix 8: 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	<input type="checkbox"/> Male <input type="checkbox"/> 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: <input type="checkbox"/> Note/Letter <input type="checkbox"/> E-mail <input type="checkbox"/> Verbal/Telephonic					
Reviewed by: (Names/Positions of Official(s) reviewing grievance)					
Action Taken:					
Whether Action Taken Disclosed:			<input type="checkbox"/> Yes <input type="checkbox"/> No		
Means of Disclosure:					

Appendix 9: 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 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.

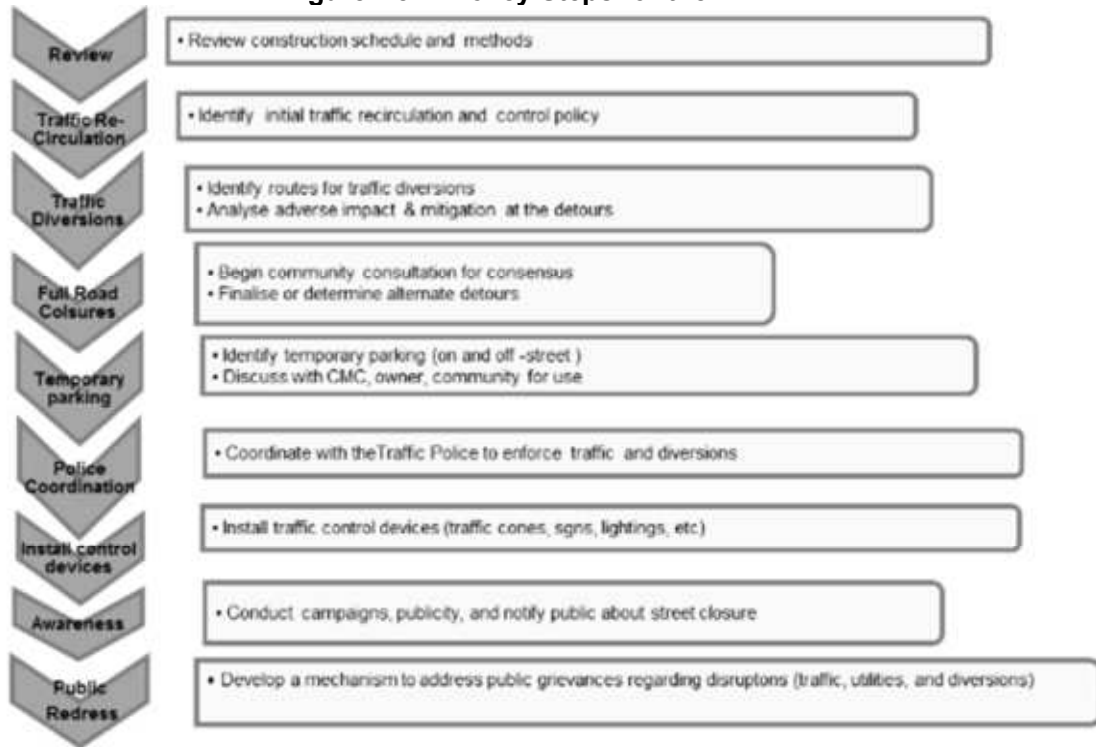
C. Analyze the Impact Due to Street Closure

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”).

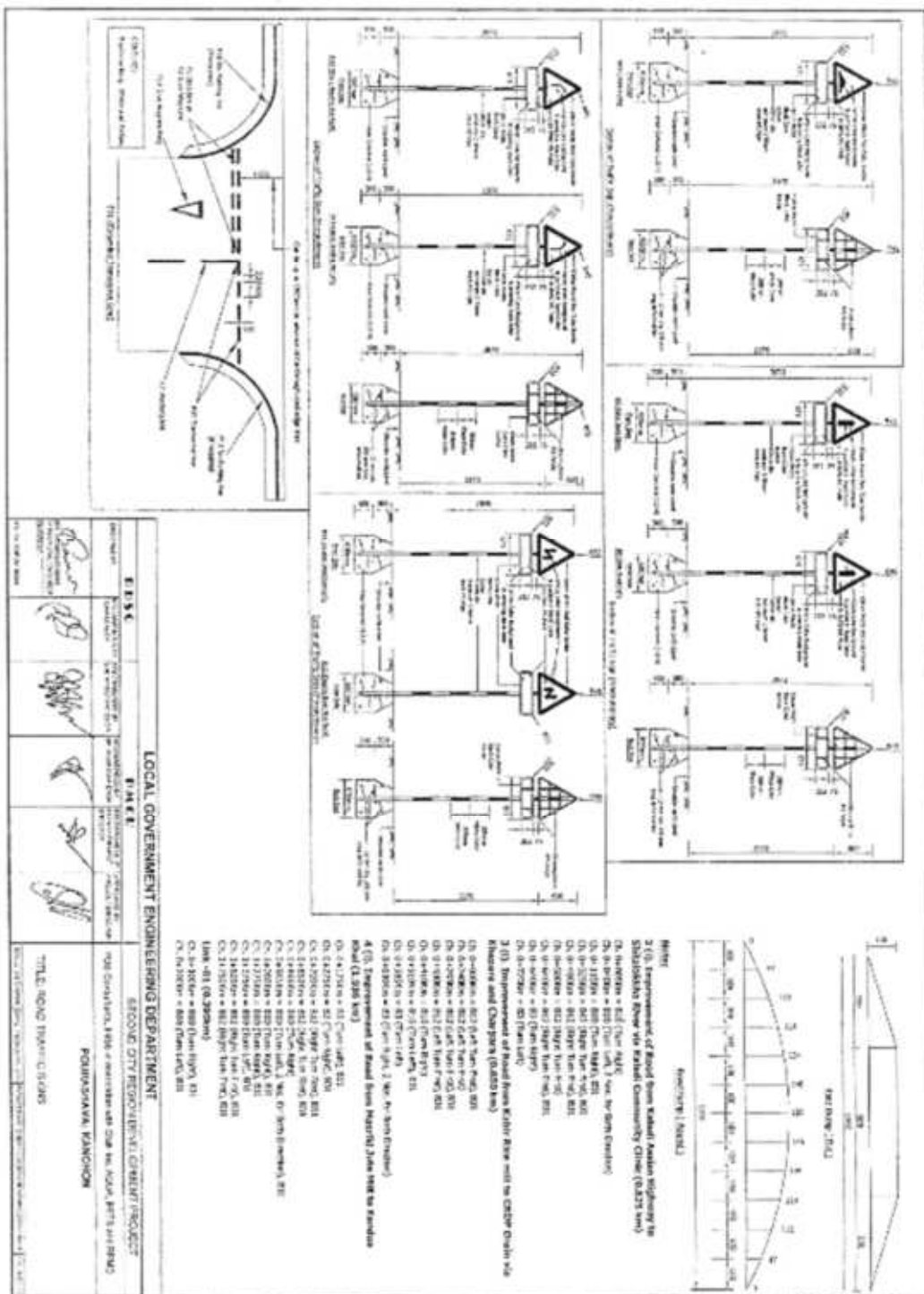
13. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs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

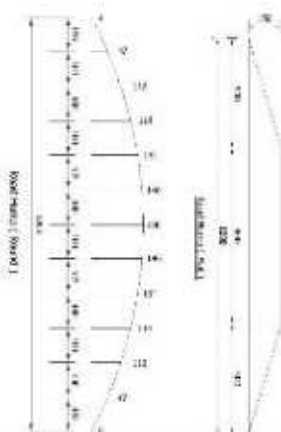
14. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type)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

17. Specific information on road safety measures (structural and non-structural) considered for the 4 (four) candidate subproject scheme roads are shown and described in the figures below:

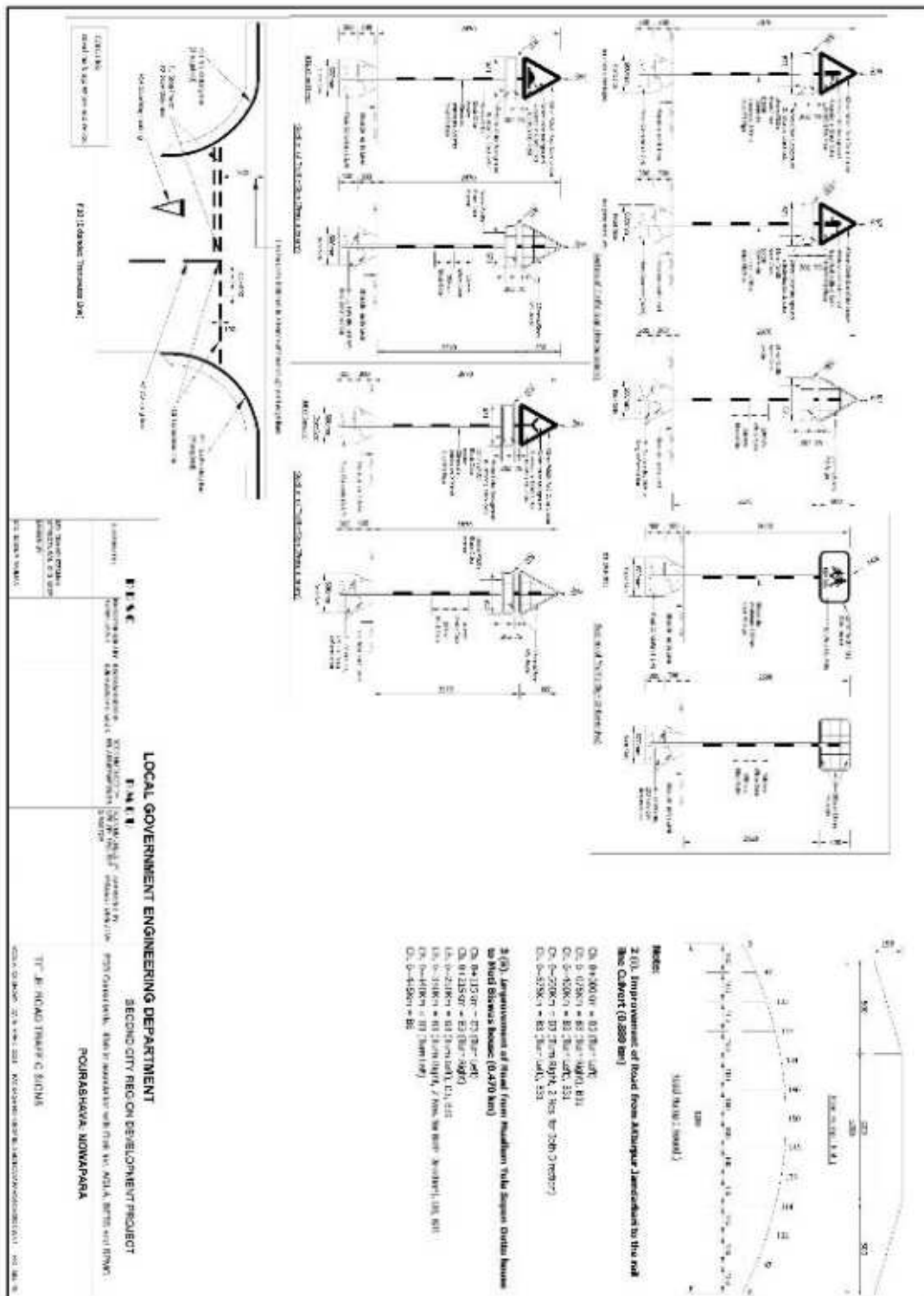


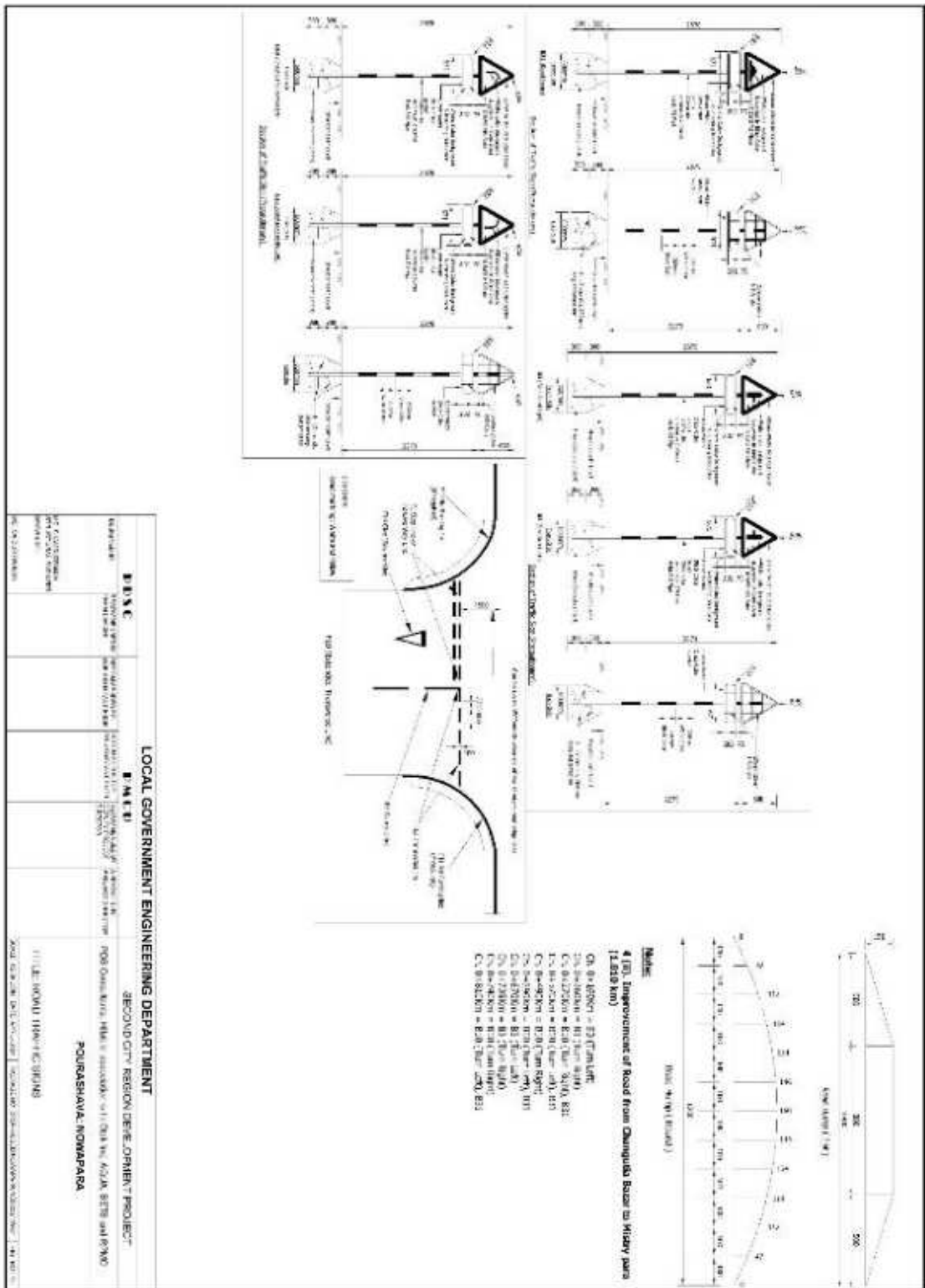


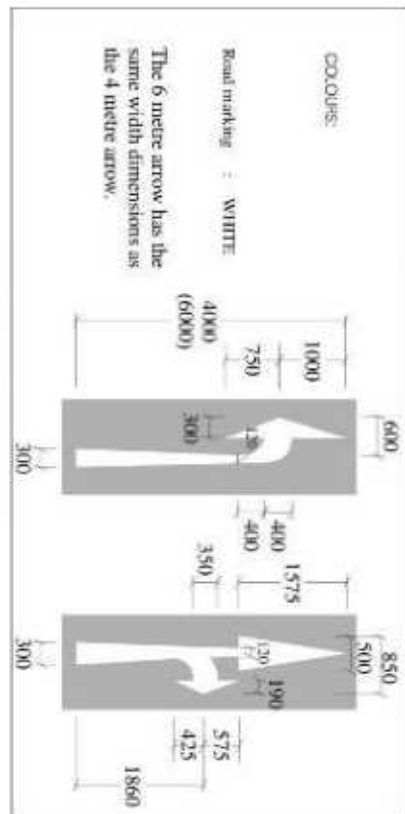
1 (i). Improvement of Road from Nowgurni Link Road to model College (1.000 km)

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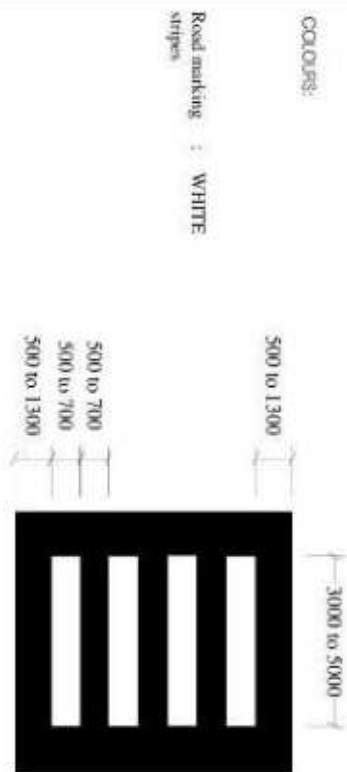
800.423.0266 • 703.378.1271 • FAX 703.378.1272



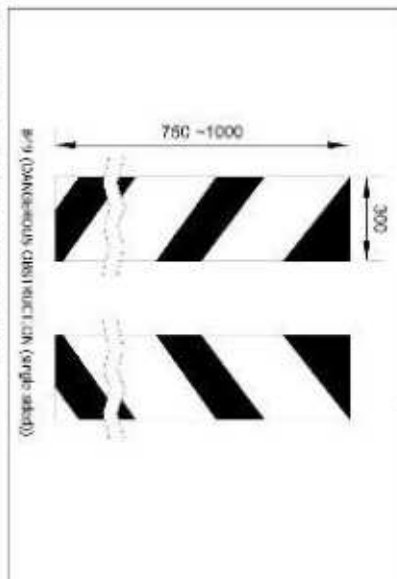
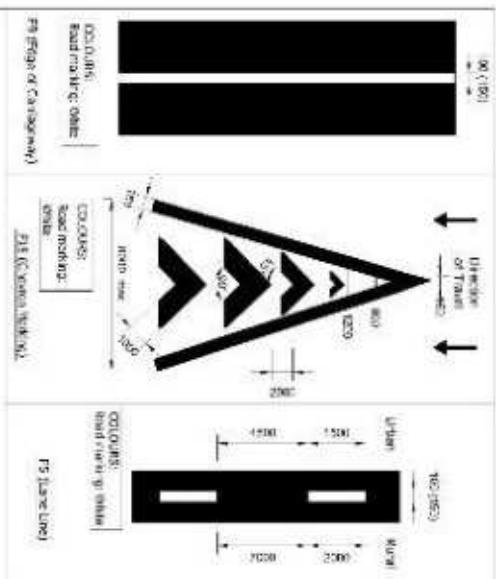




F12 (Traffic Lane Arrows)



F3 (Pedestrian Crossing)



LOCAL GOVERNMENT ENGINEERING DEPARTMENT

SECOND CITY REGION DEVELOPMENT PROJECT

POURASHAWA: MONAPALCA

TITLE ROAD TRAINING STUDY

[illegible]

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)	
<i>Location/zoning permits</i>		
<i>Permit to construct</i>		
<i>Building permit</i>		
<i>Transport / hauling permits</i>		
2. Compliance with IEE Requirements	(Approved / Under Preparation / Submitted to PIU for Approval)	
<i>Site-specific EMP (SEMP)</i>		
<i>Corrective Action Plan, if any</i>		
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		
- Sleeping utilities (e.g. beds, pillows, blankets, mosquito nets, etc.)		
- Power/Electricity supply		
- Drinking water supply		

Monitoring Item	Status	Remarks
- 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)	
<i>Complaints</i>		
<i>Complaints resolution</i>		
5. Environmental Quality Measurement	(Passed / Failed / Not Applicable)	
<i>Ambient air quality sampling</i>		
<i>Noise level measurement</i>		
<i>Receiving water quality sampling</i>		

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?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	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 of solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	a) Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	b) Is any wastewater discharged to storm drains?				
	c) Is any wastewater being treated prior to discharge?				
	d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
7.	Dust Control	Yes	No	NA	
	a. Is the construction site watered to minimize generation of dust?				
	b. Are roads within and around the construction sites sprayed with water on regular intervals?				
	c. Is there a speed control for vehicles at construction sites?				
	d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	e. Are construction vehicles carrying soils and other spoils covered?				
	f. Are generators provided with air pollution control devices?				
	g. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?				
8.	Noise Control	Yes	No	NA	
	a) Is the work only taking place between 7 am and 7 pm, week days?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	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?				
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: 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

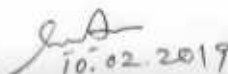
Date: 10/02/2019

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.



(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 Araihaaz 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 Araihaaz 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.



1/4

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 14: 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/ 72

Date: 11/05/2022

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 received on 21/03/2022.

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, 2023. 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.


(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 15: Sample outline of OHS, COVID-19 H&S Plan and Waste Management Plan

A. Sample outline of OHS plan

Si no	Activity	Hazard Associated with the activity		Condition	Impact	Control	Use of PPE
1	Mobilization, Clearing and Grub binging.	Injury during falling from height, materials handling, electric shock, slip & trip, vehicle movement etc.		Routine	Human injury & construction hampered	Awareness build up, cleaning and daily checkup.	Hand gloves, Helmet, visible vest and boot
2	Earth / Sand Filling work	Injury during falling from height, materials handling, electric shock, slip & trip, vehicle movement etc.		Routine	Human injury & construction hampered	Awareness build up, Cleaning and daily checkup.	Hand gloves, Helmet, visible vest and boot
3	Excavation	Injury during falling from height, materials handling, slip & trip, vehicle movement, edge collapse etc.		Routine	Human injury & construction hampered	Awareness build up, cleaning and daily checkup.	Hand gloves, Helmet, visible vest and boot
4	Concrete Mixing /setting, carrying etc.	Chemical Hazard, Injury during materials handling, falling, electric shock, slip & trip, vehicle movement etc.		Routine	Human injury & Construction hampered	Follow SOP, Awareness build up, cleaning & daily	Hand gloves, Helmet, visible vest and boot
5	Electrical switchboard, wiring etc.	Noise, injury during materials handling, falling from high, electric shock, slip & trip, vehicle movement etc. during performing work.		Routine	Human injury & Construction hampered	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
6	Steel bar cutting, bending, welding etc.	Noise, injury during materials handling, falling from high, electric shock, slip & trip, vehicle movement etc. during performing work.		Routine	Human injury & construction hampered.	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
7	Wood / steel shutter making, erection, handling etc. work	Injury during materials handling, falling from high, electric shock, slip & trip, vehicle movement etc. during performing work.		Routine	Human injury & construction hampered	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot

8	Asphalt / Prime Coat / Tack Coat laying, Dense Bituminous Surfacing, Scarify & hard bed preparation painting works	Injury during materials handling, slip & trip, vehicle movement, fire etc. during performing work.		Routine	Human injury & construction hampered	Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
9	Plant, equipment, Vehicles movement.	Noise, stuck by, slip & trip, Injury during performing work.		Routine	Human injury & Construction hampered	Traffic management; Follow SOP, Awareness build up, cleaning & daily checkup.	Hand gloves, Helmet, visible vest and boot
10	Materials handling	Injury during falling from high, materials falling, electric shock, slip & trip, platform Collapse etc.		Routine	Human injury & construction hampered	Awareness build up, cleaning and daily checkup	Hand gloves, Helmet, visible vest and boot
11	Fire safety	Fire due to electric short circuit, asphalt laying & welding works		Routine	Human injury /fatality & construction Hampered.	Awareness build up & training, cleaning and daily checkup	Hand gloves, Helmet, visible vest and boot
12	Plaster / Brick on End Edging work, Sand blinding, Flush Pointing etc.	Stuck by, contact with chemicals, slip & trip, materials falling, etc.		Routine	Human injury /fatality & construction hampered.	Awareness build up, supervision training.	Hand gloves, Helmet, visible vest and boot
13	Shutter Dismantling	Falling from high, shutter collapse, electric shocked.		Routine	Human injury & product hampered	Awareness build up, supervision training.	Hand gloves, Helmet, visible vest and boot

B. Sample outline of COVID-19 H&S plan

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APPENDIXES

Appendix-1: Coronavirus – A toolbox talk for construction workers

Appendix-2: List of Useful Documents and Websites on COVID-19

c. Sample outline of Waste Management Plan

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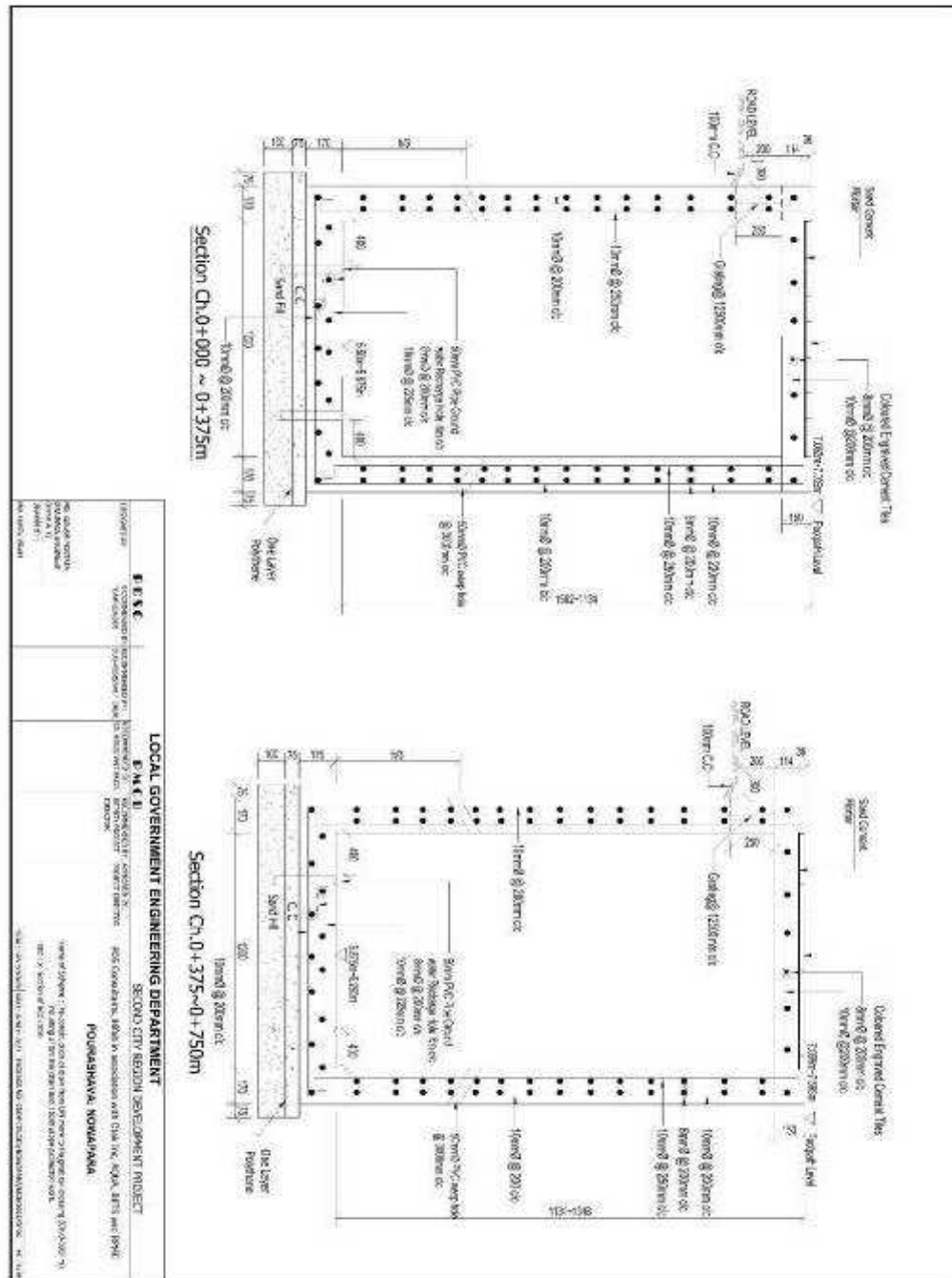
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Appendix 16: Environmental and Social Risk Assessment Matrix (without application of mitigation measures)

Project Phases and Activities	Physical		Water	Ecology			Socio-Economic		
	Noise	Odor	Water Contamination	Scavenging Animals	Aquatic Diversity	Terrestrial Vegetation	Occupational Health Hazard	Waste Management	Employment Generation
Pre-Construction Phase									
Land cleaning and development	-	-	-	-	-	MN	-	-	MP
Construction of labor camps	MN	-	MN	-	-	MN	-	MN	MP
Billboard display at construction site	-	-	-	-	-	-	-	-	-
Construction Phase									
Construction material unloading	MN	-	-	-	-	-	-	-	MP
Earth works	MN	-	-	-	-	MN	MN	-	HP
Construction of drainage system	-	-	MN	-	-	-	-	-	HP
Improvement of road and footpath	MN	-	MN	-	-	MN	-	-	HP
Monitoring of EMP works	HP	-	-	-	-	HP	MP	MP	-
Post-Construction Phase									
Post construction site cleaning	MN	-	MN	-	-	-	-	MN	MP
Solid waste generation	-	MN	MN	MN	-	-	-	MN	MP
Monitoring of EMP works considering measures	HP	HP	HP	MP	MP	HP	MP	HP	HP

Note: *Highly negative (adverse) impact (HN); Moderately negative impact (MN); Insignificant impact (I); Highly positive (beneficial) impact (HP); Moderately positive impact (MP); No impact (NI)*

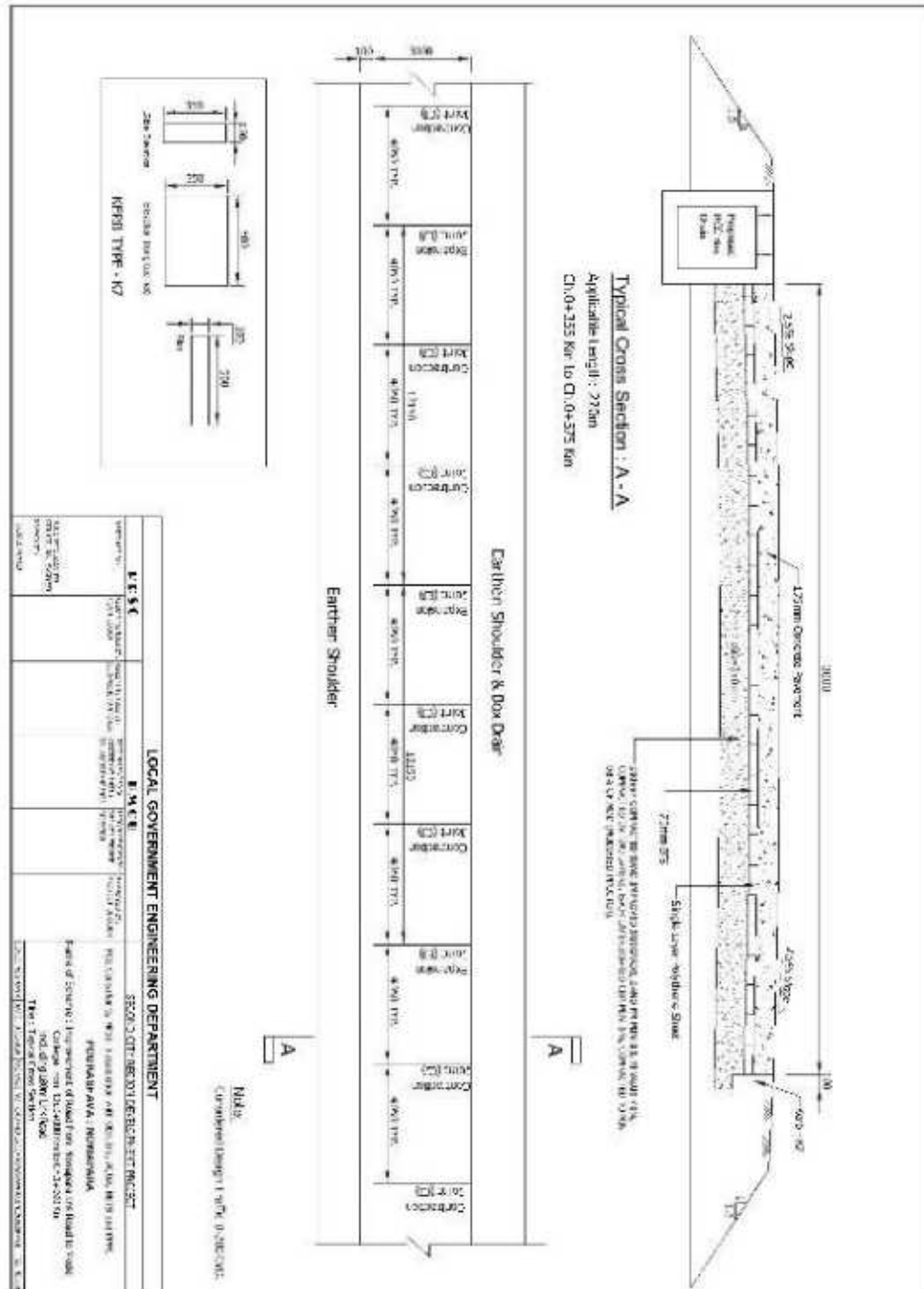
Scheme no. 1: Cross section of Re-construction of drain from DN more to Rajghat rail crossing (Ch.0-3301m) including 245m link drain and 150m slope protection work



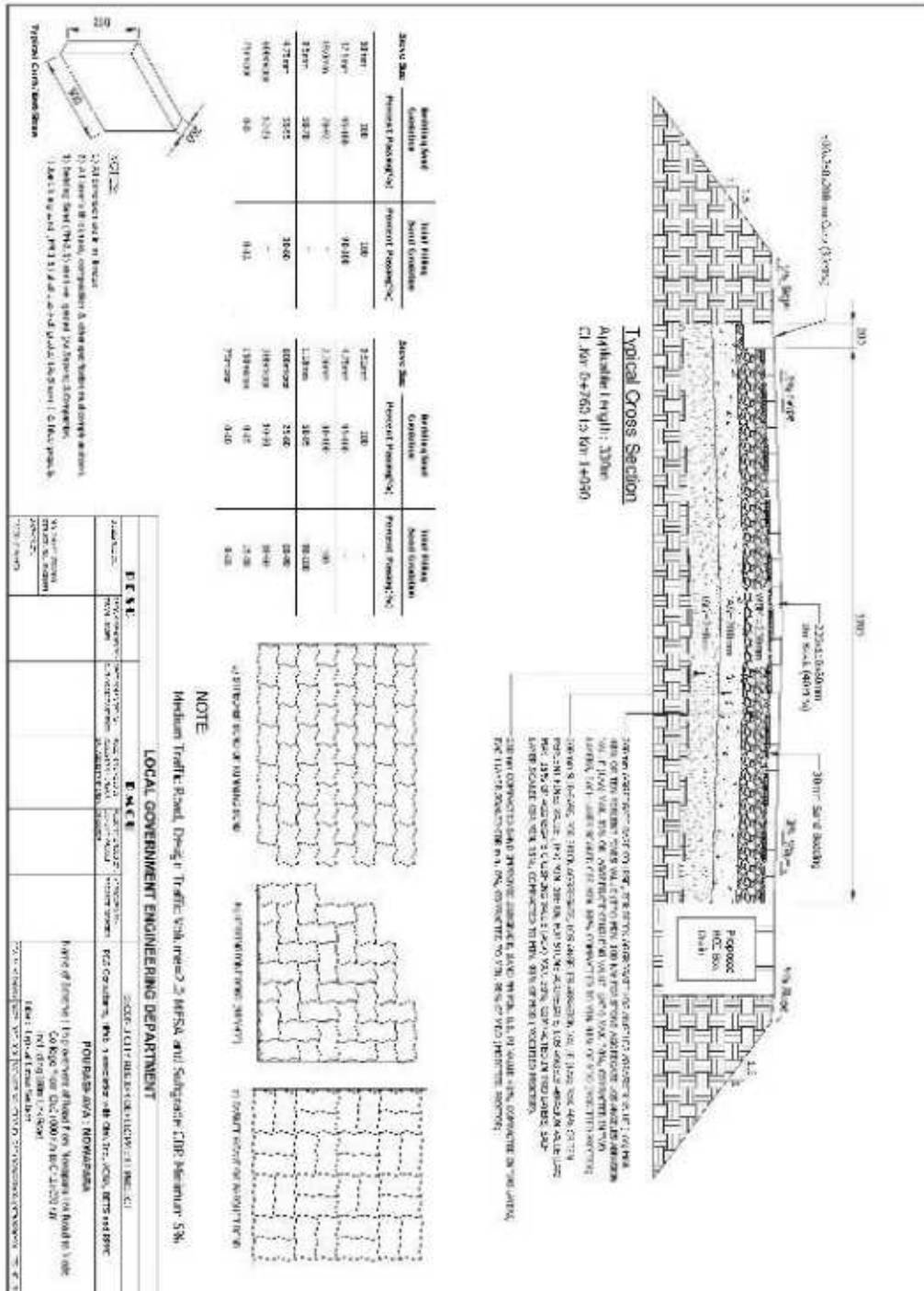
Typical section (Ch. 0+000 – 0+355 km)



Typical section (Ch. 0+355 – 0+575 km)



Typical section (Ch. 0+760 – 1+090 km)



Typical Cross Section - A-A
 Applicable length: 1500m
 C10+500 for C10+100 km (148-01)

Earthen Shoulder & Box Drain

ITEM NO.	DESCRIPTION	UNIT	QUANTITY	REMARKS
1	Earthen Shoulder (1500mm wide)	m ²	1500	
2	Box Drain (150mm wide)	m ²	150	
3	Earthen Shoulder (1500mm wide)	m ²	1500	

LOCAL GOVERNMENT ENGINEERING DEPARTMENT

PROJECT: 2021-2022 ROAD IMPROVEMENT PROJECT

SECTION: 1500mm wide earthen shoulder and box drain

DATE: 15/05/2022

BY: [Signature]

CHECKED: [Signature]

APPROVED: [Signature]

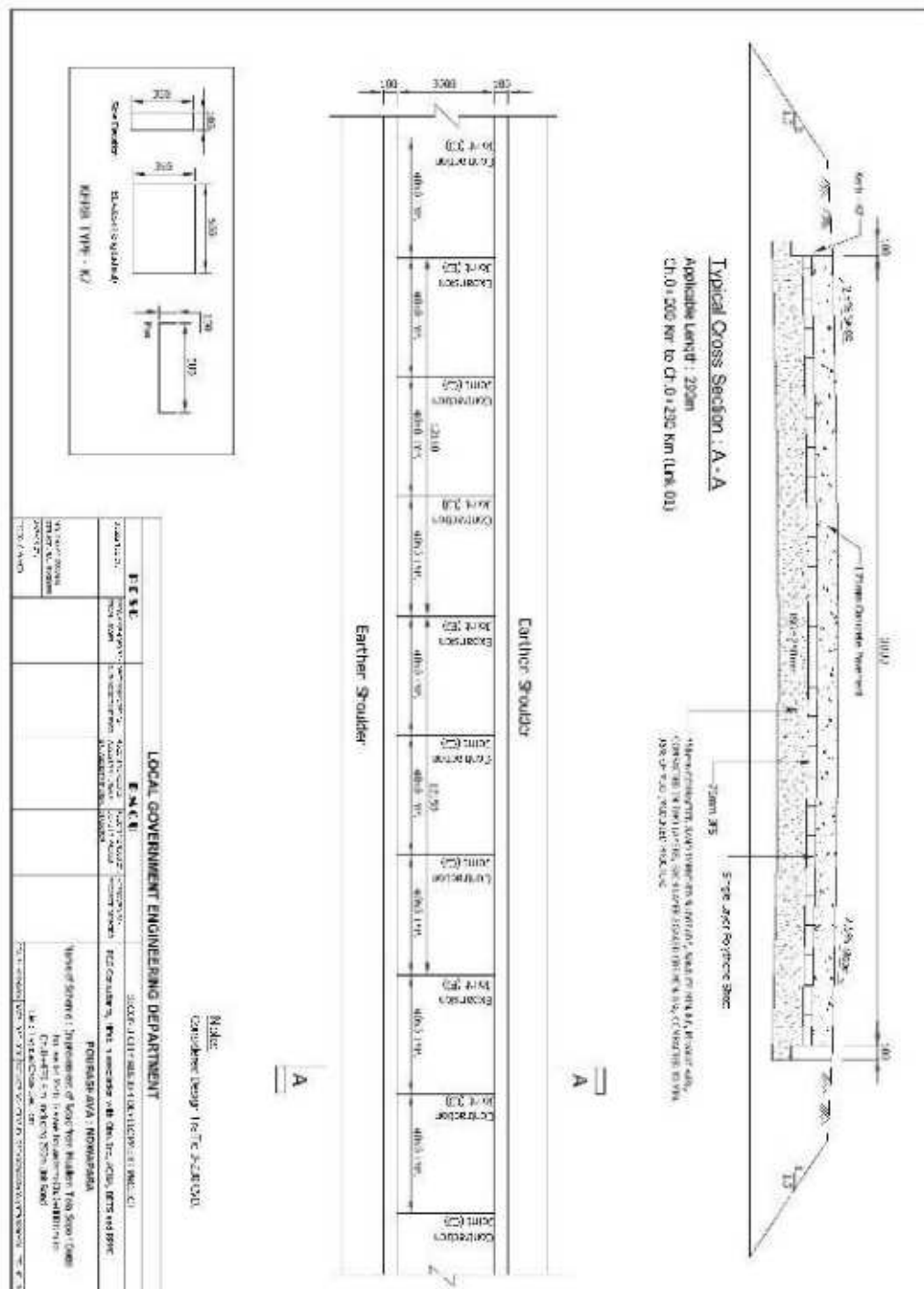
Typical section (Ch. 0+625 – 0+880 km) (Link-01)



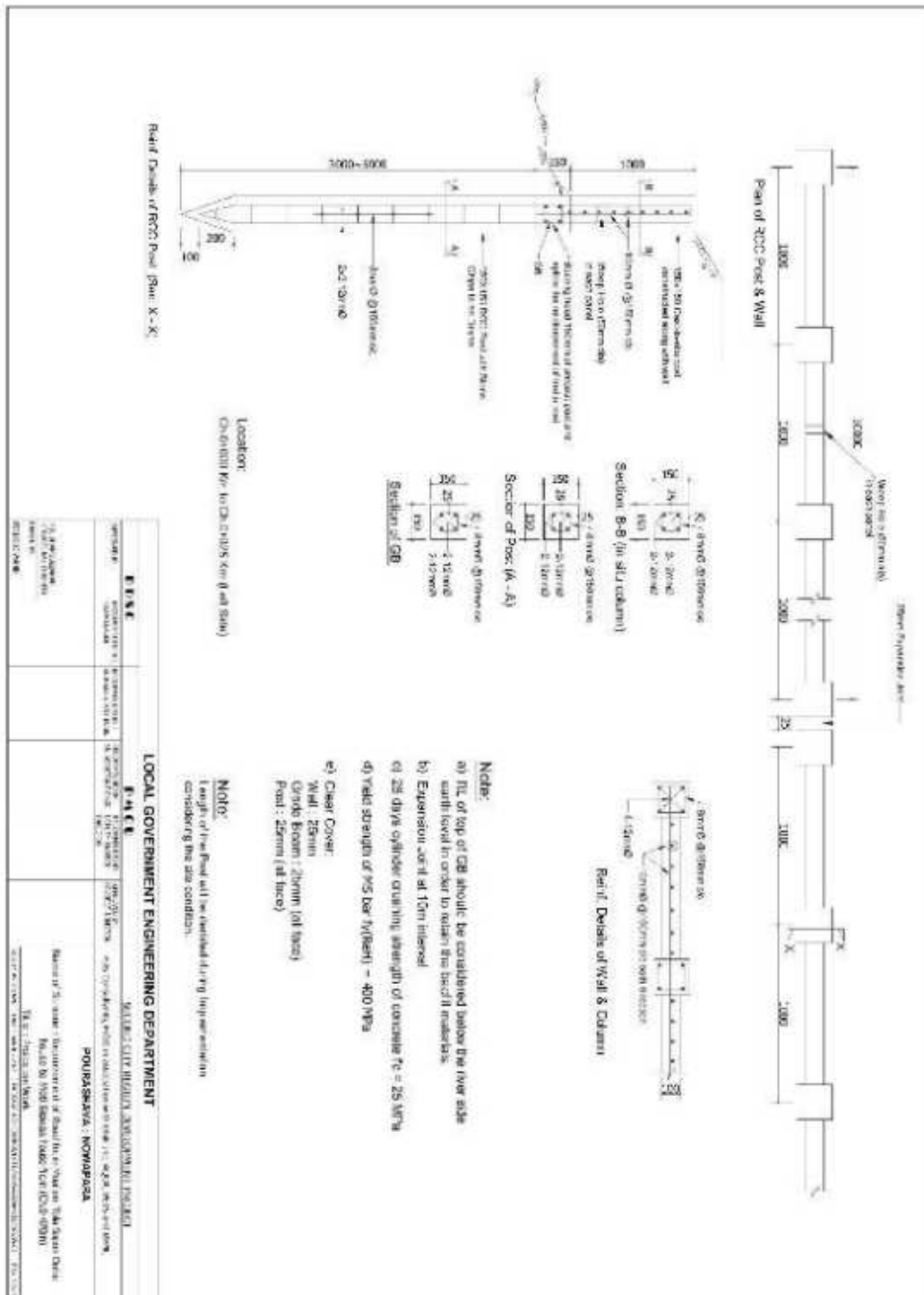
(Cross section of RCC Drain)



Typical section (Ch. 00+ 290 km)



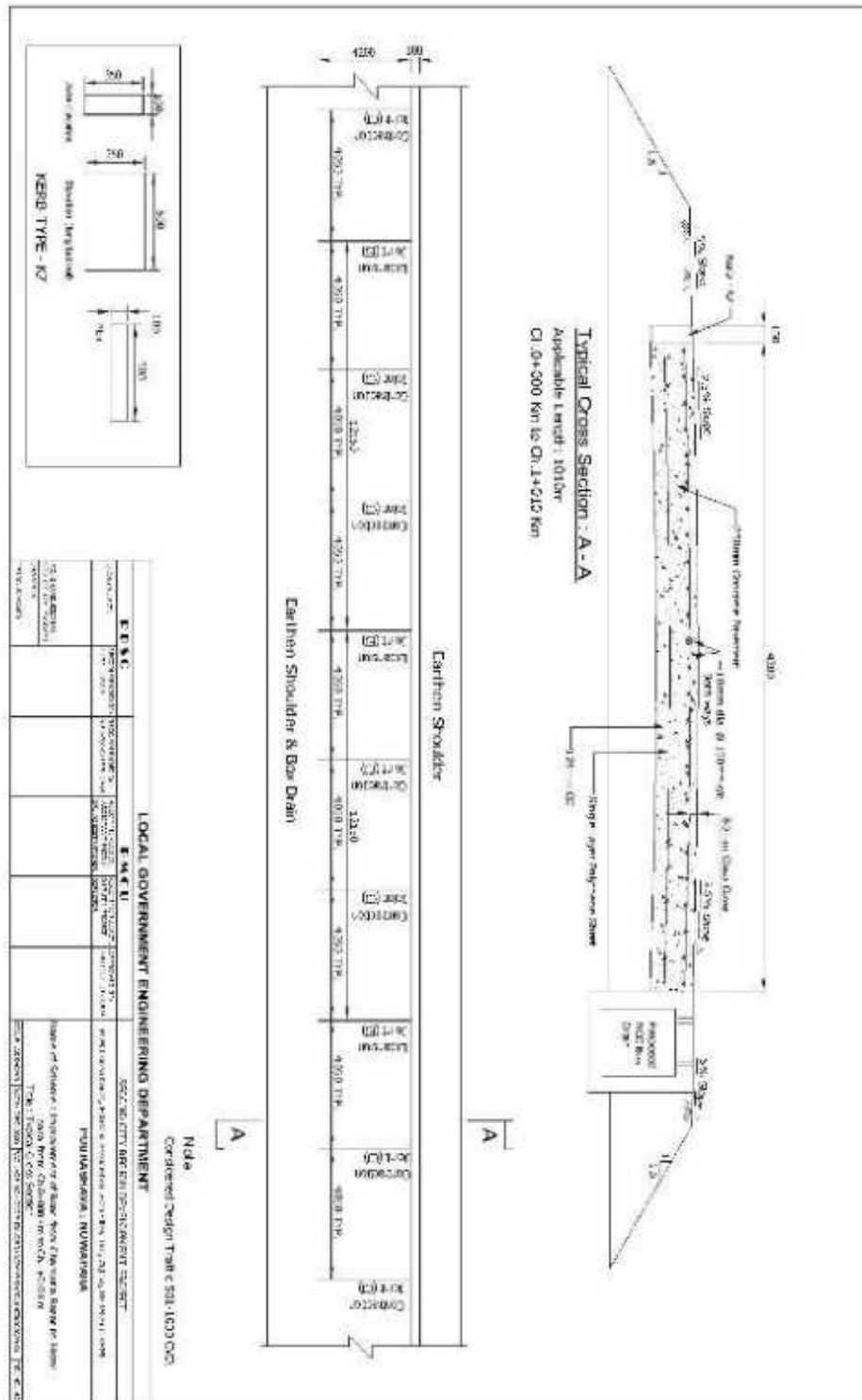
Scheme 4: Cross section of proposed Protection works at Ch. 00m – 25m



[illegible]

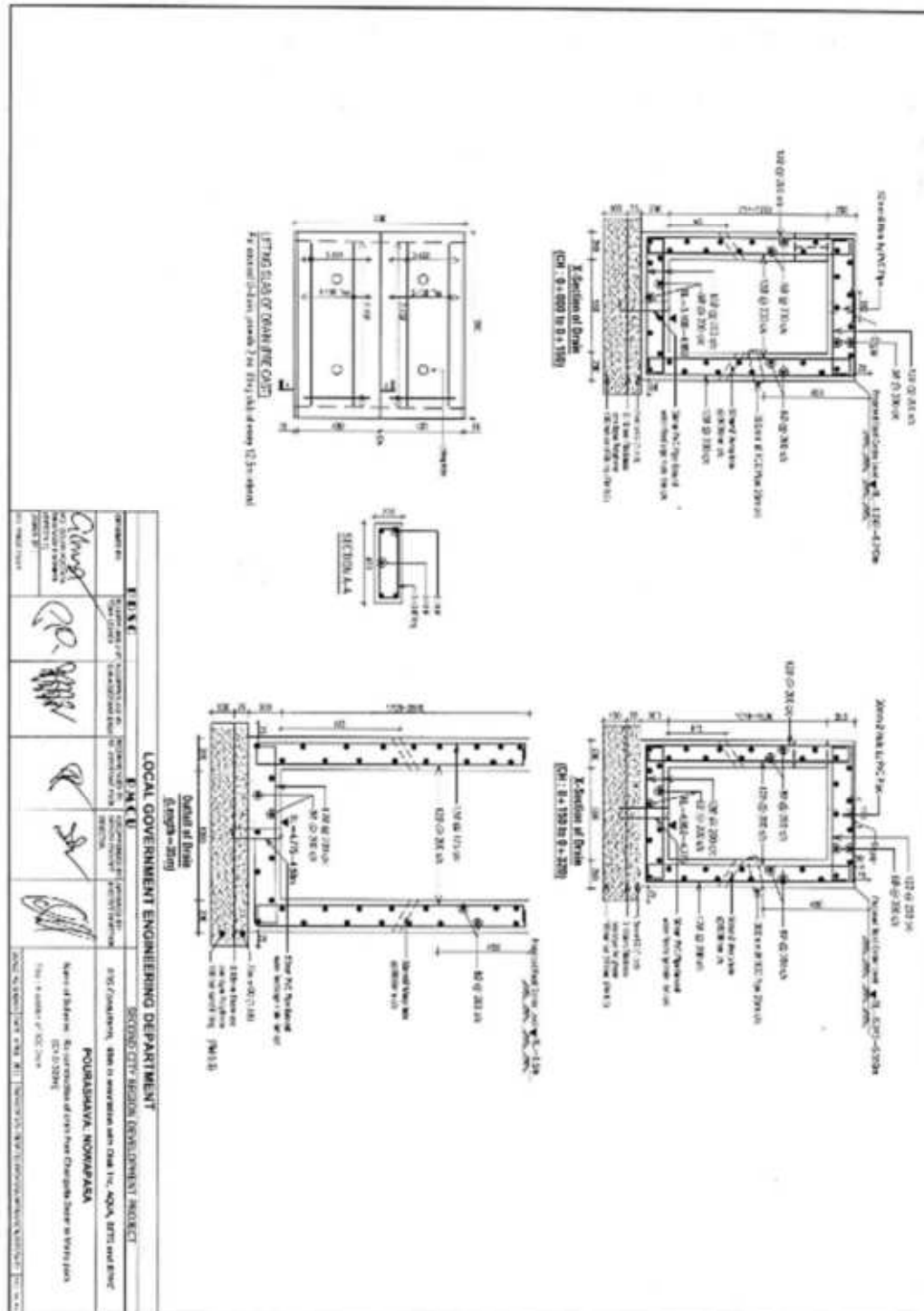
Scheme no. 5: Improvement of Road from Changutia Bazar to Mistry Para (Ch.0-1010m)

Typical section (Ch. 00+ 1010 km)



[illegible]

**Scheme 5: Re-construction of drain from Changutia Bzar to Mistry Para (Ch.0-320m)
(Cross section of RCC Drain)**



[illegible]

Appendix 18: Dust Suppression Log Chart

LOCAL GOVERNMENT ENGINEERING DEPARTMENT
City Region Development Project-II
LGED Headquarters, Dhaka

Dust Suppression Log Chart (ধুলা নিয়ন্ত্রন কার্যক্রমের লগ চার্ট)

Name of sub-project:	
Scheme name of sub-project:	
District:	Upazila:

Month:

Sl. No.	Date	Period of spraying water			Signature of the contractor's representative	Signature of the supervising engineer
		Morning	Mid-day	Afternoon		
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
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