Initial Environmental Examination

Project No. 49329-006
October 2022

Bangladesh: Second City Region Development Project

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

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

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/DHAMRAI/NCB/2021/W-01.This package includes combination of construction and rehabilitation of the following road alignments or components in the Dhamrai Pourashava in Dhaka region:

(i) Improvement of road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria;
(ii) Construction of drain from South West Corner of Bata Shoe Company to Bangshi River at Saibaria;
(iii) Improvement of road from Kaliagar Protiva School to Islampur Rishipara ;
(iv) Re-construction of drain from Kaliagar Protiva School to Islampur Rishipara ;
(v) Improvement of road from Rice Mill to Bangshi River at Kumrail Tekpara ;
(vi) Construction of drain from Rice Mill to Bangshi River at Kumrail Tekpara;
(vii) Improvement of road from Dhamrai Bazar to Bangshi River at Kagojipara;
(viii) Re-construction of drain from Dhamrai Bazar to Bangshi River at Kagojipara;

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 8 (eight) subproject roads and drains is 4.525km and 4.312km respectively. 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 rural 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 Dhaka 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 are 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 has been strengthened with external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. PIUs have been established at the Upazila or local level where Second CRDP subprojects are located. In this subproject, Dhamrai Upazila is serving as the PIU. The PMCU and Dhamrai PIU have the responsibility for overseeing subproject management, including overseeing EMP implementation.

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

Monitoring and Reporting. 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 Dhaka 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 PIU (Dhamrai Pourashava). 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

14. 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.

15. 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.

16. 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/DHAMRAI/NCB/2021/W-01, which includes combination of construction and rehabilitation of the following road alignments or components in the Dhamrai Pourashava in Dhaka city region:

[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*.

(i) Improvement of road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria;
(ii) Construction of drain from South West Corner of Bata Shoe Company to Bangshi River at Saibaria;
(iii) Improvement of road from Kaliagar Protiva School to Islampur Rishipara ;
(iv) Re-construction of drain from Kaliagar Protiva School to Islampur Rishipara ;
(v) Improvement of road from Rice Mill to Bangshi River at Kumrail Tekpara ;
(vi) Construction of drain from Rice Mill to Bangshi River at Kumrail Tekpara;
(vii) Improvement of road from Dhamrai Bazar to Bangshi River at Kagojipara;
(viii) Re-construction of drain from Dhamrai Bazar to Bangshi River at Kagojipara;

B. Purpose of the Initial Environmental Examination

17. 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.

18. Screening using ADB's rapid environmental assessment checklist for road (**Appendix 1**) was initially conducted, and results of the rapid assessment show that the project is unlikely to cause any 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 **Error! Reference source not found.**& 2.

C. Extent of the Study

20. 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

21. 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.

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

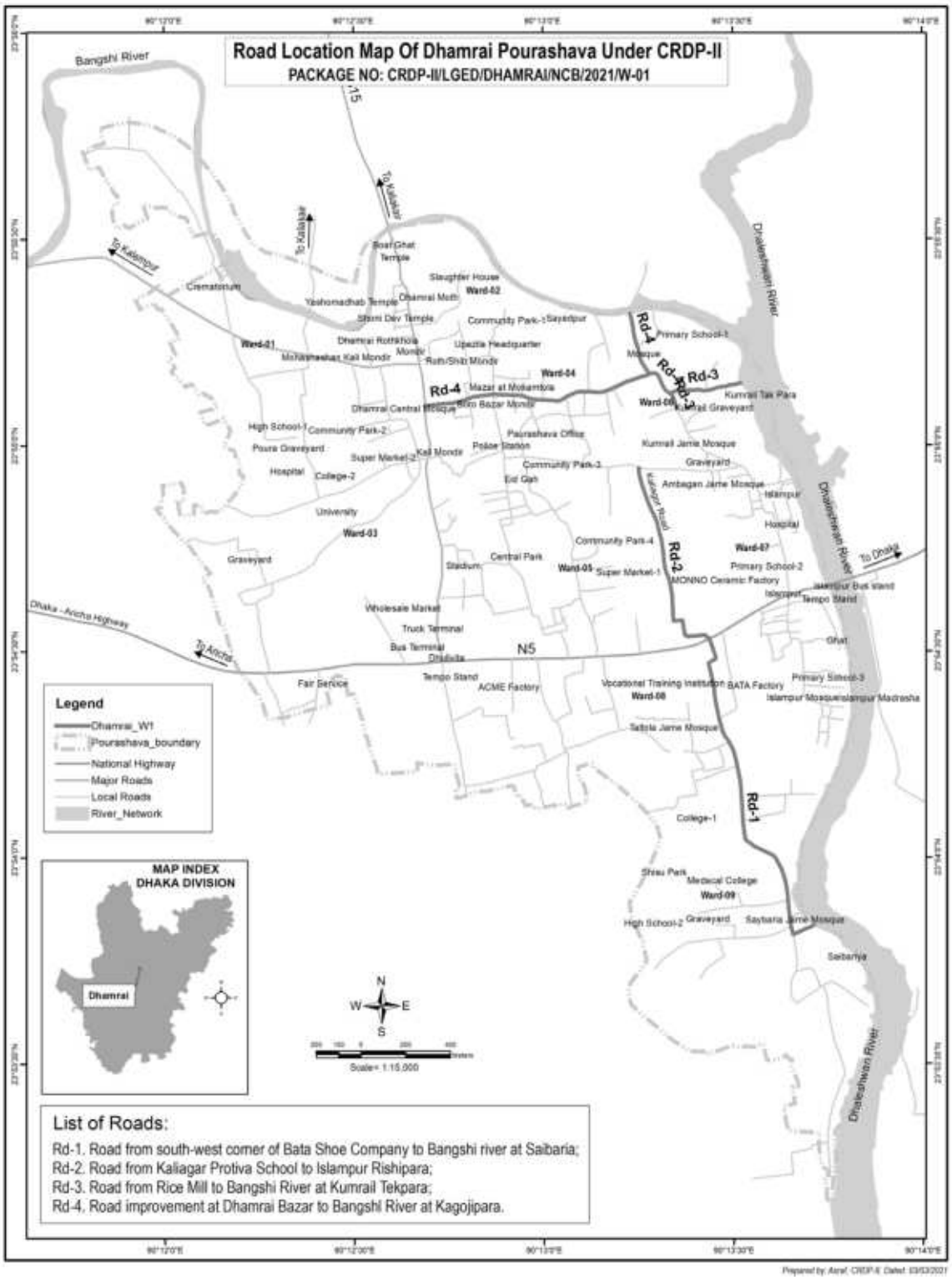


Figure 2: Location Map of Dhamrai Package W-01 Subproject on Google Map (Red Lines)

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

22. 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

23. 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]

24. **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.

25. **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.

26. **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.

27. **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.

28. **Consultation and Participation.** PMCU and Dhamrai PIU have carried out meaningful consultation[6] at Dhamrai Pourashava Office on 8/12/2019 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 8**).

29. **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.

30. **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.

31. **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.

32. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMCU and PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to subprojects. When the Government of Bangladesh

[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.

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.

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

34. 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]

35. **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.

36. **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.

37. **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.

38. **Bidding and Contract Documents.** IEE, which contain the EMP, shall be included in bidding and contract documents and verified by PIU. The PMCU and PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors

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

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

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

to (i) comply with all other conditions required by ADB;[10] and (ii) to submit to PIU, for review and approval, a site-specific environmental management plan (SEMP), including (i) proposed sites/locations for construction work camps, storage areas, hauling roads, lay down areas, disposal areas for solid and hazardous wastes; (ii) specific mitigation measures following the approved EMP; (iii) monitoring program as per 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.

39. **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

40. **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.

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

Table 1: Summary Environmental Clearance Application Requirements Per Categorya

[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.

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.

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

42. 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

	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

43. The application and requirement for issuance of ECC are described in the ECR, 1997 and summarized in

44. **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

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

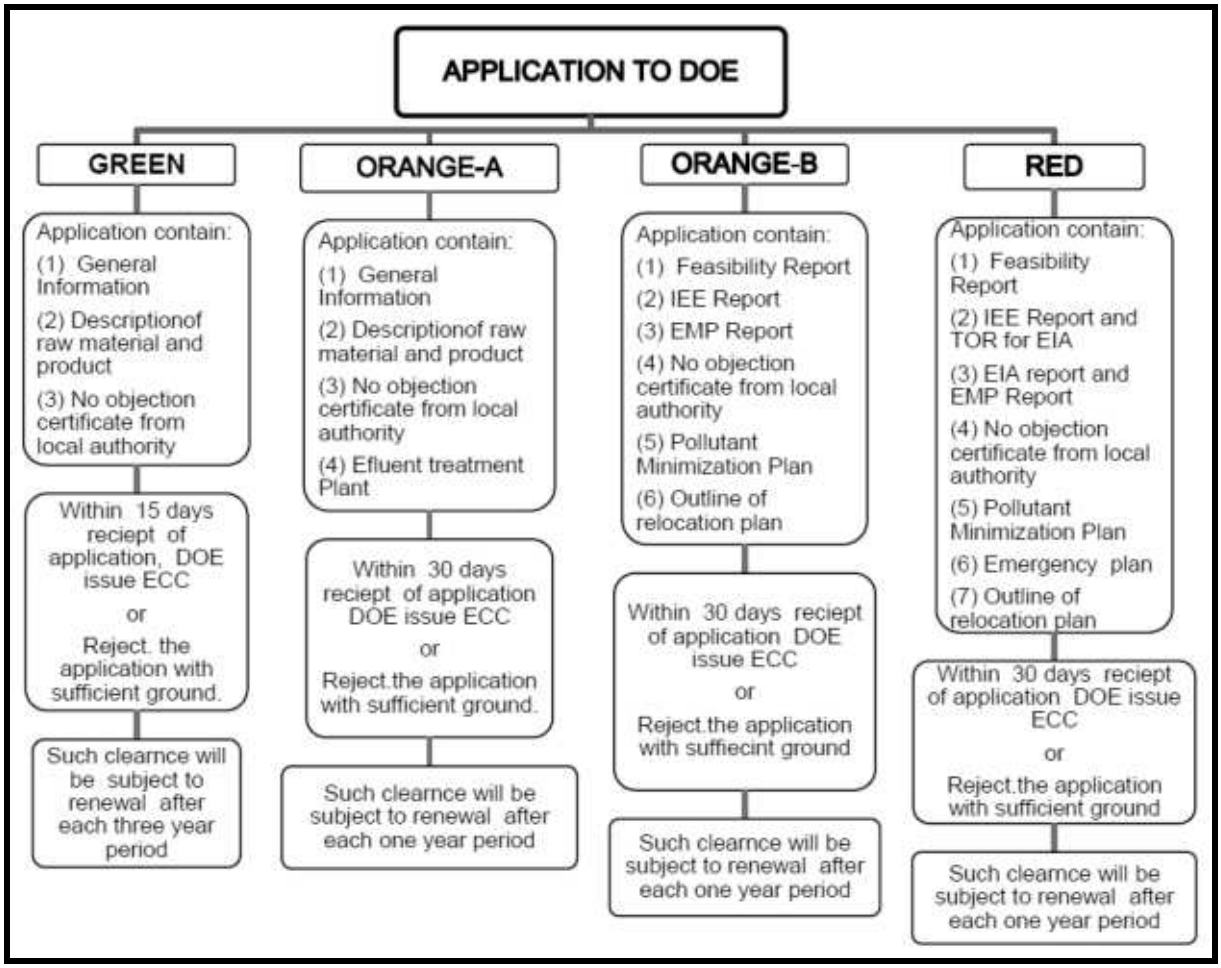
46. For obtaining the environmental clearance certificate (ECC) from DOE for the Second CRDP, an application was filed by PMCU vide LGED memo 46.02.000.913.99.001. 1-07; dated 30/08/2018 and 27/12/2018. Accordingly DOE issued an Environmental Clearance Certificate for Second CRDP subprojects (up through Orange B) involving construction and rehabilitation of roads and associated drainage subprojects in Dhaka region by means of a letter No. DOE/ Clearance/5194/2013/ (clearance Certificate Number 53)/ issue Date 10/02/2019 (**Appendix 18**). Construction and Rehabilitation of Roads and associated drainage improvements of Dhamrai Pourashava Package W-01 subprojects are categorized as Orange B category projects, and are exempt from further review requirements under DOE rules. [12]

47. **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.

[11] www.doe-bd.org

[12]By PMCU, the required fee for ECC application and other necessary documents was submitted to DOE on 30 August, 2018.

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

48. 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)

Notes:
[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)

Notes:
(a) Not to be exceeded more than once per year.
(b) The objective is attained when the annual arithmetic mean is less than or equal to 50 ug/ m^3.
(c) The objective is attained when the expected number of days per calendar year with a 24- hour average of 15 µg/ m^3 is equal to or less than 1.
(d) The objective is attained when the expected number of days per calendar year with the maximum hourly average of 0.12 ppm is equal to or less than 1

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_q in dBA)		Applicable Per ADB SPS[c] (dBA)	
	Day	**Night**	**07:00 – 22:00**	**22:00 – 07:00**	**Day time**	**Night time**
Industrial area	75	70	70	70	70	70
Commercial area	70	60	70	70	70	60
Mixed Area	60	50	55	45	55	45
Residential Area	55 *(6 am to 9 pm)*	45 *(9 pm to 6 pm)*	55	45	50	40
Silent Zone	50	40	55	45	45	35

Notes:

[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^5[d] 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/100 ml
Standard per ECR,1997 (Schedule 3A)	6.5-8.5		5 0r 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^5[d] (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

49. 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 *khals* through dredging and de-siltation work.	CRDP-2 is relevant to the BCCSAP's programs and will contribute towards achieving the objective of restoration of the network of rivers and *khals* through dredging and de-siltation work
The Embankment and Drainage Act (1952)	This Act describes the protection of embankments and drainage facilities	The Embankment and Drainage Act (1952) is applicable to CRDP-2 as the project will support

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 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.	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 all related issues within their legal and administrative mandate.	The subproject aims to help Dhamrai Pourashava (as the LGI) achieve or fulfill these mandates.

Laws, Regulations, and Standards	Details	Relevance/Applicability
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

50. **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.

International Environmental Agreement	Year Ratified	Details	Relevance
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

49. The proposed subproject is a combination of construction and rehabilitation of the following road alignments or components:

i) Improvement of road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Ch. 0 - 1565m);
ii) Construction of drain from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Ch. 8 - 1560m);
iii) Improvement of road from Kaliagar Protiva School to Islampur Rishipara (Ch.0 - 920m);
iv) Re-construction of drain from Kaliagar Protiva School to Islampur Rishipara (Ch. 0 - 810m) including 75m link drain;
v) Improvement of road from Rice Mill to Bangshi River at Kumrail Tekpara (Ch.150 - 465m);
vi) Construction of drain from Rice Mill to Bangshi River at Kumrail Tekpara (Ch. 0 - 425m);
vii) Improvement of road from Dhamrai Bazar to Bangshi River at Kagojipara (Ch. 0 - 1295m)
viii) Re-construction of drain from Dhamrai Bazar to Bangshi River at Kagojipara (Ch. 0 - 1300m)

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: Roadway Improvement Components

Road No.	Description	Length, (km)	Existing Carriageway Width, (m)	Existing Vacant Road Width, (m)
i)	Improvement of road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Ch. 0 - 1565m);	1.565	3.0	3.4-10.0
ii)	Construction of drain from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Ch. 8 - 1560m);	1.552	3.0	3.4-10.0
iii)	Improvement of road from Kaliagar Protiva School to Islampur Rishipara (Ch.0 - 920m);	0.92	3.0 ~ 3.7	4.4 ~ 8.31
iv)	Re-construction of drain from Kaliagar Protiva School to Islampur Rishipara (Ch. 0 - 810m) including 75m link drain	0.810	3.0 ~ 3.7	4.4 ~ 8.31
v)	Improvement of road from Rice Mill to Bangshi River at Kumrail Tekpara (Ch.150 - 465m);	0.315	3.0	3.8-7.8

Road No.	Description	Length, (km)	Existing Carriageway Width, (m)	Existing Vacant Road Width, (m)
vi)	Construction of drain from Rice Mill to Bangshi River at Kumrail Tekpara (Ch. 0 - 425m);	0.425	3.0	3.8-7.8
vii)	Improvement of road from Dhamrai Bazar to Bangshi River at Kagojipara (Ch. 0 - 1295m)	1.295	3.0 ~ 5.0	5.3 ~ 9.3
Viii)	Re-construction of drain from Dhamrai Bazar to Bangshi River at Kagojipara (Ch. 0 - 1300m)	1.3	3.0 ~ 5.0	5.3 ~ 9.3

B. Existing Condition of Subproject Components

Road:1 Improvement of road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Ch. 0 - 1565m);

50. **Road Location:** The subproject is 1.565km long, one of the 1st priority readiness road sub project of selected Link Roads, start from South West Corner of Bata Shoe Company (N 23°54'31.81" and E 90°13'26.24") and ends near the western bank of Dhaleshwari River at Saibaria. (N23°53'50.052" and E 90°13'42.69"). It passes through several Bazars, villages and agricultural/open fields. The area is predominantly agricultural, but currently, many small and large industries are developing in the subproject area. Existing vacant road width varies along the road; minimum 3.4 m at Ch. 1500m and maximum is 10m at Ch. 1150m. Existing carriageway width also varies between 3.0 ~ 3.7m at several chainages along the road alignment.

51. **Road Condition***:* The carriageway width varies between 3.0 ~ 3.7m at several chainages along the road alignment. The existing road surface is made of partly BC and partly earthen, 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 4** shows some of the existing conditions of this road.

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

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

54. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 3.4 ~ 10m and includes carriageway of width 3.0 ~ 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.

55. **Strip Map**. The strip map showing the locations of the structures along this alignment is in **Appendix 5**. The strip map was drawn as a result of the field surveys conducted along the alignment and show that no physical cultural resources will be encroached or affected due to the improvement the subproject road.

Figure 4: Site Photograph of existing condition of Improvement of road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Ch. 0 - 1565m);Rd-01

Existing road condition of road at chainage 1425

Road 2: Improvement of road from Kaliagar Protiva School to Islampur Rishipara (Ch.0 - 920m);(Rd-02)

56. **Road Location:** The subproject is 0.920km long, one of the 1st priority readiness road subproject of selected Link Roads, start from Kaliagar Protiva School (N 23°54'56.69"and E 90^0 13' 15.095") and ends at Islampur Rishipara (N 23°54'31.802" and E 90°13'26.233").. This road passes through markets/bazaars, agricultural/open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies along the road - minimum is 4.4 m at Ch.275m and maximum is 8.31m at Ch.500m. Existing carriageway width is 3.0-3.7 m at several chainages along the road alignment.

57. **Road Condition***:* This road contains carriageway of width 3.0-3.7m at several chainages along the road alignment .The existing road surface is earthen 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 5** shows some of the existing conditions of this road.

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

59. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 4.4m ~ 8.31m and includes carriageway of width 3.0-3.7m. 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.

60 Strip Map. The strip map showing the locations of the physical cultural structures, particularly religious structures along this alignment is in **Appendix 6**. 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 5: Site Photograph of existing condition of Improvement of road from Kaliagar Protiva School to Islampur Rishipara (Ch.0 - 920m);(Rd-02) (Rd-02)

Existing road condition of road at chainage 480

Road 3: Improvement of road from Rice Mill to Bangshi River at Kumrail Tekpara (Ch.150 - 465m); (Rd-03)

61. **Road Location:** The subproject is 0.903 km long, one of the 1st priority readiness road subproject of selected Link Roads, starts from Rice Mill (N 23°55'5.458" and E = 90°13'21.107") and ends at Kumrail Tekpara (N 23°55'09.01"and E 90°13'31.193"). This road passes through agricultural/open fields, sporadic rural settlements on both sides of the road alignment. Existing vacant road width fluctuates from place to place; minimum is 3.80 m at Ch.

190m and maximum is 7.8 m at Ch. 50m. Existing carriageway width 3.00m all through along the road alignment.

62. **Road Condition***:* This road contains carriageway of width 3.0m all through along the road alignment. The existing road surface is made of BC road. 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.

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

64. **Structures:** There is no structure of any form along the road alignment for cross drainage purpose.

65. **Existing Alignment and Right-of-Ways (RoW)***:* The existing road subproject will be improved within existing alignment / RoW. The vacant road width varies between 3.80 ~ 7.8m and includes carriageway widths all through along the road alignment 3.0m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

66. **Strip Map**. The strip map showing the locations of the physical cultural structures, particularly religious structures along this alignment is in **Appendix 7**. 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 6:Site Photographs of existing condition of Improvement of road from Rice Mill to Bangshi River at Kumrail Tekpara (Ch.150 - 465m); (Rd-03)

Existing road condition of road at chainage 130

Road 4: Improvement of road from Dhamrai Bazar to Bangshi River at Kagojipara (Ch. 0 - 1295m (Rd-04)

67. **Road Location:** The subproject is 1.295km long, one of the 1st priority readiness road subproject of selected Link Roads, starts from Dhamrai Bazar (N 23°55'05.736" and E 90^0 12' 41.264") and ends at near southern bank of Bangshi River at Kagojipara (N 23°55'19.092"and E 90°13'13.753"). This road passes through markets/bazaars, agricultural/open fields and sporadic settlements alongside the road alignment. Existing vacant road width varies between 5.3 ~ 9.3 at sections along the alignment includes carriageway of width 4.0-5.0.

68. **Road Condition***:* The existing subproject road contains carriageway of width is 4.0-5.0m. The existing road surface is of BC, and 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.

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

70. **Structures:** There is 14.0m Single Lane Bridge at Ch.9208m.along the road alignment. As the bridge is in good condition, it will not require any rehabilitation.

72. **Existing Alignment and Right-of-Ways (RoW)***:* The existing subproject road will be improved within existing alignment / RoW. The vacant road width varies between 5.3 ~ 9.3 m, and includes carriageway of width 4.0-5.0m. The side slope of road embankment will be of 1:1.5. From field investigation, no tree is found along the proposed carriageway. No trees will be cut and all trees found along the sides of the proposed carriageway will be preserved per detailed design.

73. **Strip Map**. The strip map showing the locations of the physical cultural structures, particularly religious structures along this alignment is in **Appendix 8**. 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 Improvement of road from Dhamrai Bazar to Bangshi River at Kagojipara (Ch. 0 - 1295m (Rd-04)

Existing road condition of road at chainage 160

C. Proposed Interventions or Development

Road 1: Improvement of Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)

74. Proposed interventions planned for the Existing Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria of length 1.565 km (Ch. 0+000 to Ch.1+565 Km) 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 and RCC carriageway of width 5.0 and 3.0m respectively and the side/s of the carriageway will have earthen (soft) shoulder depending on the availability of vacant road width;

(i) Pavement works comprising construction of 250mm improved sub-grade, 225mm sub-base, 150mm WBM (base course) binder and wearing course (for BC Road);and 175 mm CC layer over single layer polyethylene over 100mm CC over existing BC Road (for RCC 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

(v) Protection works (pallisading) 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 8a below:

Table 8a: Locations and Lengths of Proposed Protection Works along Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria

Sl. No.	Left Side Chainage and Length (m)	Right Side Chainage and Length (m)	Sample site photograph of existing condition of proposed road section
1	nil	Ch.0+010km to Ch.0+050km (40m)	
2	nil	Ch.0+465km to Ch.0+510km (45)m	As this section become impassable for traffic, community people with their own initiative by the help of pourashava have filled up the roadside ditches to protect the road edges erosion/sliding & make traffic passable 
Total Length =		**85m**	

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

Figure 8: Photograph of the Outfall of the proposed drain along the road South West Corner of Bata Shoe Company to Bangshi River at Saibaria

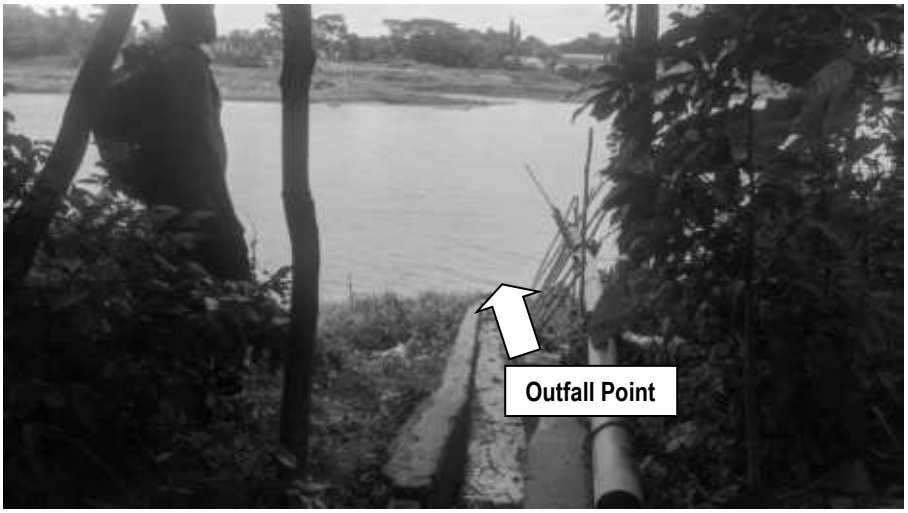


Table 9: Summary of Proposed Improvement Works for Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)

Road No.	Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition	Location
Rd-01	Improvement of Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria from Ch.0+000 Km to Ch.1+565 Km.	1.565 Km	BC /CC Pavement, soft shoulders, slope protection works	**Road:** a) BC Road with 5.0m carriageway from Ch.00-115m, Ch. 210-720m, Ch. 853-1290, Ch. 1330-1468m with soft shoulder. b) BC Road with 5.0m carriageway from Ch.115-210m, Ch.720-853m, Ch. 1290-1330m with soft shoulder. c) CC Road with 3.0m carriageway from Ch.1468-1565m. **Slope Protection Works:** At 2 segments (**ref. Table 8**) **Drainage:** 0.90m dia Pipe Drain from Ch.00-450m at Right Side. 1.20m dia Pipe Drain from Ch.450-1150m at Right Side. 1.40m dia Pipe Drain from Ch.1150-1468m at Right Side. 1.40m dia Pipe Drain from Ch.1468-1565m at Center Line.	**Road:** a) BC Road with 3.0m carriageway from Ch.00-115m, Ch. 210-720m, Ch. 853-1290, Ch. 1330-1468m. b) HBB Road with 3.0m carriageway from Ch.115-210m, Ch.720-853m, Ch. 1290-1330m. c) BC Road with 3.0m carriageway from Ch.1468-1565m.	Starting from Bata shoe Company more

However, the typical section for the roadways and drainage design with their cross-sections are exhibited in **Appendix16.**

Road-2: Improvement of Road from Kaliagar Protiva School to Islampur (Road: Rd-02)

75. Proposed interventions planned for the Existing Road from Kaliagar Protiva School to Islampur 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 and RCC carriageways of widths varying between 3.7m ~ 3.0m according to design, the side/s of the carriageway will have hard shoulder/s or walkway/s and soft shoulders depending on the availability of vacant road width;

(iii) Pavement works comprising construction of 250mm improved sub-grade, and 175 mm CC layer over single layer polyethylene over 100mm CC over existing BC Road (for RCC 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

(v) Protection works (pallisading) 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 10a below:

Table 10: Locations and Lengths of Proposed Protection Works along Road from Kaliagar Protiva School to Islampur

Sl.no	Left Side Chainage and Length (m)	Right Side Chainage and Length (m)
1	nil	Ch.0+505 to 0+690 Km= 185 m
2	nil	Ch.0+795 to.0+910 Km= 115 m
	Total Length:	**300 m**

However, the existing status with Proposed Development interventions of the subproject road is summarized in **Table11.**

Figure 9: Photograph of the Outfall of the proposed drain along the road Kaliagar Protiva School to Islampur

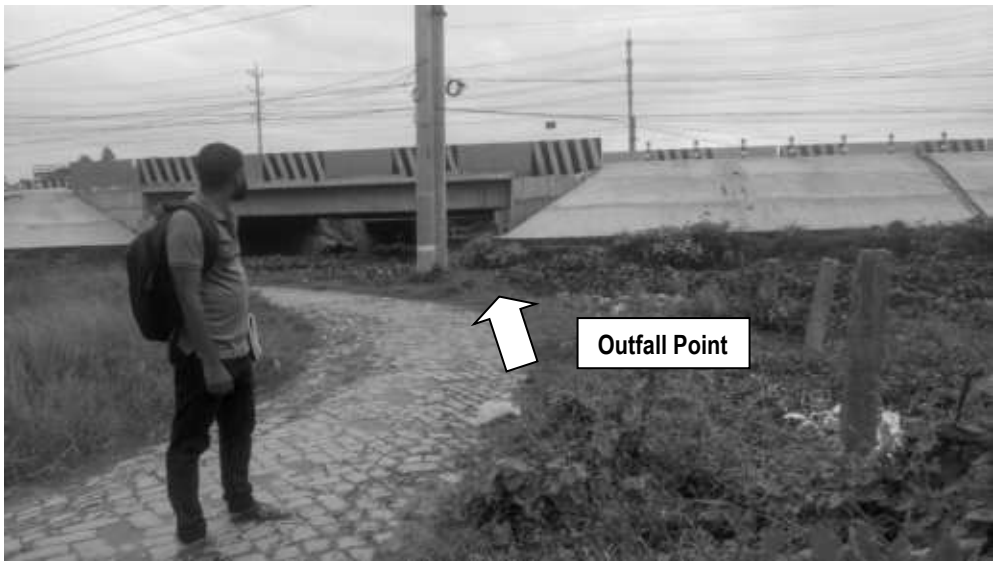


Table 11a: Locations and Lengths of Proposed Protection Works along Road from Kaliagar Protiva School to Islampur

Sl. No.	**Left Side Chainage and Length (m)**	**Right Side Chainage and Length (m)**	**Sample site photograph of existing condition of proposed road section**
1	nil	Ch.0+505km to Ch.0+690km (185m)	
2	nil	Ch.0+795km to Ch.0+910km (115m)	
Total Length =		**300m**	

Table 12: Summary of Proposed Improvement Works for Kaliagar Protiva School to Islampur Road (Road: Rd-02)

Sl. No.	Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition	Location
Rd-02	Improvement of Road from Kaliagar Protiva School to Islampur from Ch.0+000 Km to Ch.0+920 Km.	0.920 Km	RCC Pavement, slope protection works	**Road:** a. RCC Road with 3.0m carriageway from Ch.00-425m with hard shoulder. b. RCC Road with 3.70m carriageway from Ch. 425-920m with hard shoulder. **Slope Protection Works:** At 2 segments (**ref. Table 10**) **Drainage:** 0.90m dia Pipe Drain from Ch.00-395m at Center Line. 1.00m dia Pipe Drain from Ch.400-810m at Center Line. 0.90m dia Pipe Drain from Ch.00-75m(Link-01) at Center Line.	**Road:** a. BC Road with 3.0m carriageway from Ch.00-285m. b. CC Road with 3.0m carriageway from Ch. 285-425m. c. HBB Road with 3.70m carriageway from Ch. 425-920m with soft shoulder.	Starting from Provita School more

However, the typical section for the roadways design with their cross-sections are exhibited in **Appendix16.**

Road-3: Improvement of Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)

76. Proposed interventions planned for the existing Road from Rice Mill to Bangshi River at Kumrail Tekpara (Ch.0+150 Km to Ch.0+465 km) 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 Road with carriageway of width 3.0m according to design, the side/s of the carriageway will have soft shoulder/s or walkway/s depending on the availability of vacant road width;
(iii) RCC Pavement works comprising construction of 175 mm CC layer over single layer polyethylene over 100mm CC over 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
(v) Construction of pipe drain with 0.90m dia pip from chainage the 00 – 395m through the center line of the carriageway.

However, the existing status with Proposed Development interventions of the subproject road is summarized in **Table 12.**

Figure 10: Photograph of the Outfall of the proposed drain along the road Rice Mill to Bangshi River at Kumrail Tekpara

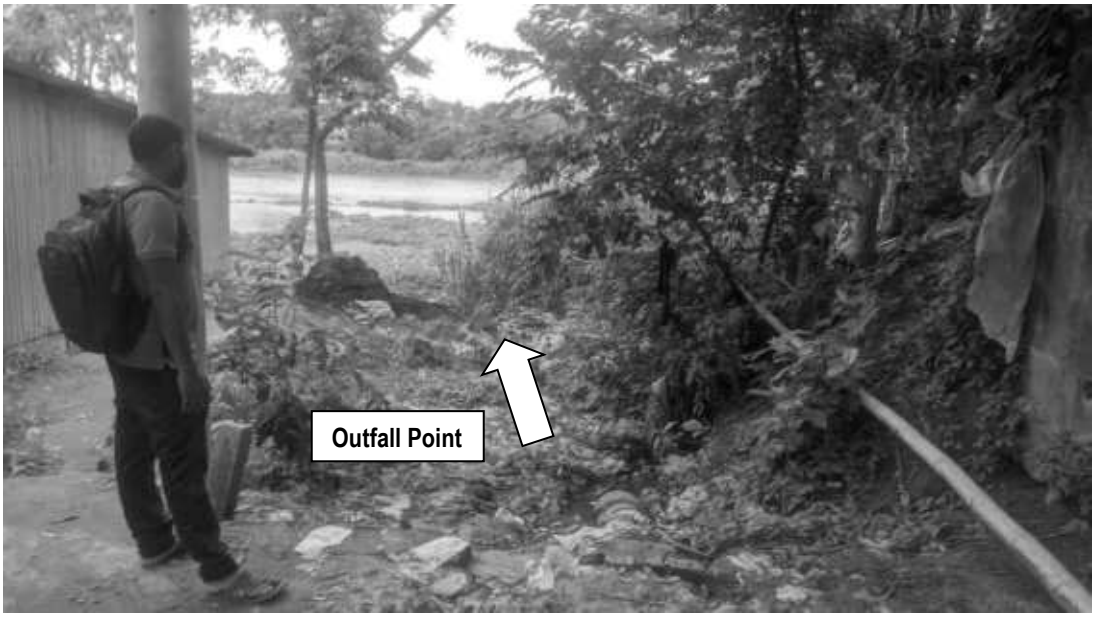


Table 13: Summary of Proposed Improvement Works for Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)

Road. No.	Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition	Location
Rd-03	Improvement of Road from Rice Mill to Bangshi River at Kumrail Tekpara from Ch.0+150 Km to Ch.0+465 Km.	0.315 km	RCC Pavement, slope protection works	**Road:** a. RCC Road with 3.0m carriageway from Ch.150-465m with soft shoulder. **Slope Protection Works:** No works. **Drainage:** 0.90m dia Pipe Drain from Ch.00-395m at Center Line.	**Road:** a. BC Road with 3.0m carriageway from Ch.150-465m.	Starting from Kagojipara more

However, the typical section for the roadways design with their cross-sections are exhibited in **Appendix16.**

Road 4: Improvement of Road from Dhamrai Bazar to Bangshi River at Kagojipara (Road: Rd- 04)

77. Proposed interventions planned for the Existing Road from Dhamrai Bazar to Bangshi River at Kagojipara from Ch.0+000 Km to Ch.1+295 Km including 330m Link Roads (Link 1: Ch. 0 -180m & Link 2: Ch.0 -150) 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 and Uni-Block carriageway of varying widths 3.0 ~ 6.0m as per design, and the side/s of the carriageway will have hard shoulder/s or walkway/s and soft shoulders depending on the design and availability of vacant road width.

(iii) Construction of 2 (two) 900mm ∅ (dia) Pipe drain at Ch. 00-150m & 00 - 675m; 1 (one) 1200mm ∅ (dia) Pipe drain at Ch. 675-925m and 1 (one) 1400mm ∅ (dia) Pipe drain at Ch. 925-1320m , and all these pipe drains will be constructed through the center line of pavement.

(iv) Pavement works comprising construction of sub-grade, sub-base, base binder course and wearing course; Road improvement based on design that considers road safety requirement per LGED published guidelines and standards.

The existing status with proposed development interventions of this road component is summarized in Table **13.**

Figure 11: Photograph of the Outfall of the proposed drain along the road Dhamrai Bazar to Bangshi River at Kagojipara

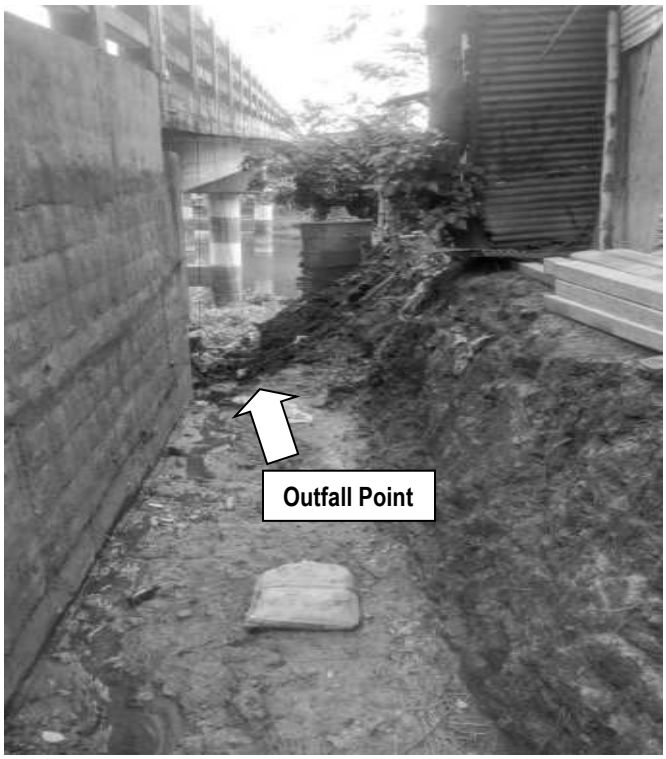


Table 14: Summary of Proposed Improvement of Road from Dhamrai Bazar to Bangshi River at Kagojipara (Road: Rd- 04)

Road No.	Name of Subprojects	Length / Area	Subproject Components	Details of Proposed Works	Existing condition	Location
Rd-04	Improvement of Road from Dhamrai Bazar to Bangshi River at Kagojipara from Ch.0+000 Km to Ch.1+295 Km including 430m Link Roads.	1.625 km	BC /RCC/Uni-block Pavement	**Road:** a. RCC Road with 5.0-6.0m carriageway from Ch. 00-310m. b. BC Road with 4.20m carriageway from Ch. 310-928m with hard shoulder. c. RCC Road with 4.20m carriageway from Ch. 928-1030m, Ch. 00-250m(link-02) with hard shoulder. d. BC Road with 3.0m carriageway from Ch.1030-1295m with hard shoulder. e. Uni-block Road with 3.00m carriageway from Ch. 00-180m(link-01) with soft shoulder. **Slope Protection Works:** No works. **Drainage:** 0.90m dia Pipe Drain from Ch. 00-675m at Center Line. 1.20m dia Pipe Drain from Ch.675-925m at Center Line. 1.40m dia Pipe Drain from Ch. 925-1320m at Center Line. 0.90m dia Pipe Drain from Ch. 00-150m at Center Line.	**Road:** a. BC Road with 5.0-6.0m carriageway from Ch. 00-310m. b. BC Road with 4.20m carriageway from Ch. 310-1030m, Ch. 00-250m(link-02). c. BC Road with 3.00m carriageway from Ch. 1030-1295m, Ch. 00-180 (link-01). **Bridge:** 1) 14.0m Single Lane Bridge at Ch.9208m. (The bridge is in good condition; it will not require any rehabilitation)	Starting from Dhamrai Bazar

However, the typical section for the roadways design with their cross-sections are exhibited in **Appendix16.**:

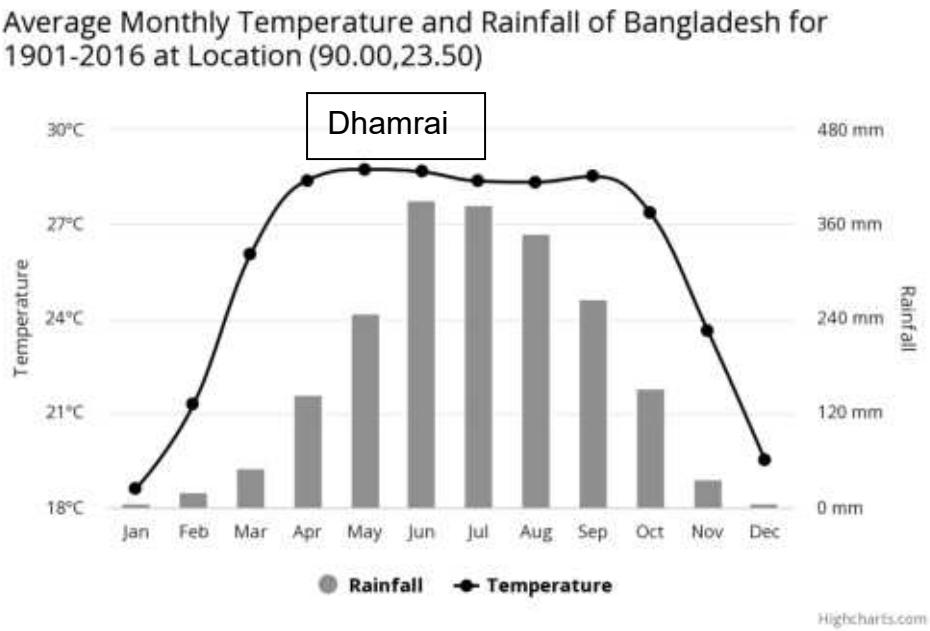
IV. DESCRIPTION OF THE ENVIRONMENT

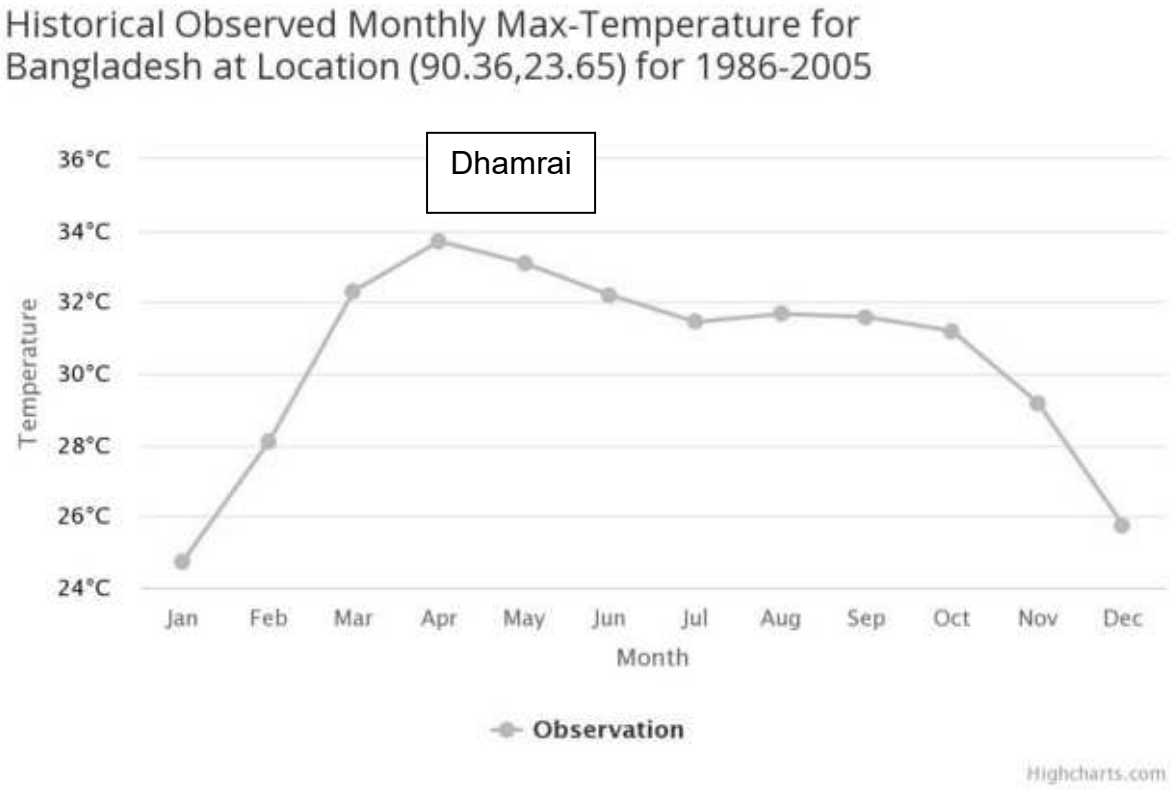
A. Physical Resources

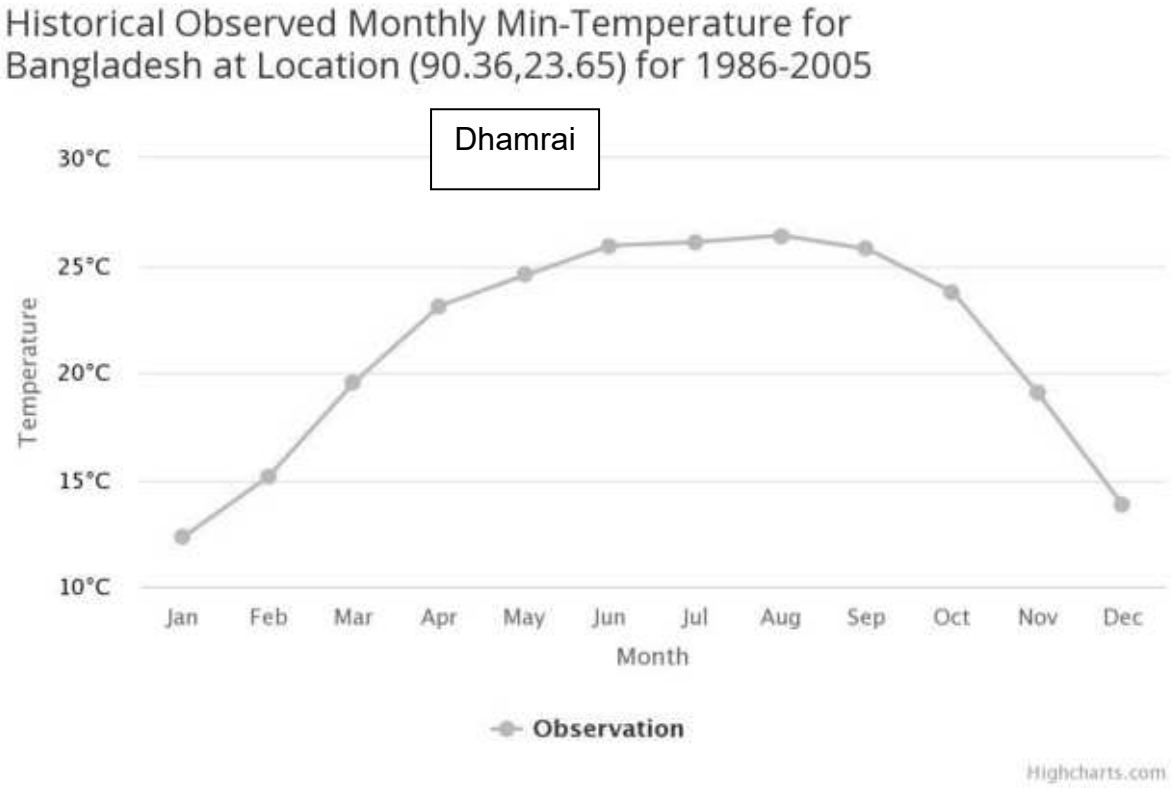
78. **Location and Extent:** The proposed subproject is located in Dhamrai Upazila, about 40 km north west of the capital city of Dhaka District in the division of Dhaka, Bangladesh, and it is in between 23°50' and 24°02' north latitudes and in between 90°02' and 90°14' east longitudes. It is bounded by Mirzapur and Kaliakair and Nagarpur on the north, Singair on the south, Savar in the east and Saturia on the west.. Total area of the Upazila is area 307.5 sq km. (*source: Banglapedia, 2015 and Bangladesh Population Census 2001, Bangladesh Bureau of Statistics; Cultural survey report of Dhamrai Upazila 2007)*

79. **Topography, Soil and Geology:** The Land type of the area is generally highland and medium highland to lowland, and poorly drained and its elevation is about 7-7.5 meters above mean sea level and the area is nearly slope from northwest to southeast. Major soils of the area are of type deep red-brown terrace soil and some area includes soils of type non-calcareous grey floodplain (non-saline).There are 2 (two) types of Land level: type1 includes medium highland (normally flooded up to about 90 cm deep) to lowland (normally flooded between 180 cm and 300 cm deep) during the flood season, and type 2 includes medium lowland (normally flooded between 90 cm and 180 cm deep) and lowland (normally flooded between 180 cm and 300 cm deep) during the flood season. Agro-ecological Zones (AEZs) of the area includes AEZ 28 (Modhupur Tract) which covers major portion of the area and relatively smaller portion is under AEZ 8 (Young Brahmaputra & Jamuna Floodplain). somewhat porous allowing for some seepage of surface water into the soil, but in general the area is subject to seasonal flooding. Bongsi river is the major drainage channel of the area, in which slowly draining streams will transport surface runoff to the river Bongsi.(***Source****:Land Resources Appraisal of Bangladesh for Agricultural Development Report 2: Agro-ecological Regions of Bangladesh, FAO/UNDP, 1988)*

80. **Climate:** The Figure below shows mean historical monthly temperature and rainfall for the Dhamrai subproject area during the time period 1901-2016 (considered as baseline climate for rainfall and temperature). The average temperature at Dhamrai ranges from 18.26^0 C (in January) to 28.14^0 C (in June). The warmest months of the subproject area usually coincide with the rainy/monsoon season (June-August). The monthly maximum rainfall averages 517.45mm (in July) in monsoon and averages monthly minimum 6.25mm (in December) in winter.


Average Monthly Temperature and Rainfall of Bangladesh for 1901-2016 at Location (90.00,23.50)
Dhamrai
30°C
27°C
24°C
21°C
18°C
Temperature
480 mm
360 mm
240 mm
120 mm
0 mm
Rainfall
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Rainfall
Temperature
Highcharts.com


Historical Observed Monthly Max-Temperature for Bangladesh at Location (90.36,23.65) for 1986-2005
Dhamrai
36°C
34°C
32°C
30°C
28°C
26°C
24°C
Temperature
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
Observation
Highcharts.com



81. **Air Quality and Noise Level:**

Air Quality. Air quality is not a challenging issue for this subproject area since it is located within dispersed rural/semi-urban settlement. Close vegetation is observed in and around the project area. Population density within the subproject area is relatively high and there are many motor vehicles operating on the subproject/local roads within the upazila. From field observation, it is expected to have little or no deterioration of air quality in the 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. However, the test results will be documented in the relevant SEMR.

*Noise Quality***.** Subproject components are in the rural/semi-urban built-up part of Dhamrai 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. Acoustic environment is not a pressing issue for this subproject since it is located within dispersed rural/semi-urban settlement. The baseline noise level will be measured by the subproject contractors prior to commencement of work. At the end of the construction, contractors will be required to conduct noise level measurements for confirming no deterioration of ambient noise quality. This is included in the environmental management plan. However, the test results will be documented in the relevant SEMR.

82. **Surface Water:** Bangsi is the main river channel flowing from north to south through the eastern side of the Upazila and on the right Gazikhali river flowing though the Upazila and are directly connected to the river Bangsi and ultimately take up the name Dhaieswari.River.

The baseline surface water quality of the subproject canals will be tested before the commencement of the work, and this is included in the environmental management plan

hereof. However, the test results will be documented in the relevant SEMR.

- **Drainage.** There are no functional roadside drains/culvert along the alignments of the subproject roads. 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 this drainage constraint; construction/reconstruction of roadside drains have been proposed; road section-wise details are given in **Tables 9, 11, 12 and 13**.

- **Erosion and Deposition.** The subproject area is generally highland and medium highland to lowland, and poorly drained. The subproject roadside area commonly suffers from normal seasonal flooding. Further the area suffers from shallow water stagnation resulting from accumulation of rainwater as well as from overflow of river water during wet season. Under the conditions, notable erosion is taking place in sections adjacent to the subproject road embankment 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 (palasiding) have been proposed in those erosion-prone areas to protect the road edges from being eroded or sliding.

83. **Groundwater:** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The water table at Dhamrai Upazila is shallow; however the main aquifer providing water supply is found at a depth of greater than 50 m. There is no report of arsenic contamination in the tube-well water of the project area. The baseline ground water quality of the subproject area will be tested before the commencement of the work, and this is included in the environmental management plan hereof. However, the test results will be documented in the relevant SEMR.

B. Ecological Resources

1. Terrestrial Ecosystem

84. **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 in the near vicinity, yet tree cover from cultivated species could be as high as 50% in some areas. There is no natural forest located alongside the subproject roads under Dhamrai Upazila. Only roadside trees are found which are largely maintained by the community or social forestry program. A large number of multipurpose fruit trees.These tress are largely of Jack fruit, Neem, Arjun, Shimul etc.and are of various maturity level and sizes situated in unequal distribution manner. Main crops grown inside the subproject area include paddy, jute, peanut, onion, garlic, chilli and other vegetables.

85. **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 Dhamrai 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

86. **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.

87. **Aquatic fauna:** The temporary aquatic habitats of the khals 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

88. **Land Use:** Total cultivable land is 23,470 hectares (81.6%) and fallow land is 7,280 hectares (19.4%). Of the total cultivable land, single crop is 8.7%, double crop 62.1% and triple crop land 29.2%. Cropping intensity is 220.83%. Land under irrigation is 38%. As regards the farmers by Land Occupancy, landless (<0.02 hectares): 11,755, marginal (0.02-0.2 hectares): 10,670, middle (1.01-3.0 hectares): 5,675 and big (>3.0 hectares): 535, and total number of farmers is 28,635. As regards the ownership of agricultural land: Landowner is 63.08% and landless 36.92%. Cultivable land per head is 0.82 hectare.

89. **Industry and Agriculture:** There are few small, medium and large size industries of different types (ceramic industry, jute industry, aluminum industry, pharmaceutical industry, textile industry, embroidery, brickfield, saw mill, rice mill, leather factory, shoe factory, cold storage, BSCIC industrial town) and cottage industries (goldsmith, blacksmith, potteries, handicraft in operation in the Upazila area. As observed from field visit at proposed subproject site, no industries were found to encroach the ROW for the proposed development. Main crops grown in the area are paddy, jute, maize, mustard seed, potato, vegetables..Extinct or nearly extinct crops are Khesari, kaun, china, gram. Main exports Rice are jute, medicine, ceramic, vegetables.

90. **Infrastructure, Transport and Communications:** Existing infrastructure in Dhamrai upazila includes many roads that are poorly maintained, degraded in condition and often impassable except at very slow speeds. Itemized these include 99.5 km paved, 360.41 km earthen road, waterways 47 nautical miles, and also includes few kilometers brick and natural drain. Regular bus services are available to travel other areas of Bangladesh. Internal movement is met by rickshaw, auto-rickshaw, easy-bike, maxi (laguna) and rickshaw van. Extinct or nearly extinct transports noted in the subproject area are Palanquin, bullock cart, gaina boat, bajra boat.

D. Social and Cultural Resources

91. **Demography:** [13]The total population of Dhamrai Upazila is 312,777 [Male: 157,546 (50.37%) & Female: 155,231(49.63%) Muslim: 311126, Hindu: 38894, Buddhist: 36 , Christian: 22 and others 90)]. The population density is 1,146 persons per sq km, and total number of households is 52,130 with average household size is 6.0 persons. Information obtained from the Upazila suggests that the main occupations of general people are agriculture 55.47%, non-agricultural labourer 2.92%, industry 2.21%, commerce 12.74%, transport and communication 3.01%, service 11.39%, construction 1.67%, religious service

[13]Banglapedia. The National Encyclopedia of Bangladesh. http://en.banglapedia.org/index.php?title=Dhamrai_Upazila

0.22%, rent and remittance 2.55% and others 7.82%.

92. **Local Market and Bazar:** There are 35 hats and bazaar and fairs 5, and most noted of which are Dhamrai Bazar, Shreerampur Bazar, Kalampur Bazar, Islampur Bazar, Kashuria Bazar and Dhamrai Rath Jatra Mela, Bhakter Mela, Paus Samkranti Mela (footnote 13). It is noteworthy to point out that none of the above Hats and Bazars fall within the proposed subproject road alignment.

93. **Health and Educational Facilities:** There are numerous health facilities, educational and religious institutions within the Upazila : *Health centres 1* Hospital 2, Union health & family welfare centre 13,Family Planning center 1 and satellite clinic 124; *Educational institutions* - college 6, secondary school 45, primary school 149, retarded children's school 2, community school 8, NGO school 109, kindergarten 16, madrasa 3. Noted educational institutions: Dhamrai College, Hardinge High School (1914), Rowail Primary School (1887), Pathantola Primary School (1888). Average literacy rate within the Upazila area is 43.9% (male 49.6% & female 38%) (Footnote 13).

94. **Water Supply and Sanitation:** There is no piped water supply system in Dhamrai Upazila. The sources of drinking area include Tube-well 97.14%, pond 0.08%, tap 1.29% and others 1.49%. The presence of arsenic has been detected in shallow tube-well water of this upazila.; and the sanitation facilities of Dhamrai Upazila covers 34.07% (urban 82.68 and rural 27.05%) of dwelling households of the upazila use sanitary latrines and 62.03% (urban 15.86% and rural 68.70%) of dwelling households use non-sanitary latrines; 3.90% of households do not have latrine facilities.(footnote 13)..

95. **Access to electricity:** All the unions of the upazila are under rural electrification network. However 39.47% of the dwelling households have access to electricity.

96. **Pollution and Road Safety:** People are concerned about increasing pollution in the subproject area as well as safety of people while crossing the roads. 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.

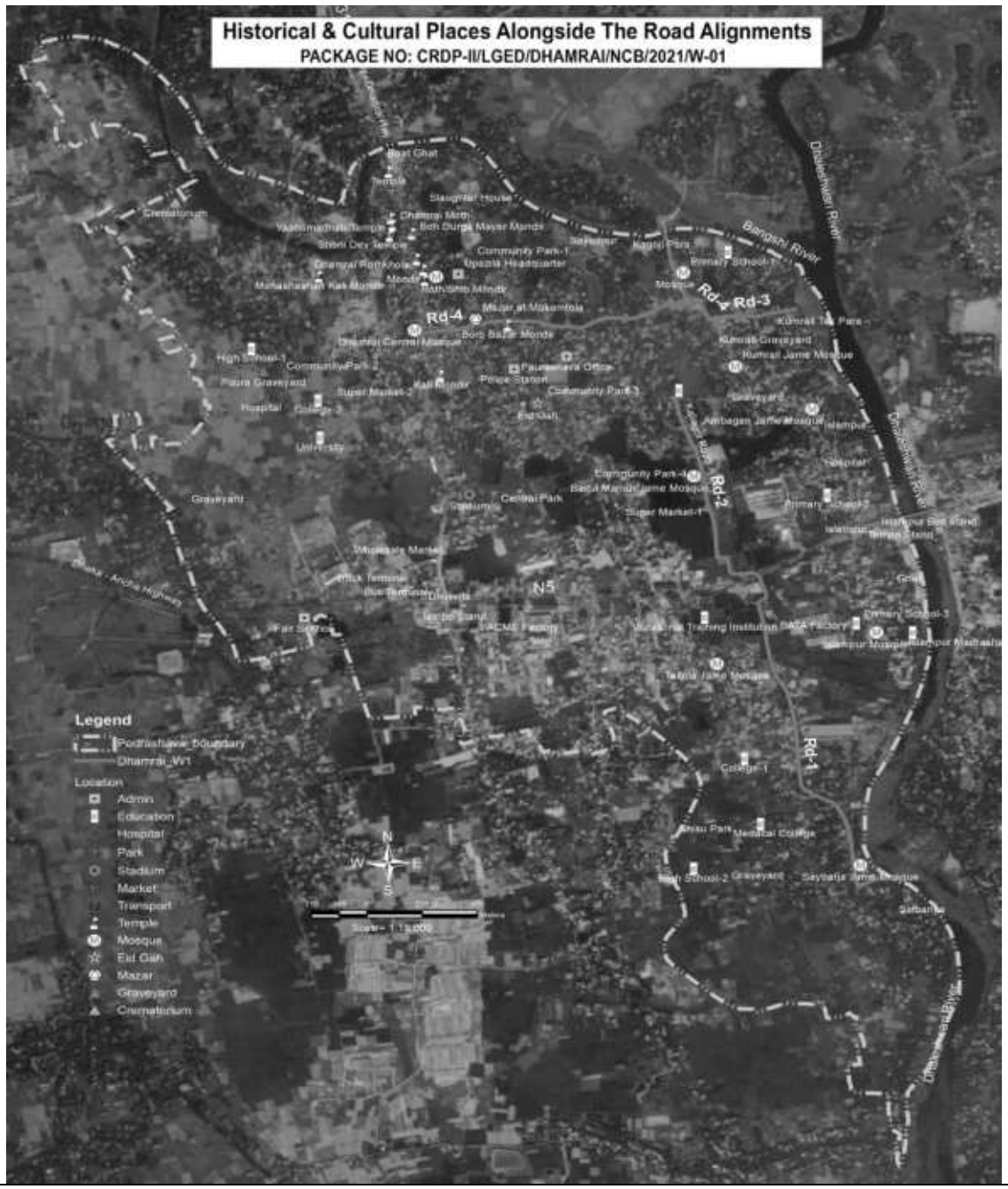
Existing Solid Waste Management of Municipality. Solid wastes are managed and disposed through the municipal collection system. As regards the Existing Solid Waste Management of the Municipality or the City Corporation, it is to mention that the Municipality collects waste from house to house either by their own employees or by engaging more efficient collection of waste from waste generation sources. Further, resource recovery from municipal solid wastes are carried out at sources following 3-R Policy that focussed mainly on steps a) reduce, c) reuse, d) recycle, and these are followed before the end disposal of the wastes. Presently, with regard to secondary transfer system of solid municipal wastes, open spaces on roadsides are used to store solid waste, either directly on the pavement or using concrete bins

E. History, Culture and Tourism

97. Archaeological heritage and relics of the Dhamrai area are marked by Ashok Pillar and Mokam Tola and also marked by the War of Liberation Mass grave 1 (western side of Kalampur Bazar). The Dhamrai Roth Jatra And Fair is an important cultural festival for Hindus of the area**.** Roth jatra festival begins on around the 10 days of Bangla Calendar month of Ashar and "Ulto Roth" takes place one week after. A month-long Roth Maela is held in Dhamrai for this occasion.The Roth cart is approximately 45 feet (14 m) high and pulled by the pilgrims who turn up for the event. As regards the religious institutions at Dhamrai, there are 410 mosques, 132 temple, 1 church, 1 pagoda, and tomb 6; these archaeological/religious/cultural heritage and relics are generally of local interest and tourist

attraction only. None of these will be adversely affected by the proposed roadway improvements. **Figure 19** 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 improvement works

Figure 12: Aerial Map Showing the Locations of cultural Heritage sites Relative to the Subproject Alignment



F. Socio-economic benefits from the Road Improvement Schemes

98. 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.

99. **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 15: Summary of environmental features around road alignments

Sl. No.	Environmental Features	Within 100 m core zone	Within 7 km buffer zone
1	Ecological		
a)	Presence of Wildlife Sanctuary/ National Park	No	No
b)	Reserved Forests	No	No
c)	Wetland/water bodies	Rivers Bangshi and Dhaleswari, Small ponds and ditches, none is protected	Rivers Bangshi and Dhaleswari, ponds and ditches, but none is protected
d)	Migratory route for wild animals	No	No
e)	Migratory routes for birds	No	No
f)	Migratory routes for fishes	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 7 Km radius	Pattern similar to Land use of up to 7 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

100. 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

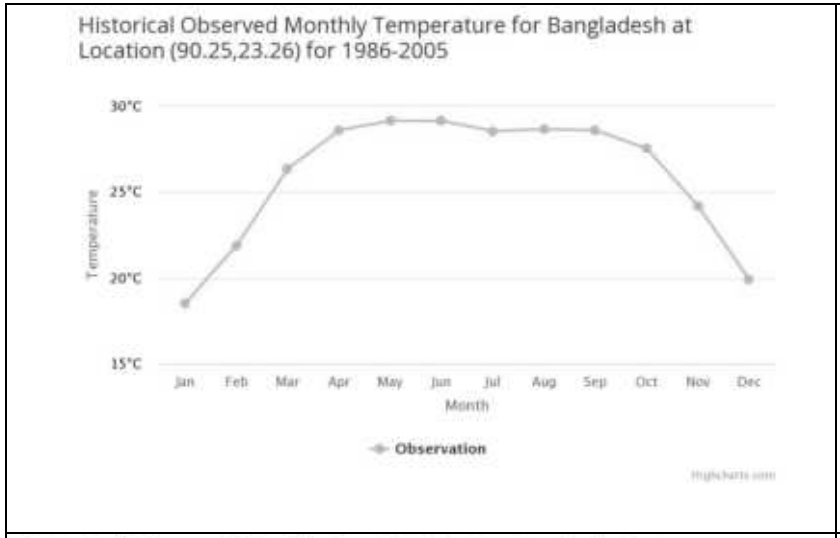
with geology and geography, a related variable is soil moisture as it affects road foundation stability.

101. 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.

102. 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.

103. Using gridded climate data from World Bank Climate Change Portal, the following are the baseline (1986-2005) climate features for the subproject area. Also shown are the projections for 2020-2039 (close to the mid-century) derived from World Bank Climate Change Portal high-resolution climate change modelling under a scenario in which atmospheric CO_2 concentration doubles by end-century with reference to mid-1800s (roughly equivalent to RCP 6.0).[14] The Figures here below exhibit the mean or changes in monthly temperature (Figs. A & B) and in monthly precipitation (Figs. C & D) compared to the reference period (1968-2005). In general, the value of monthly temperature change values between 0 and 4 degrees. Zero value indicates there is no change in projected monthly temperature compared to historical mean. In the case of precipitation, the value of monthly precipitation change values between -100 and +200 mm. Zero value indicates there is no change in projected monthly precipitation compared to historical mean. It is to note 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.



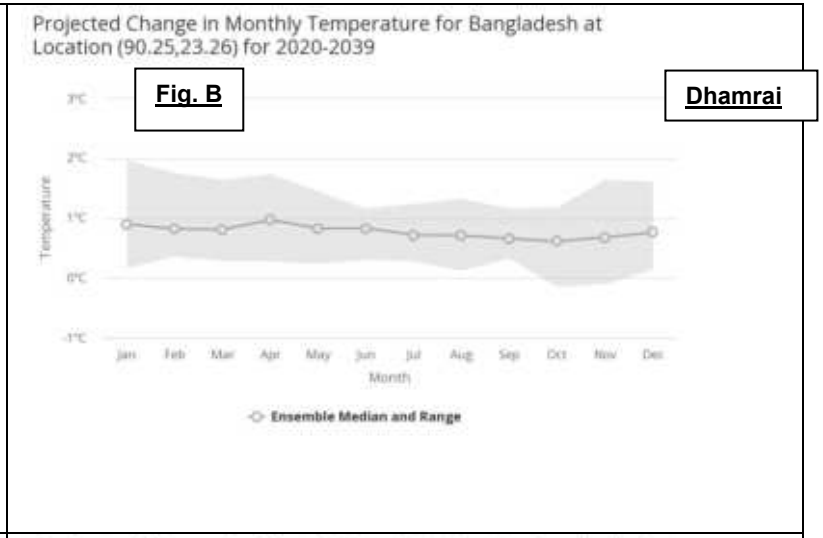


Fig. B

Dhamrai

Dhamrai

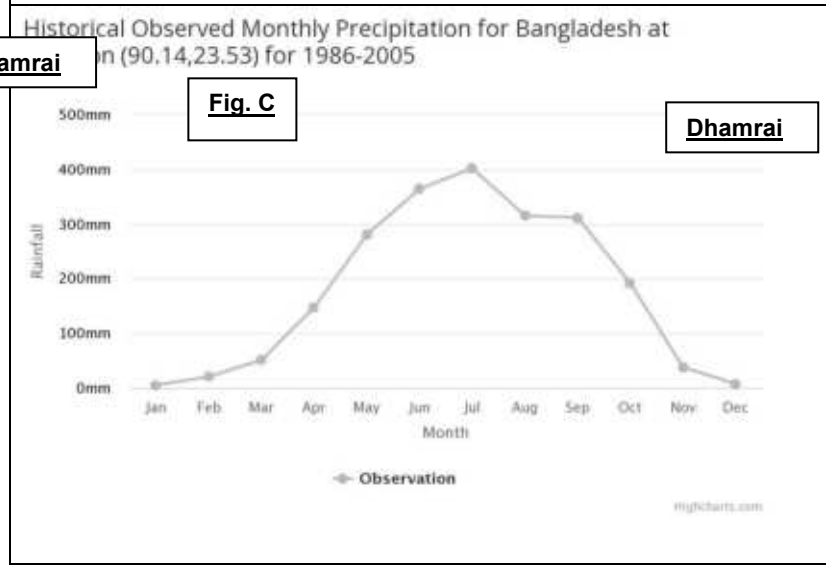


Fig. C

Dhamrai

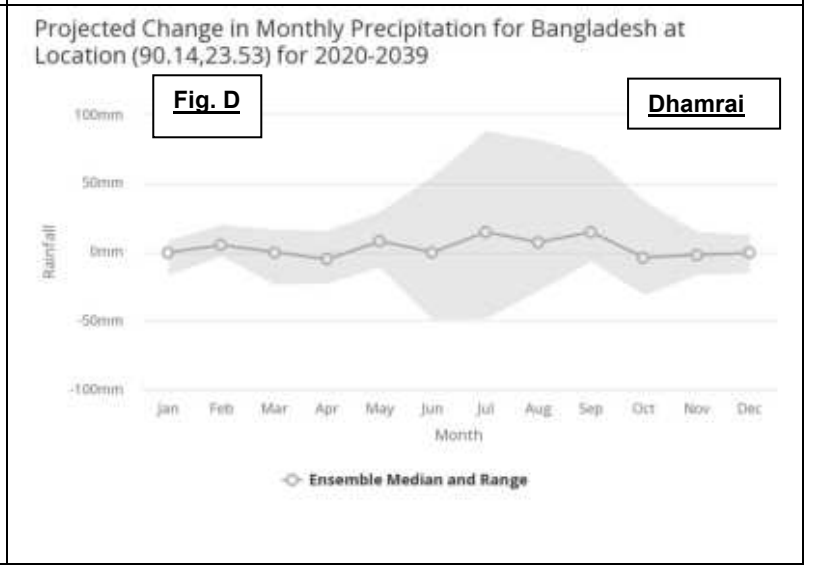


Fig. D

Dhamrai

Fig. D

V. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A. Compliance with subproject selection criteria

104. 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 16: Compliance matrix with subproject selection criteria

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

Criteria	Remarks
sustainability of the demand for such compost.	

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

105. **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.

106. **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.

107. **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 clearancewillbelower.Thereforeconsiderationofincreasebridgeheightis 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.

108. 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 17: 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	• Incorporate measures and sites for handling excessive spoil materials • Incorporate drainage plan in final design	PMCU, PDSC
Incorporation of	Road accidents	• Ensure to include in the design	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
community health and safety measures 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.	
Location trees, utilities and other infrastructures before construction.	Disruption of utility services; False claims from people; Water quality changes due to construction. Interference with other utilities and other infrastructures, including heritage areas, if any, during construction	• 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	Nuisance to nearby receptors. Impacts to qualities of ambient air, surface water, groundwater, and land. Impacts to health and safety of community and workers.	• Ensure compliance with national or international standards on noise, ambient air and effluent, whichever are more stringent. • Ensure all bid and contract documents prepared and finalized have copy of the IEE as attachment.	PMCU, PDSC
O&M Manual preparation	Impacts to health and safety of community.	• Prepare a comprehensive O&M manual to include periodic inspection and maintenance of 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	• 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	PMCU, PDSC

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
	logging, and water pollution.	Resources Development Board for sand quarrying.	
Spoil management and disposal	Inappropriate disposal of spoils will cause nuisances to affected properties, including siltation of canals.	• Identify designated disposal sites approved by the upazila. • A spoil management plan will be developed. A sample spoil management plan is in **Appendix 3**.	PMCU, PDSC
Construction camps	Inappropriate location for construction camps will impact the general welfare and health and safety of the workers.	• Identify construction camp sites that are strategically located relative to the work sites. • Ensure these camp sites can be easily provided with the basic amenities for the workers.	PMCU, PDSC

C. Anticipated Impacts and Mitigation Measures – Construction Phase

109. 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 straightforwardconstruction,soimpactswillbemainlylocalizedandnotgreatlysignificant;(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.

110. 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. Existing Bituminous Concrete (BC) will be reused after converting into sizeable grade.

111. **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.

112. 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

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

114. **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.

115. **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.

116. 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]
(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.

117. **Noise Levels.** Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment,

[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*.

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.

118. 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.

119. **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.

120. 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 3**;
(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.

121. 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.

122. **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

123. 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.

124. **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.

125. 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 3**;
(ii) avoid stockpiling of excess excavated soils as far as possible;
(iii) avoid disposal of any debris and waste soils in or near water bodies/rivers;
(iv) coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas;
(v) 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;

126. **Impact on Ecological Resources.** 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.

127. **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.

128. 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 4** 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 employers and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.

129. **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.

130. 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.

131. **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.

132. **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 9**. 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.

4. Impacts on the socioeconomic, environment and resources

133. 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.

134. 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.

135. **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 18) 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).

136. 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.

137. **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. A sample outline of the OHS including Emergency Response Plan including Disaster Management and COVID HS plan is given in the **Appendix 17**

138. 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:

(i) Communication and Training

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

(ii) Physical Hazards

a) Use of personal protective equipment by all workers such as earplugs, safety shoes, hard hats, masks, goggles, etc. as applicable, and ensure these are used properly;

b) Avoidance of slips and falls through good house-keeping practices, such as the sorting and placing loose construction materials or demolition debris in established areas away from foot paths, cleaning up excessive waste debris and liquid spills regularly, locating electrical cords and ropes in common areas and marked corridors, and use of slip retardant footwear;
c) Use of bracing or trench shoring on deep excavation works;
d) Adequate lighting in dark working areas and areas with night works;
e) Rotating and moving equipment inspected and tested prior to use during construction works. These shall be parked at designated areas and operated by qualified and trained operators only;
f) Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
g) Use of air pollution source equipment and vehicles that are well maintained and with valid permits;

(iii) General Facility Design and Operation

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

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

139. **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.

140. 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) Continuing driver education/awareness campaigns and road safety campaigns in schools.

(vii) Regular cleaning and maintenance of drains and proper solid waste management

VI. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A. Consultation

141. 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.

142. **Preliminary Consultation.** Public consultations were conducted in 8 December 2019 which was attended by various stakeholders. The summary of consultation meeting is attached as **Appendix 8**. 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 he 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.

143. **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, DOE, FD, Telecommunication, Electricity Supply, Gas supply etc. to obtain NOCs (if required).

B. Information Disclosure

144. 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.

145. 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.

146. 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 Dhamrai 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 Dhamrai 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 Dhamrai 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

147. 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 contractor will bear the cost for resolving any grievances. The project GRM will not supersede any legal government grievance procedures.

148. 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,

[17]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."

complaints or 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 20** for the outline.

149. **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 11**. The suggested format for record-keeping of grievance is in **Appendix 12**.

150. **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.

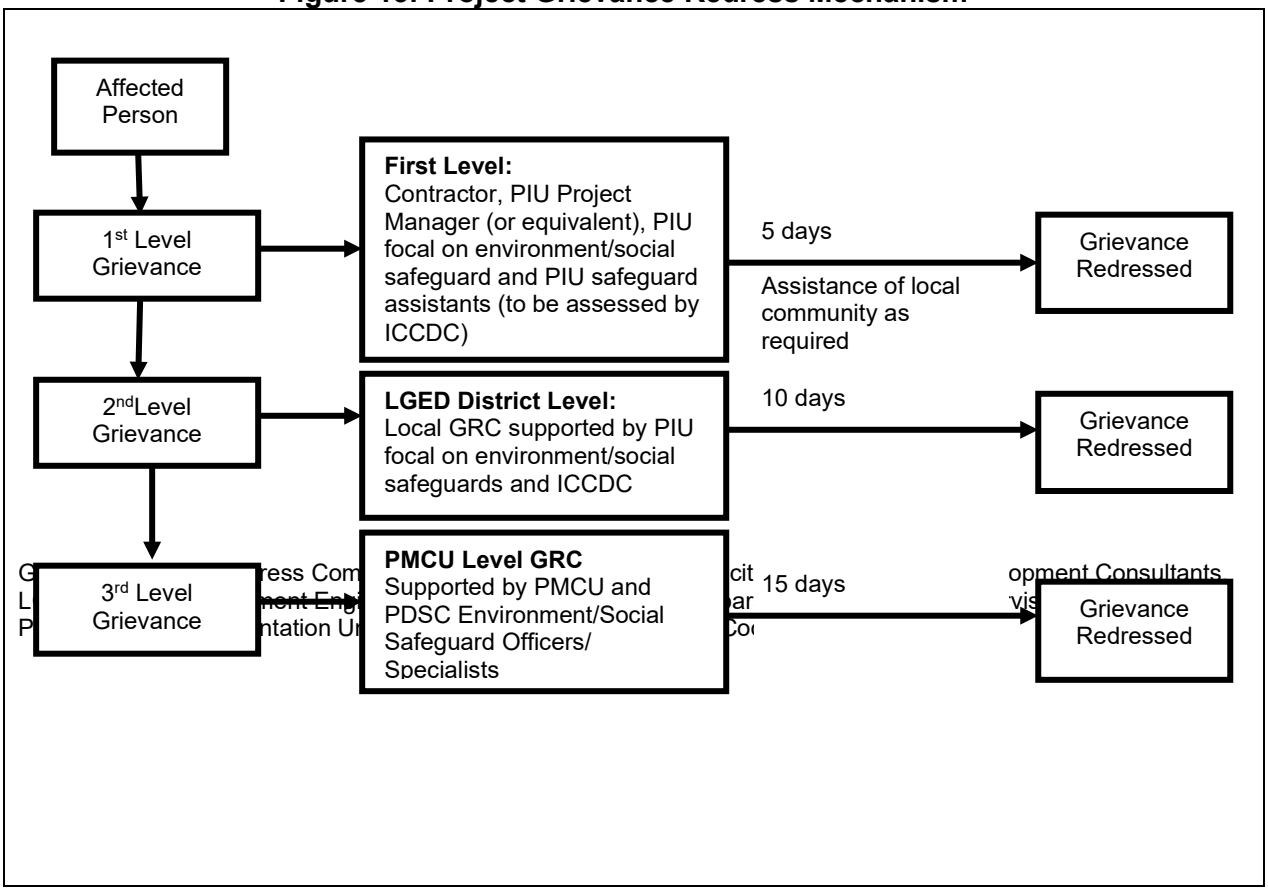
151. The functions of the local GRC are as follows: (i) provide support to affected persons on problems arising from land acquisition (temporary or permanent), asset acquisition and eligibility for entitlements, compensation and assistance, and other environmental or social safeguard issues unresolved 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.

152. **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.

153. 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 13: Project Grievance Redress Mechanism[18]



154. 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.

155. 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. If any grievance related to environmental safeguards issues (like dust generation/pollution,

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

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

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

156. **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 responsible[19] 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 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 assists the PMCU in this regard.

157. **Project Implementation Unit**. The Dhamrai 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. Dhamrai PIU has appointed one environment staff responsible for day-to-day monitoring of the project progress and implementation of the environmental provisions in the EMP. and the environment staff ensures compliance with government and ADB requirements on environmental safeguards. The Dhamrai PIU is to prepare quarterly progress reports on all aspects concerning environmental assessment, management, monitoring, and report to the PMCU.

158. **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 Dhamrai 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 Dhamrai PIU.

159. **Contractors**. The contractors of subprojects will have specific roles in the implementation of the EMPs. Each contractor shall have at least one environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. All these specific roles and responsibilities will be defined in the IEE reports, which shall form part of the contract documents. Dhamrai PIU will monitor contractors' environmental performance. **Table 17** summarizes the overall roles and responsibilities of PMCU, Dhamrai PIU, and ADB.

Table 18: Institutional Roles and Responsibilities

[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.

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	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.	

PMCU	PIU	ADB
Environmental Officer of PMCU to ensure that the total budget for implementing the EMP is included in the bid and contract documents.		
Construction stage		
PMCU to review the PIU monthly monitoring reports (**Appendix 16**) to 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.	Contractors have specific roles: a) to implement the EMPs and b) to conduct environmental monitoring. Each contractor shall have at least one environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. PIU with support of the Environmental Specialist(s) of PDSC 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 PDSC 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.	ADB to review the reports and provide necessary advice/guidance needed to the PMCU.
Operation Stage		
LGED and Dhamrai 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

160. 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**.

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

162. 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 19: Environmental Management Plan Matrix

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Design and Pre-Construction Phase					
1. Consents, permits, environmental clearances, etc.	Failure to obtain necessary consents, permits, and other appropriate regulatory clearances i.e environmental Clearance Certificate (ECC) can result to design revisions and work stoppage	• Obtain all of the necessary consents, permits, environmental clearances, etc. before the start of civil works. • Include in detailed design drawings and documents all conditions and provisions if necessary.	PMCU, PIU, and 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	• Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction. • Require construction contractors to prepare a contingency and spoil management plan. • It is to note that the subproject roads are single lane road; and hence, no utilities will be affected/disrupted.	PMCU, PIU, and PDSC	List of affected utilities and operators; Bid document to include a requirement for a contingency plan for service interruptions, e.g. provision of water if disruption is more than 24 hours, spoil management plan.	During detailed design phase; Review of spoils management plan: Twice (once after first draft and once before final approval)
3. Storm water runoff and conveyance of pollutants.	Besides stormwater, silts, solid wastes, domestic wastewater and septic tank effluents from within the residential and commercial establishments may enter the subproject drains and pollute the	The design to consider the following: • The inlet design to ensure that only storm or rain water flows into the drainage system; • Prevent households from connecting outlets of septic tanks and grey water to the drains;	PMCU, PDSC, DHAMRAI PIU	Incorporated in the drainage master plan and in the final detailed design. Testing of water quality of subproject Drain.	During detailed design phase During post construction phase Once in a year (Dhamrai Pourashava will bear the cost)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	Bangshi River.				
4. Construction work camps, stockpile areas, storage areas, and disposal areas	Disruption to traffic flow and sensitive receptors	Determine locations before award of construction contracts.	PIU and PDSC	List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land.	During detailed design phase
5. Waste generation	Generation of solid waste, wastewater from labor camp and other construction waste may cause pollution	• Follow the principle of "Reduce, Reuse, Recycle, and Recover" • Prohibition of unwanted littering and discharge of waste. • Solid waste is managed and disposed through the municipal collection system. • Develop a plan for waste management prior to commencing of construction and get approval from PIU.	Contractor	Contractor's records. Visual inspection.	Visual inspection by PIU on monthly ba
6. Sources of raw materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, resulting water logging, and water pollution	Prepare list of quarry sites and approved sources of materials.	PIU and 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, with a discussion with detailed design engineers and PIU on the suitability of sources and permit for additional quarry sites if necessary.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
7. EMP Implementation Training	Impact to the environment, workers, and community	Project Manager and Contractor should be trained on EMP implementation, including spoils management, traffic management, community and occupational health and safety, COVID-19 health & safety, Bangladesh Labor Act, and other standard operating procedures	PMCU, PIU, PDSC, Contractor's EHS Supervisor (or equivalent)	Record of completion of training (Safeguards Compliance Orientation). Contractor records for	During the detailed design phase and 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 quality (pH, DO, Cl-, EC, As, NO3 BOD5d, COD,);and Noise level	Contractor, PIU, and PDSC	Testing of Ambient air quality; Surface water quality; Ground water quality and Noise level	Once before construction activities commence (sampling will take place at the start and end part of the drains
During Construction Phase					
A. Physical Characteristics					
9. Topography landforms, geology, and soils and river morphology and hydrology	Sand, gravel or crushed stone will be required for this subproject. Extraction of natural aggregate materials may cause localized changes in topography and landforms (if on land) or river morphology and hydrology (if on the river).	• Prepare Aggregates Management Plan as part of the SEMP. • Source aggregates only from entities with environmental clearances and license. • Use quarry sites and sources permitted by relevant government agencies only, such as the Bangladesh Water Development Board for sand quarrying. • No new quarry sites shall be used for the subproject. • Verify suitability of all material sources and obtain approval from implementing agency. • Document all sources of materials and include in the monthly reporting to the	Contractor	Records of sources of materials.	PIU on a monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		PIU.			
10. Construction of component of the subproject (Bridge, sluice gate, walkway etc.)	Construction related impact Dust emission Noise pollution Pedestrian and vehicle movement Generation of construction wastes	• 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; • 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.	Contractor	Contractor records for EMP implementation at worksites.	PIU on a monthly basis
11. Water quality	Pollution of Bangshi River due to: (i) poorly managed construction sediments, and waste	• Dispose excess spoils as per the sample Spoil Management Plan attached in **Appendix 5** of IEE. • Locate temporary storage areas on flat	Contractor	Areas for stockpile storage of fuels and lubricants and waste materials.	Visual inspection by PIU and PDSC on weekly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	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.	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.		Number of silt traps installed along trenches leading to water bodies. No visible degradation to nearby drainage, water bodies due to construction activities. Results of river water quality testing.	Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
12. Groundwater quality	Pollution of groundwater resource due to potential seepage of construction chemicals such as fuels and temporary latrines at construction camps.	• Provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality. • Provide portable toilets at construction camps and 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.	Contractors	Areas for stockpile storage of fuels and lubricants. Availability of sanitary latrines at construction camps.	Visual inspection by PIU and PDSC on monthly basis
13. Air quality	Excavation and construction works will create dust from various sources such as excavation of dry soil; backfilling; loading, transport and unloading of raw materials and spoils; movement of vehicles; rock-crushing; and concrete mixing. Smoke emission from construction vehicles and burning of fuels from labor camps may contain pollutants such	• Confine earthworks according to excavation segmentation plan that should be part of site-specific environmental management plan (SEMP). • Consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials. • Bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites. • Damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. • If re-surfacing of disturbed roads cannot	Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; A certification that vehicles are compliant with air quality standards. Results of ambient air quality testing.	Visual inspection by PIU and PDSC on monthly basis Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons that are dangerous to human health.	be done immediately, spread crushed gravel over backfilled surfaces. • During demolition, water exterior surfaces, unpaved ground in the immediate vicinity and demolition debris. • Place signage at active work sites in populated areas. • Require trucks delivering aggregates and cement to have tarpaulin cover. • Clean wheels and undercarriage of vehicles prior to leaving construction sites; • Limit speed of construction vehicles on access roads and work sites to a maximum of 30 km/h. • Prohibit burning firewood in work and labor camps (promote liquified petroleum gas for cooking purposes and electric heater for heating purposes). • Use vehicles that have government-issued permits and registrations. • Prohibit open burning of solid waste.			
14. Acoustic environment	Noise level at the construction sites and their vicinities may be elevated due to construction activities. This will impact both the workers and community people near the construction sites, especially in noise-sensitive areas such as	• Provide prior information to the local public, including institutions such as schools and hospitals, about the work schedule. • use equipment that emits the least noise, well-maintained and with efficient mufflers. Install silencers if necessary and practical; • restrict noisy activities to day time; • avoid use of noisy equipment or doing noisy works at night time;	Contractor	Number of complaints from sensitive receptors; Use of silencers in noise- producing equipment and sound barriers; Results of ambient noise level	Visual inspection by PIU and PDSC on monthly basis. Frequency and sampling sites to be finalized.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	near health care facilities, educational institutions and places of worship.	• 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.		measurements.	
15. Aesthetics	Interference with the enjoyment of the area and creation of unsightly or offensive conditions	• dispose excess spoils as per the sample Spoil Management Plan attached in **Appendix 3** of IEE; • avoid stockpiling of excess excavated soils as far as possible; • avoid disposal of any debris and waste soils in or near water bodies/rivers; • coordinate with PIU for beneficial uses of excess excavated soils or immediately dispose to designated areas; • recover used oil and lubricants and reuse or remove from the sites; • Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas; and • Remove all wreckage, rubbish, or temporary structures which are no longer required.	Contractor	Number of complaints from sensitive receptors; Worksite clear of hazardous wastes; Worksite clear of any wastes unutilized materials, and debris; Transport route and worksite cleared of dirt	Visual inspection by PIU and PDSC on monthly basis
B. Ecological Resources					

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
16. (Biodiversity) Terrestrial ecology including terrestrial biodiversity	Removing and damaging flora particularly trees and fauna by the construction workers Threat to animals due to poaching or leisure catching by workers in the subproject areas	• Prevent workers or any other person from removing and damaging any flora (trees) and fauna found in the subproject sites; • Prohibit employee and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.	Contractor	Complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	Visual inspection by 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 Bangshi River. As such, aquatic species particularly fishes found at the Bangshi river likely to be affected.	• avoid excavation and other civil works during monsoon season; • not to undertake construction works near these sites during the spawning and breeding period between June and September.	Contractor	Reports of Contractors to PIU.	Visual inspection by PIU and PDSC on monthly basis
18. Slope erosion and sedimentation	Sedimentation of surface drainage networks, biological systems disruption The silts and solid wastes from the road surface may be washed down to the subproject drains, which could result to heavy siltation and obstruct flow along the drain.	The design to consider the following: • The inlet design to ensure that only storm or rain water flows into the drainage system; • Retaining the existing plants and vegetation to prevent soil erosion along the drains. • 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	Contractor	Visual Inspection	Monthly in the segment of construction.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• Designing channels and ditches for post-construction flows • Lining steep channel and slopes (e.g. use jute matting)			
19. Disposal of excavated spoil	• Inappropriate disposalof spoils will cause nuisances to the surroundings; • Stocking of excavated spoils at subproject site for longer period shall create potential nuisance (such as spread bad smells and increase population of harmful mosquitos and flies) and community complaints; • disposal of any debris and waste/excavated soils in or near water bodies, rivers//khals/ canals, shall pollute the subject water courses;	• Recover or collect the non-biodegradable waste materials from the mixture of excavated soils. • Handle and haul the non-biodegradable wastes and hazardous materials separately from the excavated soil; • Dispose excavated spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints; • Haul all wastes using transport equipment such as dump trucks with proper cover(e.g., tarpaulin) to avoid accidental release along the route to the disposal site; • Utilize haulers that are authorized to handle and transport these kinds of wastes. • dispose excess spoils per the Spoil Management Plan attached in Appendix 3; • avoid stockpiling of excess excavated soils as far as possible; • avoid disposal of any debris and waste/excavated soils in or near water bodies/rivers; • coordinate with PIU for beneficial uses of	PIU	Visual Inspection	Visual inspection by PIU, and cleaning on semi-annually or as and when situation demands.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		excess excavated soils or immediately dispose to designated areas; • For the disposal of subproject excavated soils/spoils, the contractor shall submit the spoil management plan showing disposal site before commencing of the work. • avoid excavation and other civil works during monsoon season; • store spoils away from the canal to avoid being washed down back to the canal(ideally at least 100 m from the surface water);			
C. Socioeconomic Characteristics					
20. Traffic and disturbance to community	At some areas along the subproject Khal, some construction and rehabilitation works will impede the flow of traffic. These activities may also cause damage to community facilities and utilities that could result to inconvenience of the local people.	• prepare and implement a traffic management plan in collaboration with local authorities; • where traffic congestion will likely occur, place traffic flagmen during working hours; • provide compensation to affected people; • manage stockpile; • manage pumped water from excavations either to drains or drums for later use; • relocate the affected power supply poles, and advise the concerned authority during accidental damage to utilities. • erect and maintain barricades if required	Contractor	Traffic route during construction works, Including number of permanent signs, barricades, and flagmen on worksite; Number of complaints from sensitive receptors; Some signages placed at the subproject location; Number of walkways, signages, and metal sheets placed at subproject location	Visual inspection by Dhamrai PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• inform through display board about nature, duration of construction and contact for complaints • complete the work quickly nearby institution, place of worship, business, hospitals, and schools. • consult with business and institutions for work schedules. • restore damaged properties and utilities			
21. Socioeconomic status	• Opportunity for increasing local revenue.	• Engage the local workforce. • Secure construction materials from local market.	Contractor	Employment records; Records of sources of materials Records of compliance to Bangladesh Labor Act 2006	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 (Footnote 15) • 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.	Contractor	The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (Appendix 10); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at the subproject location;	Visual inspection by PIU and PDSC on weekly basis Frequency and sampling sites to be finalized

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• 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		Agreement between landowner and contractors in case of using private land as work camps, storage areas, etc.	
23. Workers Health & Safety	• There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. • Workers need to be mindful of the occupational hazards which can arise from working at height and excavation works.	• Implement the occupational health and safety plan in the SEMP, which follows international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities • Comply Labor Act 2006 • Exclude public from worksites • Provide personal protective equipment to workers and ensure their effective usage • Document procedures to be followed	Contractor	Equipped first-aid stations; Medical insurance coverage for workers; Number of accidents; Records of supply of uncontaminated water; Condition of eating areas of workers; Record of health and safety orientation training; Availability of personal protective equipment at construction site;	Visual inspection by PIU and PDSC on a weekly basis. Frequency and sampling sites to be finalized

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	• COVID-19 hazards as well as the usual construction and transportation hazards	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; • 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		Number of moving equipment outfitted with audible back- up alarms; Signage for storage and disposal areas; Condition of sanitation facilities for workers; and Records of results of noise level measurements.	
D. Historical, Cultural, and Archaeological Characteristics					

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
24. Physical and cultural heritage	The subproject will not encroach or run over into any physical, and cultural resources. As well, the subproject area is not a potential archaeological area and therefore no impact is envisaged. There are no archaeological, paleontological, or architectural sites of significance listed by Bangladesh Department of Archaeology.	• However, as a precautionary approach, the contractor will be required to: • strictly follow the protocol by coordinating immediately with 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.
E. Others					
25. Submission of EMP implementation Report	Unsatisfactory compliance to EMP	• Appointment of EHS supervisor • Timely monitoring reports with field photographs	Contractor	Availability and competency of appointed supervisor Monthly report	Monthly monitoring report to be submitted by Contractor to PIU; Quarterly report by PIU to PMCU, and Semi-annual report by PMCU to ADB.
Post-Construction &Operational Phase					
26. Post Construction Activities	Damage due to debris, spoils, excess construction materials	• Remove spoils wreckage, rubbish, or temporary structures no longer required; • All excavated roads shall be reinstated to original condition; • All disrupted utilities should be	Contractor	PMCU and/or PIU report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored	Before handover of completed works to PIU.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		restored; • All affected structures rehabilitated /compensated; • The construction camp needs to clear of spills; e.g. oil, paint, etc. and other pollutants after dismantling; • All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled; • Request PMCU/PIU in writing that worksites and camps are vacated and restored to pre-project conditions.		to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	
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 drainage 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.	• The design includes cover slab for the proposed drain hence, it should be ensured that each drain is provided with cover slab • Prepare and implement maintenance plan. • Provision of regular monitoring. • Put into effect the local ordinance that prohibits discharge of domestic wastewater, septage and solid wastes into community canals including the subproject drains.	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	Dhamrai PIU shall undertake the following actions to ensure that the subproject	PIU	Visual Inspection	Visual inspection by PIU, and cleaning on

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	community may cause clogging of the drain/canal/khal	operates sustainably: • 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 canal. • 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

163. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist. **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 20: 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, As, NO^3 BOD^{5d}, COD,);and Noise level	All subproject sites	Contractor	Sampling & measurement of Ambient air quality (Surface water Ground water quality and Noise level	Once before commencement of construction activities (sampling will take place at the start and end part of the roads)	PMCU, PIU, PDSC
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					

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
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}, $PM_{2.5}$, NOx, SOx & CO); Surface water (pH, DO, Cl^- BOD^{5d}, COD, NH^4/NO^3, TSS, TDS & total coliform); Ground water quality (pH, DO, Cl^-, EC, As, NO^3 BOD^{5d}, COD,);and Noise level	Subproject sites	Contractor	Contractor records, Results of laboratory analyses	Semi-annually (sampling will take place at the start and end part of the roads)	PMCU, PIU, PDSC
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	Monthly	PIU, PDSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
			workers		
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. Passage of local ordinance prohibiting discharge of wastewater, septage and solid wastes into community drains including the subproject drain.	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
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

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
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 bridge site after completion of the 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

164. The PMCU safeguards experts (environmental and social) with support from PDSC Environment Specialist and Social Safeguard Specialist will be responsible for training the Dhamrai 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 project along with the frequency of sessions is presented in **Table 20:.**

Table 21: Training Program for Environmental Management

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

Items	Pre-construction	Construction	
	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 Module 3: COVID-19 H&S training	Reporting requirements	
Duration	1 day	1 day	1 day on a regular period to be determined by PMCU and PDSC
Participants	PMCU and PIU staff (technical and environmental) involved in the project implementation	PMCU, PIU, Contractors	PMCU, PIU, Contractors

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

165. Most of the costs associated with environmental mitigation and enhancement measures are included in the EMP budget. In consideration to the environmental impacts and their mitigation measures for this sub-project, some items need to be incorporated in the BOQ of this sub-project. A substantial part of environmental costs shall cover under Civil Works Contract. However, environmental costs under Civil Works Contract are not included here. Costs of these items will be dealt elsewhere in the respective project component document. The environmental costs presented in **Table 21:1** 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 22: Tentative EMP Budget for BOQ
(The following items need to be incorporated in the BOQ of this sub-project)

Item #	Description of Items	Unit	Quantity	Unit Rate, Taka	Item Total, Taka
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			3,20,000.00
2	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the Engineer-in-charge.	LS			1,30,000.00
3	Prevention of spillage, leakages of polluting materials to the entire satisfaction of the engineer-in-charge.	LS			10,000.00

4	Providing and maintaining adequate potable water supply facilities (Shallow Tube well) at camp site and work site to the entire satisfaction of engineer-in-charge. Water Supply Tube well 04 Nos.	Nos.	4	15,000.00	60,000.00
5	Providing and maintaining adequate sanitation facilities at camp site and work site to the entire satisfaction of engineer-in-charge. Sanitation Toilet 06 nos. (02 for women and 04 for men)	Nos.	6	10,000.00	60,000.00
6	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
7	Proper disposal of camp site wastes to the entire satisfaction of the engineer-in-charge.	LS			2,00,000.00
8	Maintain First aid box at camp site to the entire satisfaction of the Engineer-in-charge.	LS			20,000.00
9	Miscellineus	LS			1,00,000.00
Estimated cost for additional environmental items					**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 (DHAMRAI 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 (DHAMRAI 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 (DHAMRAI Clause 29.2 of General Conditions of Contract)

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
10	**Traffic Management** Maintaining traffic management at worksite from time of commencement of construction activities to time of completion activities, including ensuring that the road is safe for users (this includes providing necessary barricades, warning signs/lights, guide signs, flagmen, maintaining diversion roads by cutting, filling, constructing, etc. or by any other means) in accordance with the full satisfaction of the Engineering-in-charge.					Contractor (DHAMRAI Clause 27.1 (b) of General Conditions of Contract)
11	**Installation of signboards/billboards** 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	**Working labour shed:** Construction of Labor shed with C.I sheet Roofing, fencing and brick soling floor as per approved plan and to the entire satisfaction of the engineer-in-charge.					Contractor (DHAMRAI Clause 29.2 of General Conditions of Contract)
13	**Personal Protection Equipment for Workers** Providing and maintaining appropriate (safe design, fit and comfort) personal protection equipment (PPE) to ensure the highest possible protection for employees in establishing and maintaining a safe and healthful working environment at workplace.					Contractor (DHAMRAI Clause 27.1 (a), 29.1 of Particular Conditions of Contract)
14	**Removal of equipment/ surplus materials/ rubbish/temporary structures/fully reinstate** On completion of the Contract, Contractor shall remove the equipment, surplus materials, slope erosion, canal sedimentation, rubbish and temporary structures of all types and shall leave sites in clean condition to the entire satisfaction of the engineer-in-charge and local people					Contractor (DHAMRAI Clause 27, 40.3, 80.2 of Particular Conditions of Contract)
15	**Occupational Health and Safety** To ensure safety of health and hazards for construction workers including -Adequate housing for all workers					Contractor (DHAMRAI Clause 27, 29.1 of Particular Conditions of

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
	-Safe and reliable water supply; -Hygienic sanitary facilities and sewerage system					Contract)
16	**Community Health and Safety** To ensure safety of health and hazards on local resources and infrastructures of nearby communities					Contractor (DHAMRAI Clause 27 of Particular Conditions of Contract)
17	**COVID-19 Health and Safety** Washable cloth face mask, disposable hand gloves, wash basin & water container, soap, alcohol-based sanitizer, pump spray, disinfectant, tissue papers, garbage bin, plastic bag, contactless temperature reader etc.					Contractor (DHAMRAI 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 23: 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	10,000x12=1,20,000

				during construction phase)	
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

166. 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.

167. 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 15**. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

168. 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 16**. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

169. PMCU shall consolidated quarterly reports from the PIUs including Dhamrai PIU and results of its independent monitoring or inspection activities. PMCU shall accomplish semi-annual environmental monitoring report (SEMRs), which shall be submitted to ADB for review and disclosure on ADB website. Submission of SEMR will continue until ADB issues a Project Completion Report. The template for the SEMR (Semi is attached as **Appendix 17**.

170. 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.

171. 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

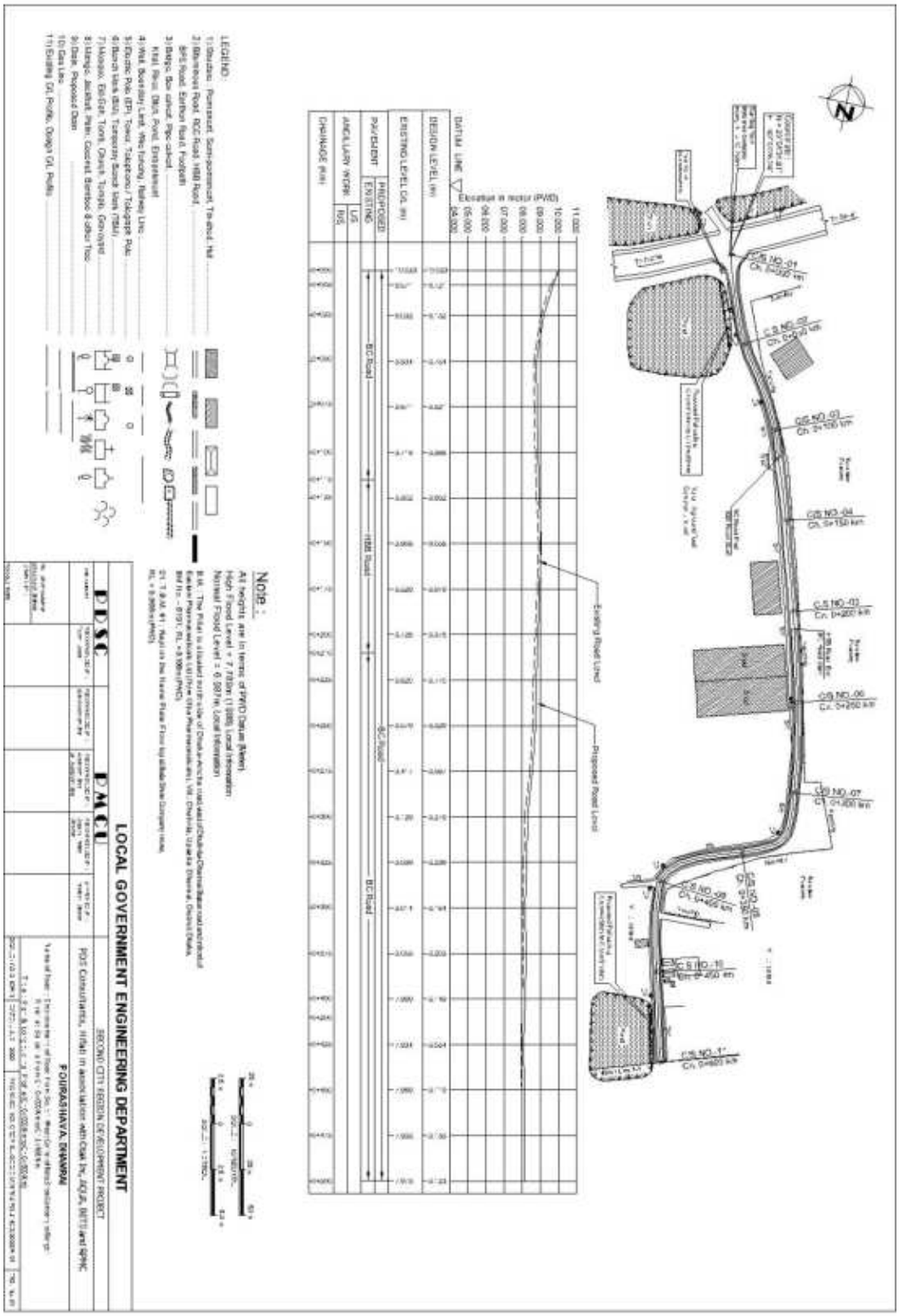
172. The proposed subproject is not an environmentally critical undertaking. IEE indicates that the proposed subproject, and its components, is not located within or adjacent to environmentally sensitive areas.

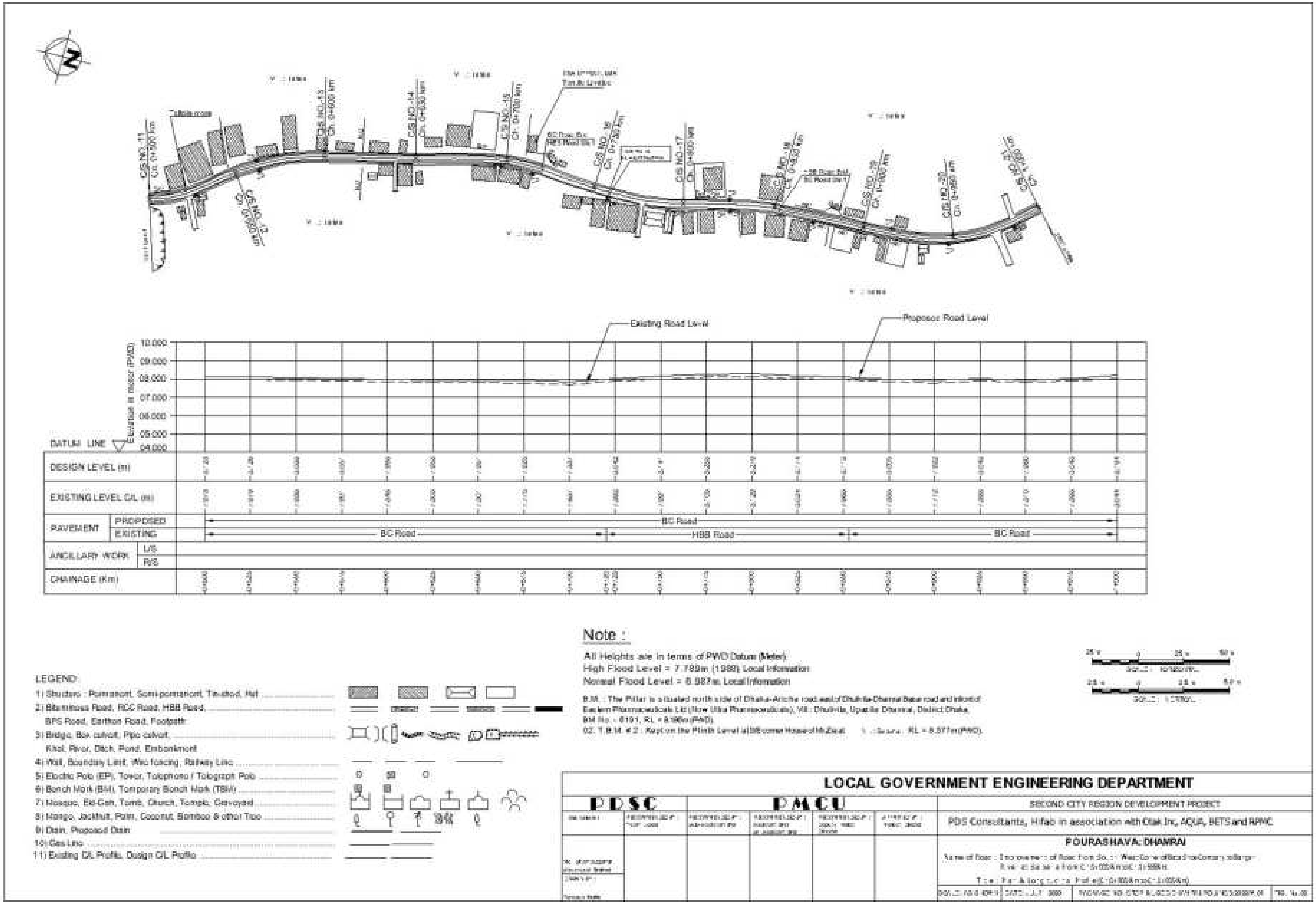
173. The extent of adverse impacts is expected to be local, confined within the projects' main areas of influence, waste disposal sites, and the routes to and from these sites. With mitigation measures in place and ensuring that the bulk of earthworks are completed before the onset of the rainy season,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

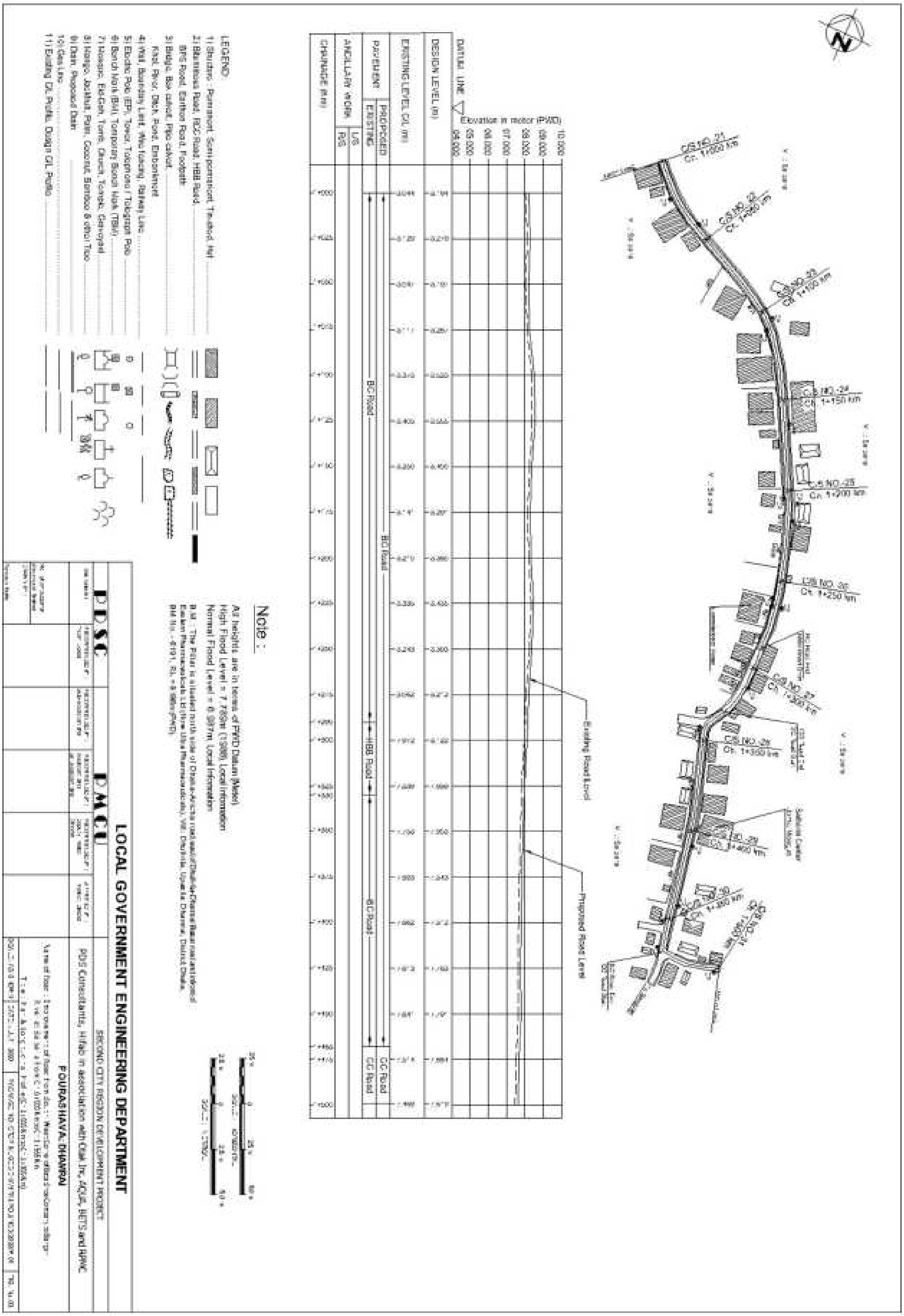
174. The few adverse impacts of moderate magnitude during construction will be temporary and short-term (i.e., most likely to occur only during peak construction activities). These will not be sufficient to threaten or weaken the surrounding resources. Mitigation measures, integral to socially and environmentally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

175. Based on the above findings, the classification of the subproject under Package No. CRDP-II/LGED/DHAMRAI/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 Dhamrai 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.

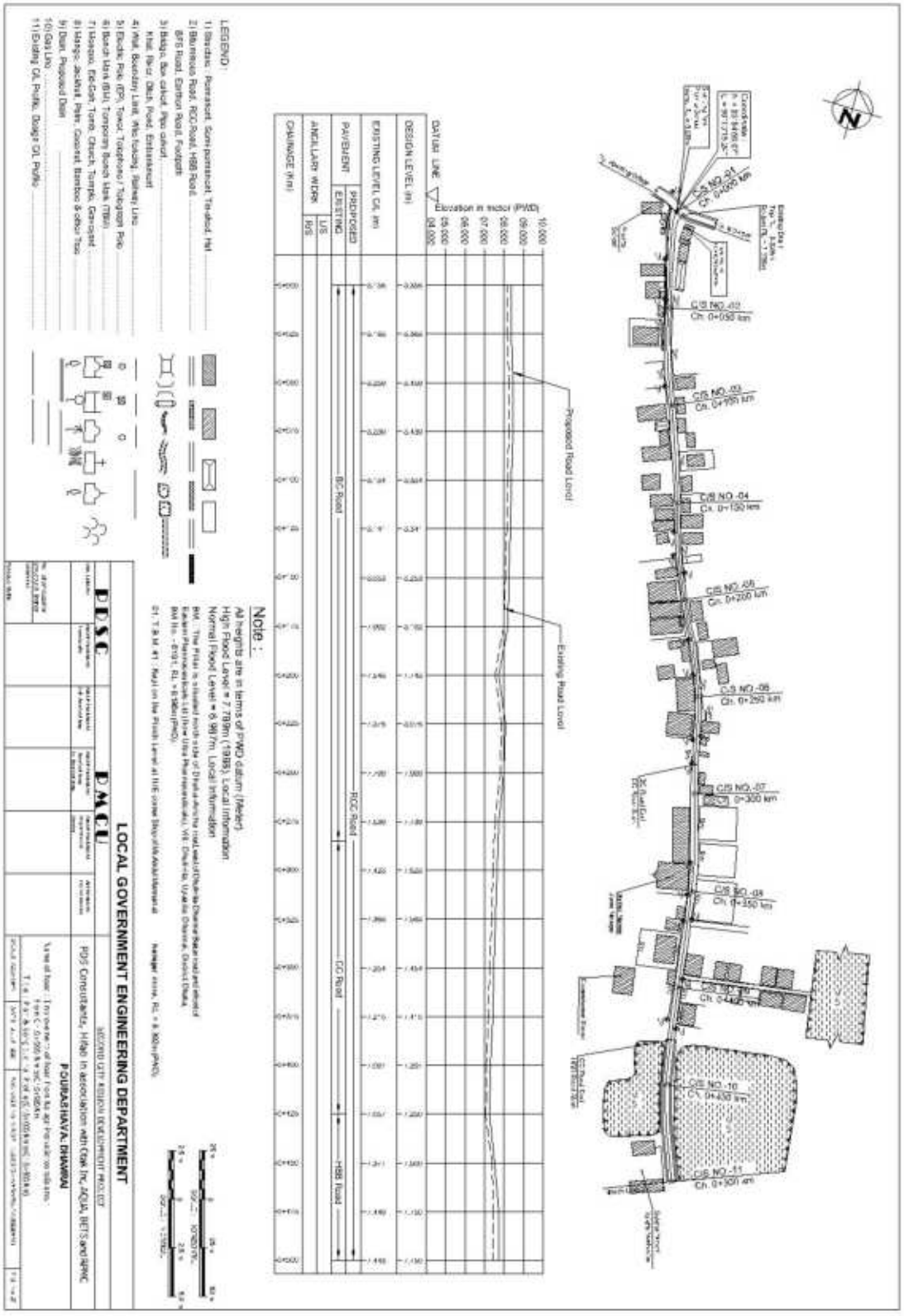
Appendix 1: Strip Maps of Subproject Road Alignments of Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)

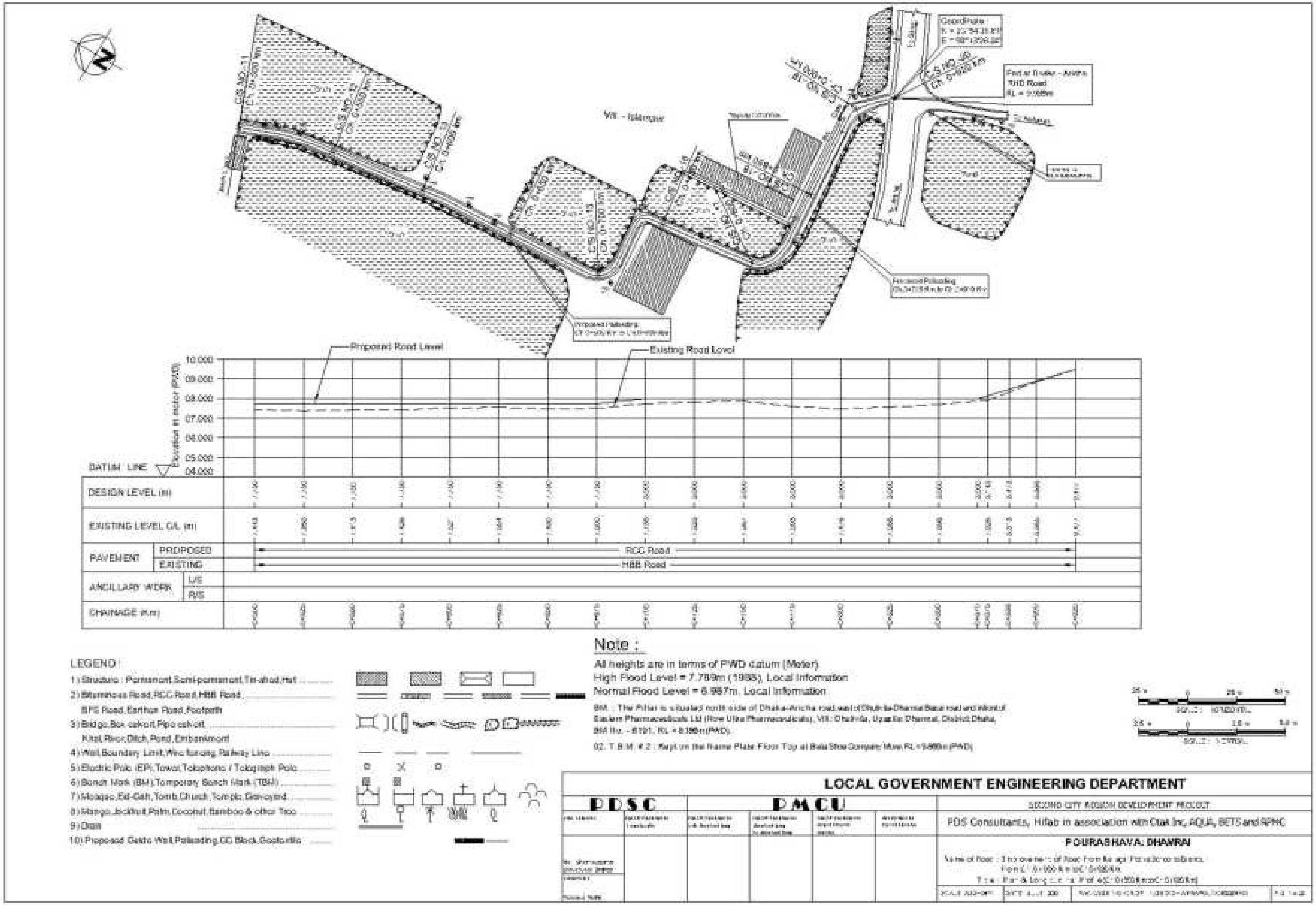



C/S NO.-11
Ch. 0+500 km
C/S NO.-12
C/S NO.-13
Ch. 0+600 km
C/S NO.-14
Ch. 0+630 km
C/S NO.-15
Ch. 0+700 km
C/S NO.-16
Ch. 0+730 km
C/S NO.-17
Ch. 0+800 km
C/S NO.-18
Ch. 0+830 km
C/S NO.-19
Ch. 0+900 km
C/S NO.-20
Ch. 0+950 km
C/S NO.-21
Existing Road Level
Proposed Road Level
10.000
09.000
08.000
07.000
06.000
05.000
04.000
DATUM LINE
Elevation in meter (PWD)
DESIGN LEVEL (m)
EXISTING LEVEL C/L (m)
PAVEMENT
PROPOSED
EXISTING
BC Road
HBB Road
ANCILLARY WORK
L/S
R/S
CHAINAGE (Km)
Note :
All Heights are in terms of PWD Datum (Meter).
High Flood Level = 7.789m (1988), Local Information
Normal Flood Level = 6.987m. Local Information
LEGEND:
1) Structure : Permanent, Semi-permanent, Tin-shed, Hut
2) Bituminous Road, RCC Road, HBB Road,
BFS Road, Earthen Road, Footpath
3) Bridge, Box culvert, Pipe culvert,
Khal, River, Ditch, Pond, Embankment
4) Wall, Boundary Limit, Wire fencing, Railway Line
5) Electric Pole (EP), Tower, Telephone / Telegraph Pole
6) Bench Mark (BM), Temporary Bench Mark (TBM)
7) Mosque, Eid-Gah, Tomb, Church, Temple, Graveyard
8) Mango, Jackfruit, Palm, Coconut, Bamboo & other Tree
9) Drain, Proposed Drain
10) Gas Line
11) Existing C/L Profile, Design C/L Profile
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
PDSC
PMCU
SECOND CITY REGION DEVELOPMENT PROJECT
PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
POURASHAVA: DHAMRAI


Existing Road Level
Proposed Road Level
Elevation in meter (PWD)
DATUM LINE
DESIGN LEVEL (m)
EXISTING LEVEL G/L (m)
PAVEMENT
PROPOSED
EXISTING
BC Road
HBB Road
CC Road
ANCILLARY WORK
L/S
R/S
CHAINAGE (Km)
Note :
All heights are in terms of PWD Datum (Meter)
High Flood Level = 7.789m (1988), Local Information
Normal Flood Level = 6.987m, Local Information
LEGEND
1) Structure : Permanent, Semi-permanent, Tinshed, Hut
2) Bituminous Road, RCC Road, HBB Road, BFS Road, Earthen Road, Footpath
3) Bridge, Box culvert, Pipe culvert, Khal, River, Ditch, Pond, Embankment
4) Wall, Boundary Limit, Wire fencing, Railway Line
5) Electric Pole (EP), Tower, Telephone / Telegraph Pole
6) Bench Mark (BM), Temporary Bench Mark (TBM)
7) Mosque, Eid-Gah, Tomb, Church, Temple, Graveyard
8) Mango, Jackfruit, Palm, Coconut, Bamboo & other Tree
9) Drain, Proposed Drain
10) Gas Line
11) Existing G/L Profile, Design G/L Profile
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
PDSC
PMCU
SECOND CITY REGION DEVELOPMENT PROJECT
PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
POURASHAVA: DHAMRAI

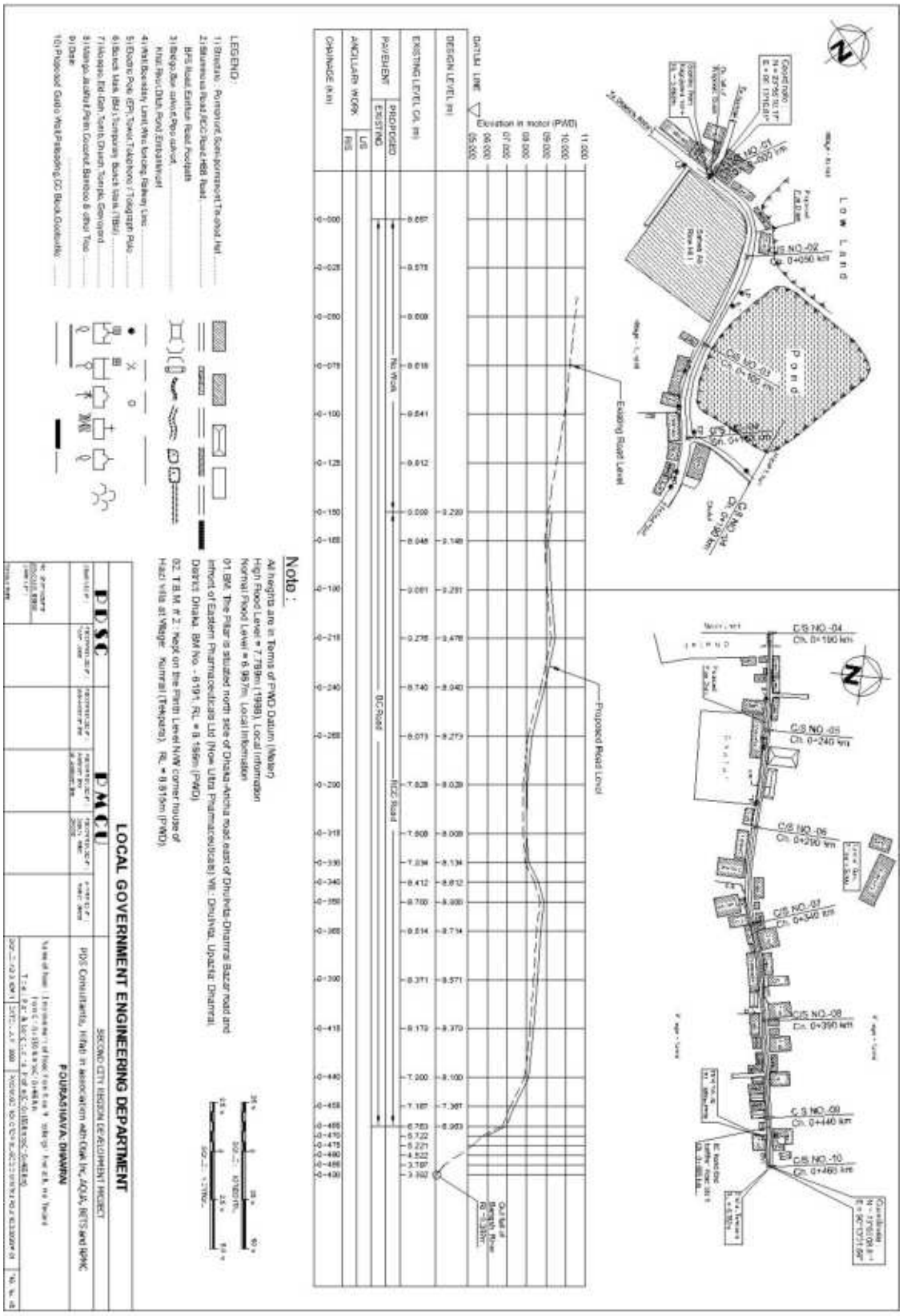
Appendix 2: Strip Maps of Subproject Road Alignments of Road from Kaliagar Protiva School to Islampur (Road: Rd-02)



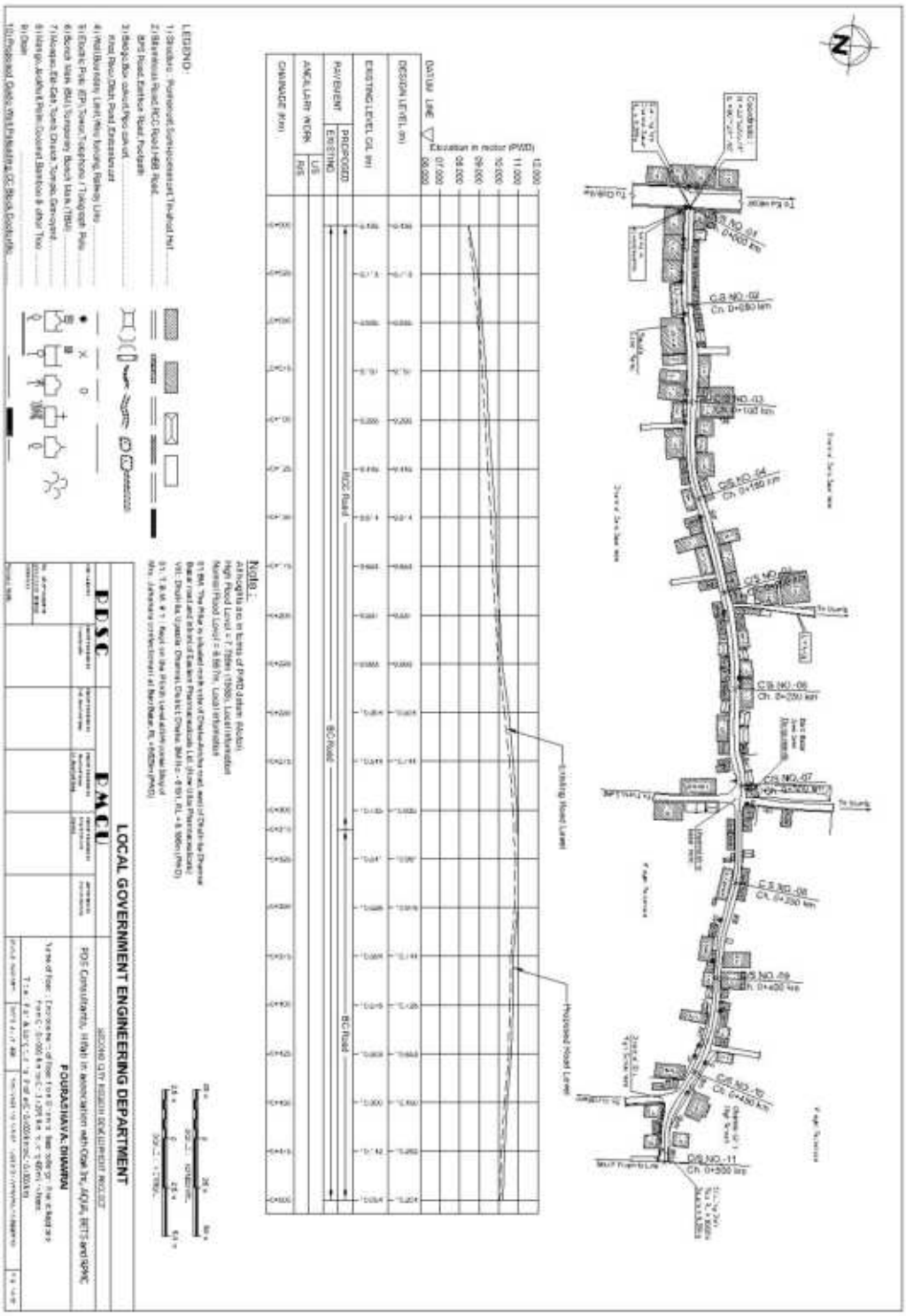


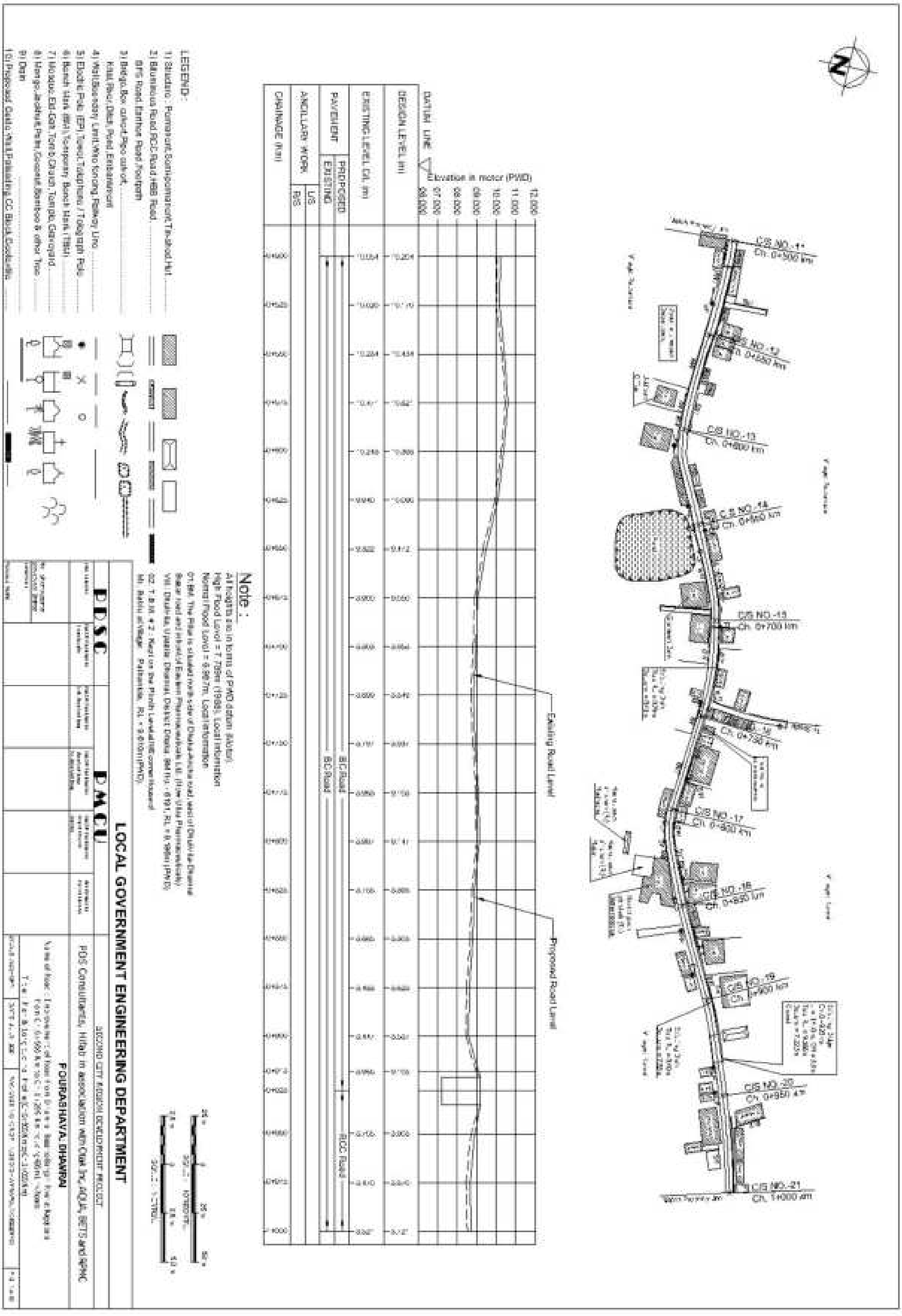
Vill - Islampur
C/S NO.-11
C/S NO.-15
Coordinate :
Fed at Dhaka - Aricha RHD Road
Proposed Road Level
Existing Road Level
Elevation in meter (PWD)
DATUM LINE
10.000
09.000
08.000
07.000
06.000
05.000
04.000
DESIGN LEVEL (m)
EXISTING LEVEL G/L (m)
PAVEMENT
PROPOSED
EXISTING
RCC Road
HBB Road
ANCILLARY WORK
L/S
R/S
CHAINAGE (Km)
Note :
All heights are in terms of PWD datum (Meter)
High Flood Level = 7.789m (1988), Local Information
Normal Flood Level = 6.987m, Local Information
LEGEND :
1) Structure : Permanent,Semi-permanent,Tin-shed,Hut
2) Bituminous Road,RCC Road,HBB Road,
BFS Road, Earthen Road,Footpath
3) Bridge,Box culvert,Pipe culvert,
Khal,River,Ditch,Pond,Embankment
4) Wall,Boundary Limit,Wire fencing,Railway Line
5) Electric Pole (EP),Tower,Telephone / Telegraph Pole
6) Bench Mark (BM),Temporary Bench Mark (TBM)
7) Mosque,Eid-Gah,Tomb,Church,Temple,Graveyard
8) Mango,Jackfruit,Palm,Coconut,Bamboo & other Tree
9) Drain
10) Proposed Guide Wall,Palisading,CC Block,Geotextile
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
PDSC
PMCU
SECOND CITY REGION DEVELOPMENT PROJECT
PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
POURASHAVA: DHAMRAI

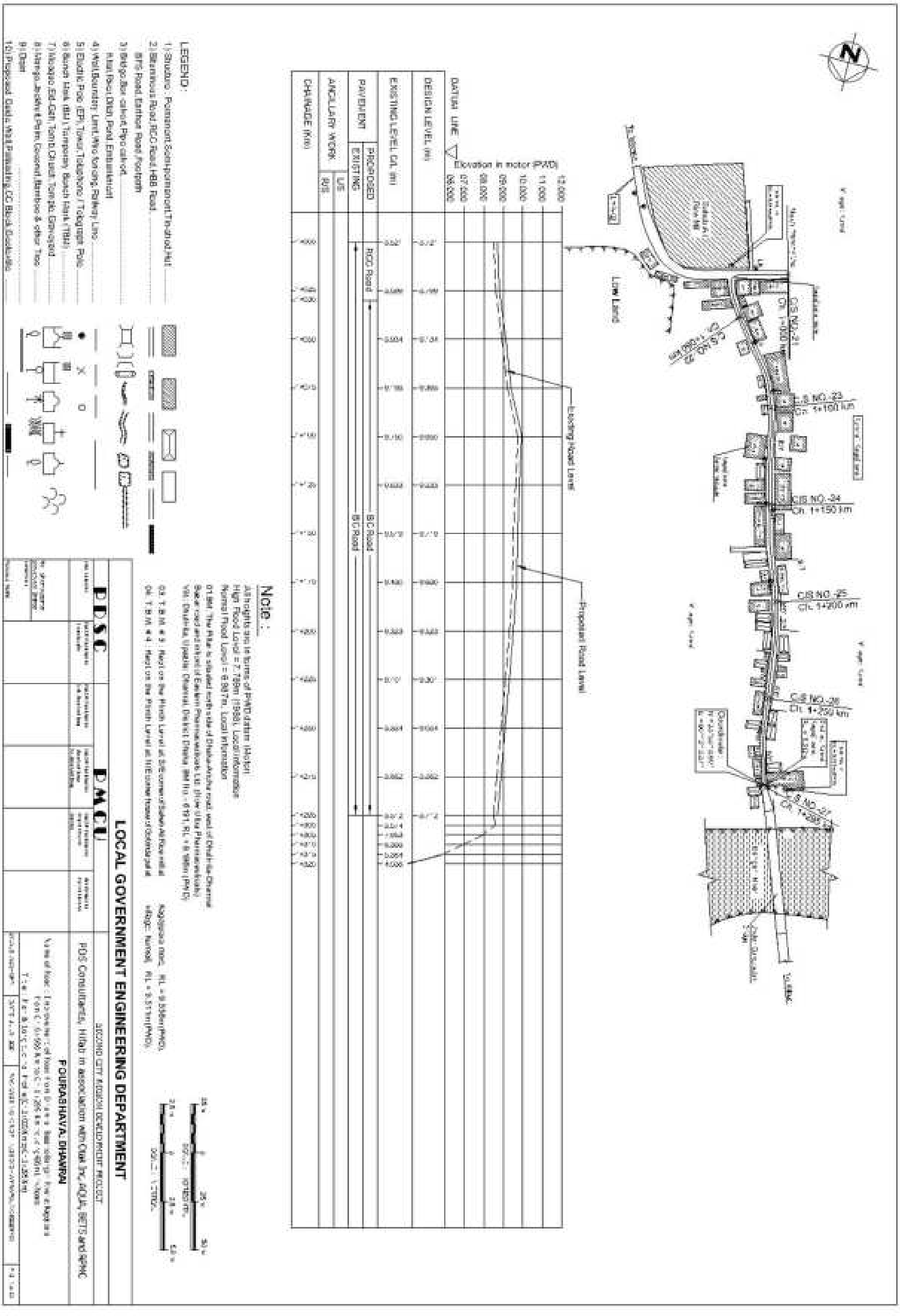
Appendix 3: Strip Maps of Subproject Alignments of Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)

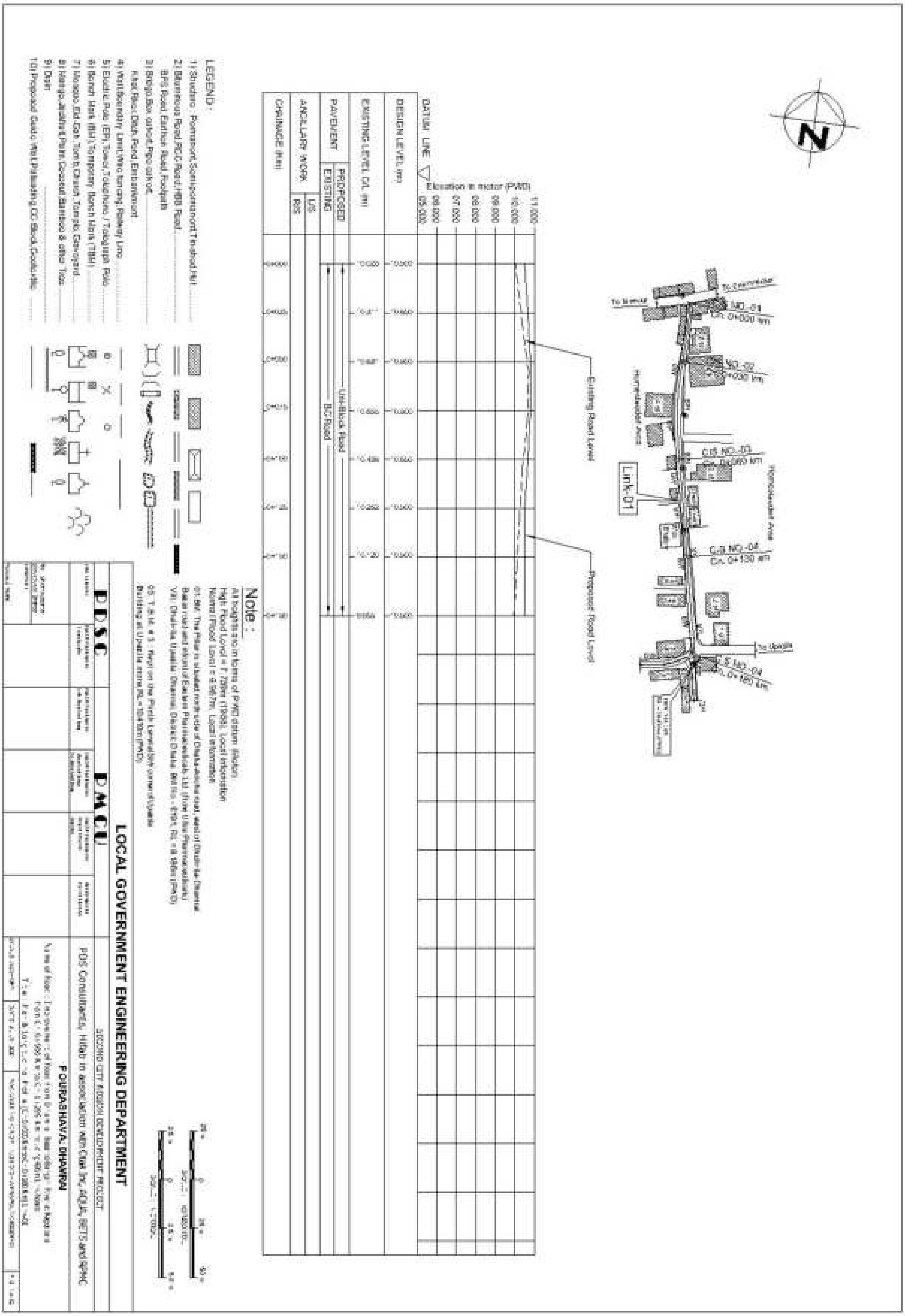


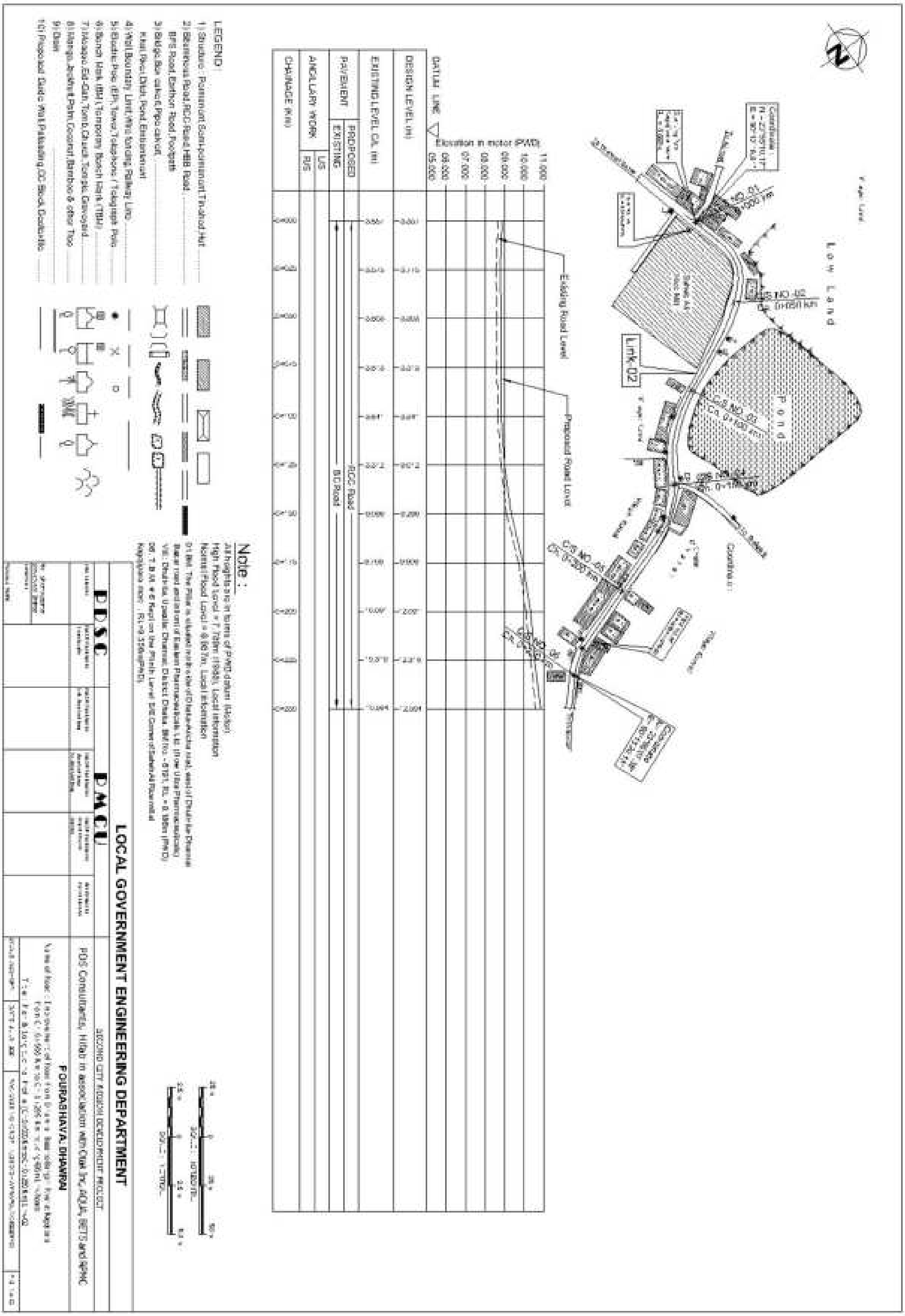
Appendix 4: Strip Maps of Subproject Alignments of Road from Dhamrai Bazar to Bangshi River at Kagojipara including 330m Link Roads (Road: Rd-04)




LOCAL GOVERNMENT ENGINEERING DEPARTMENT
POURASHAVA: DHAMRAI
LEGEND:
Note :
Existing Road Level
Proposed Road Level
DATUM LINE
DESIGN LEVEL (m)
EXISTING LEVEL C/L (m)
PAVEMENT
PROPOSED
EXISTING
ANCILLARY WORK
CHAINAGE (Km)
C/S NO.-13
C/S NO.-15
C/S NO.-17
C/S NO.-20
C/S NO.-21
Ch. 1+000 km
BC Road
RCC Road


C/S NO.-21
Ch. 1+000 km
C/S NO.-22
C/S NO.-23
Ch. 1+100 km
C/S NO.-24
Ch. 1+150 km
C/S NO.-25
Ch. 1+200 km
C/S NO.-26
Ch. 1+250 km
C/S NO.-27
Low Land
Existing Road Level
Proposed Road Level
Elevation in meter (PWD)
DATUM LINE
DESIGN LEVEL (m)
EXISTING LEVEL C/L (m)
PAVEMENT
PROPOSED
EXISTING
RCC Road
BC Road
ANCILLARY WORK
U/S
R/S
CHAINAGE (Km)
Note :
All heights are in terms of PWD datum (Meter)
High Flood Level = 7.789m (1988), Local information
Normal Flood Level = 6.987m, Local information
LEGEND:
1) Structure : Permanent,Semi-permanent,Tin-shed,Hut
2) Bituminous Road,RCC Road,HBB Road,
BFS Road,Earthen Road,Footpath
3) Bridge,Box-calvert,Pipe calvert,
Khal,River,Ditch,Pond,Embankment
4) Wall,Boundary Limit,Wire fencing,Railway Line
5) Electric Pole (EP),Tower,Telephone / Telegraph Pole
6) Bench Mark (BM),Temporary Bench Mark (TBM)
7) Mosque,Eid-Gah,Tomb,Church,Temple,Graveyard
8) Mango,Jackfruit,Palm,Coconut,Bamboo & other Tree
9) Drain
10) Proposed Guide Wall,Palisading,CC Block,Geotextile
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
PDSC
PMCU
SECOND CITY REGION DEVELOPMENT PROJECT
PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
POURASHAVA: DHAMRAI


LEGEND:
Note :
Link-01
Existing Road Level
Proposed Road Level
Elevation in meter (PWD)
DATUM LINE
DESIGN LEVEL (m)
EXISTING LEVEL C/L (m)
PAVEMENT
ANCILLARY WORK
CHAINAGE (km)
LOCAL GOVERNMENT ENGINEERING DEPARTMENT


LOCAL GOVERNMENT ENGINEERING DEPARTMENT
LEGEND
Note :
Pond
Low Land
Link-02
Existing Road Level
Proposed Road Level
DATUM LINE
Elevation in meter (PWD)
DESIGN LEVEL (m)
EXISTING LEVEL C/L (m)
PAVEMENT
PROPOSED
EXISTING
ANCILLARY WORK
CHAINAGE (Km)
RCC Road
BC Road

Appendix 5: Sample Spoil Management Plan

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

Objectives of SMP: The objectives of SMP are:

- To minimize spoil generation where possible
- Maximize beneficial reuse of spoil from construction works in accordance with spoil management hierarchy
- Mange onsite spoil handling to minimize environmental impacts on resident and other receivers
- Minimize any further site contamination of land, water, soil
- 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	PotentialImpacts
Air Quality	Potential for high winds generating air borne dust from the stockpiles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potential for spillage of spoil from truck on roads
Surface and groundwater	Contamination of surface and ground water
Noise	Associated with spoil handling and haulage and storage
Traffic	Impacts associated with spoil haulage
Land Use	Potential for spoil to be transported to a that does not have permission for storage/disposal
Design specifications	Limitations on opportunities to minimize spoil generation
Sustainability	Limited sites for storage, reuse opportunities

Spoil volumes, Characteristics and Minimization

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

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

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

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

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

Storage and stockpiling Transportation and haulage route

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

Summary of Key Issues and Remedial Actions

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

Appendix 6: 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

স্থানীয় সরকার প্রকৌশল অধিদপ্তরের আওতায় বৃক্ষরোপণ ও সংরক্ষণ এবং বৃক্ষসম্পদ বন্টন কার্যক্রম বাস্তবায়ন ম্যানুয়াল

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

Local Government Engineering Department

স্থানীয় সরকার প্রকৌশল অধিদপ্তর

April 2003

এপ্রিল ২০০৩ ইং

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

Table of Contents

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

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

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

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

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

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

3.2 Implementation

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

3.4 Wages

3.5 Financing

3.6 Implementing Agency

3.7 Tree Resources Distribution

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

Annexures

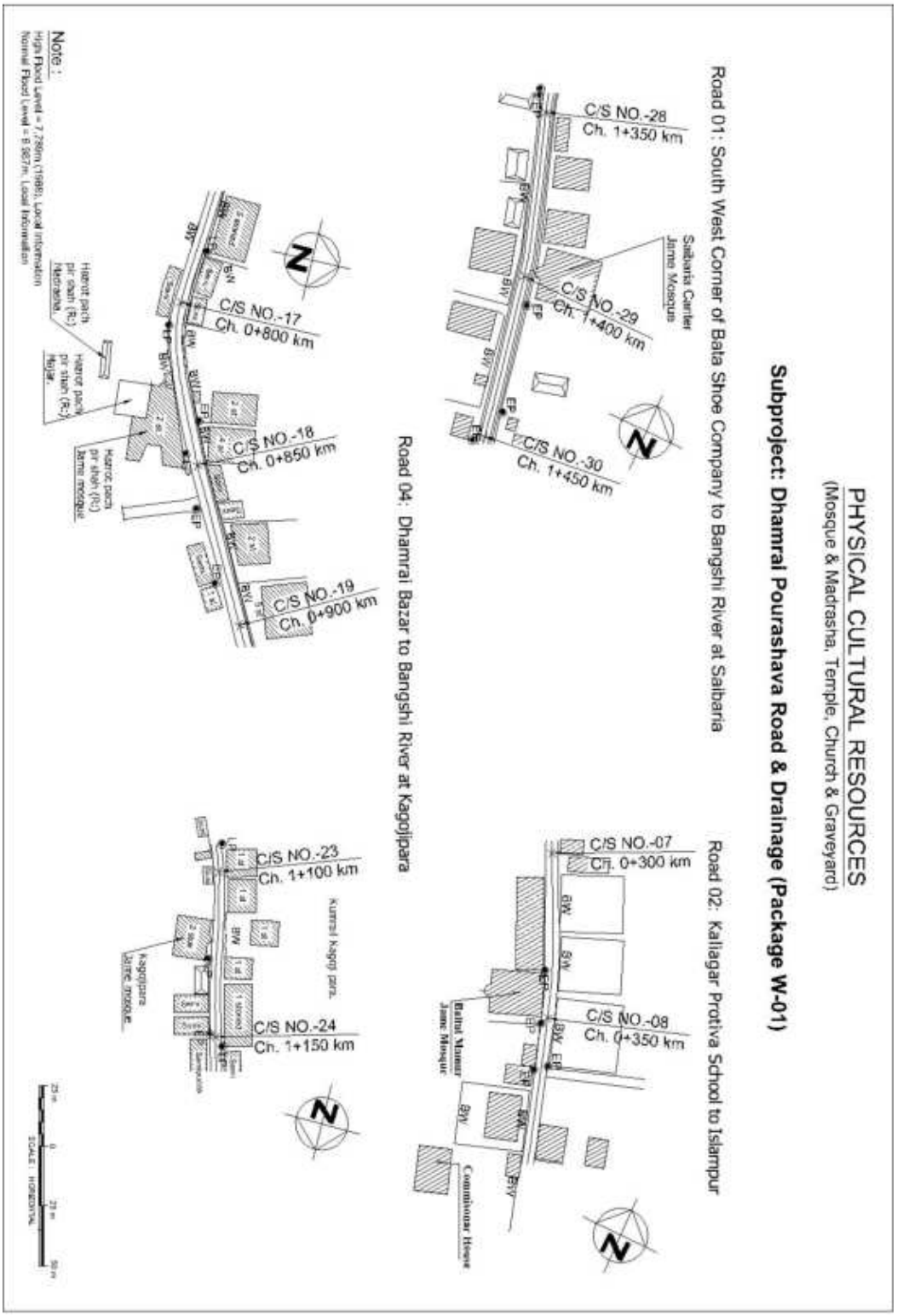
A) Road

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

B) Embankment

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

Appendix 7: Strip Maps Showing PCRs (Religious Establishments) Along the Road Alignments



Appendix 8: Public Consultation

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

<table>
<tr><th>Sl. No</th><th>Date of Consultation</th><th>Road & Place of consultation</th><th>Objective/Number & Type of Participants</th><th>Issues Discussed</th></tr>
<tr><td>01</td><td>08.12.19</td><td>a) Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)
Venue:
Dhamrai Pourashava Meeting Hall</td><td rowspan="4"><u>Objectives of Consultation</u>:
• 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

<u>Number /Type of Participants:</u>
63 (Male 40+Female23 - (Mayor, Councilors, Retired Govt. Officials, Local Elite, Businessmen, project beneficiaries etc.)</td><td rowspan="4">General perception about the project and the awareness about the proposed project are disseminated in the meeting. The following pre-defined issues are discussed in the consultation meetings:
• Information dissemination about the subproject
• possible impacts of the subproject
• participation of local people in different project activities
• Employment potential for local people in the project works
• Loss of residential/commercial structures, if any due to the project
• Resettlement and land acquisition (if foreseen specially on private land).
• Impact on social issues due to the project
• Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites), if any
• Any critical issue or concern by the local people regarding the project
• Grievances redress mechanism etc.</td></tr>
<tr><td>02.</td><td>08.12.19</td><td>b) Road from Kaliagar Protiva School to Islampur (Road: Rd-02)

Venue:
Dhamrai Pourashava Meeting Hall</td></tr>
<tr><td>03</td><td>08.12.19</td><td>c) Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)

Venue:
Dhamrai Pourashava Meeting Hall</td></tr>
<tr><td>04</td><td>08.12.2019</td><td>d) Road from Dhamrai Bazar to Bangshi River at Kagojipara including 330m Link Roads (Road: Rd-04)
Venue:
Dhamrai Pourashava Meeting Hall</td></tr>
</table>

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

1. Consultation for Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)
2. Consultation for Road from Kaliagar Protiva School to Islampur (Road: Rd-02)
3. Consultation for Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)
4. Consultation for Road from Dhamrai Bazar to Bangshi River at Kagojipara including 330m Link Roads (Road: Rd-04)


SULTATION MEETING
ON
DRAINAGE MASTER PLAN
DHAMRAI POURASHAVA
08/12/2019 01:16


07/12/2019 23:58

Consultation for Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)

Consultation for Road from Kaliagar Protiva School to Islampur (Road: Rd-02)

Consultation for Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)

Consultation for Road from Dhamrai Bazar to Bangshi River at Kagojipara including 330m Link Roads (Road: Rd-04)

LIST OF PARTICIPANTS

(১)

প্রকল্পের নামঃ- উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Pourashava Drainage Master Plan Dhamrai

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা তারিখঃ- 08-12-2019

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।	GOLAM KABIR 01714208417	MAYOR	
২।	PETER DAWES	TL PDS TEAM CRDO	
৩।	Md. Abdun Noor Deputy Team Leader, PDSC 01911326482	DTL PDSC	
৪।	Md. Golam Mustafa Drainage Design Expt-1 01712860112	Engineer	Ghmustfa
৫। ✓	Shafiq Anwar Gulshan 01711379460	RCPD.	
৬।	Ghulam Sarwar Dhamrai, 01814351893	Business	
৭।	KH. MASHUR RAHMAN DHAMRAI 01711907683	Business	
৮।	MASBOM KHAN 01711534771	Business	
৯।	Md. Zakir Hossain Chy.	Councilor	
১০।			

প্রকল্পের নামঃ- উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Dhaurai Pouraskova waste plan.

ফোকাস গ্রুপ আলোচনায় অংশগ্রহনকারীর হাজিরা তারিখঃ-

Attendance of FGD participants Date: 08.12.2019

ক্রমিক নং Sl. no	নাম ঠিকানা মোবাইল নম্বর Name ,address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।			
২।	01711949912		
৩।	01727798666		
৪।	Md AG Jhur Rahman 01712-097917	Dhaurai	
৫।	Md. Naimur Rahman 01711-115876		
৬।	MD. KAWSAR KHAN 01727332910		
৭।	01-12-19		
৮।	Md. Anfar Alam Arif 01711 640580	Bussines	
৯।	Mafuz Ali 01970038512	Privat Service	
১০।	01916622666		

৩

প্রকল্পের নামঃ- উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Dhamrai Pourashova Master plan.

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা তারিখঃ-

Attendance of FGD participants Date: 08.12.2019

ক্রমিক নং Sl. no	নাম ঠিকানা মোবাইল নম্বর Name ,address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।	Shirin Akter Shikha 01816- 841585	Councilor 4.5.6 No ward	Shirin 8/12/19
২।	Farhana Hossain 01909088330	Councilor 1.2.3 Ward	Farhana 8.12.19
৩।	[illegible] 01940968656	৫ নং ওয়ার্ড	[illegible]
৪।	[illegible] 01732871531	৪নং ওয়ার্ড	[illegible]
৫।	সেলিনা আক্তার [illegible] [illegible] 01784123696	৪র্থ ওয়ার্ড [illegible]	[illegible]
৬।	Rowshon Kali 01818-192944	SHABEK Councilor 01.02.03 ward	Kali 08.12.19
৭।	Chandana Rani Sarkar 01714584098	Secretary Dhamrai Pourashava	[illegible] 8/12.19
৮।	[illegible] [illegible] ওয়ার্ড [illegible]	[illegible]	[illegible]
৯।	[illegible] উপজেলা [illegible] 01711024747	Service	[illegible]
১০।	মো: [illegible] উপ-সহকারী [illegible] [illegible] 01915-444120	Service	[illegible] 8/12/19

(৪)

প্রকল্পের নামঃ- উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Dhamrai Pourashova Master plan.

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা তারিখঃ-

Attendance of FGD participants Date: 08.12.2019

ক্রমিক নং Sl. no	নাম ঠিকানা মোবাইল নম্বর Name ,address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।	[illegible] 01912[illegible]		
২।	Engr. Kazi Md Fazlul Haque Asstt. Engr. Dhamrai Pourashova	Service	
৩।	Anjuara AKTER 01720985678	Teacher	8.12.19
৪।	[illegible] 01552408051	Teacher	08.12.19
৫।	[illegible] 01936544185	Service	8.12.19
৬।	[illegible] 01752393589	House wife	
৭।	MD. Shahab Ali Councilor, Ward-06	Commissioner	
৮।	MD. Anowar Hossain 01712188394	Accounts officer	
৯।	[illegible] 01727209465	Town Planner	
১০।	[illegible] 01712-503518	SERVICE	

(৫)

প্রকল্পের নামঃ-

উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Dhamrai Pourashava Master plan.

ফোকাস গ্রুপ আলোচনায় অংশগ্রহণকারীর হাজিরা
Attendance of FGD participants:

তারিখ ঃ ০৮/১২/২০১৯
Date:

ক্রমিক নং Sl. no	নাম ঠিকানা মোবাইল নম্বর Name, address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।	MOHAMMAD AULAD HOSSAIN DHAMRAI POURASHAVA 01818774800	SERVICE	
২।	MD. DELWAR Hossain. SURVEYOR Dhamrai Paurashava	Service	01711-962079
৩।	HAJI. MD. MIZANUR RAHMAN DHAMRAI BAZER. 01744660224,	BUSINESSES	
৪।	Md. Shariful Islam Dhamrai Pourashava 01716233602	service	
৫।	MD. Shahadat DHAMRAI POURASHAVA DHAKA.	BUSINESSES	
৬।	MD. SAHIDUL AMIN 01924579199	BUSINESSES	
৭।	Md. Sarwar Khan majlish C - 01674606894	service POURASOVA	
৮।	Md. Dulul Amin 01718574013	Service	
৯।	Md. Tariqul Bari Khan 01716-639139	Assistant Tax Collector	
১০।	Md Rahul Amin 01920316797	Service	

প্রকল্পের নামঃ-

উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Dhamrai Pourashava Master plan.

ফোকাস গ্রুপ আলোচনায় অংশগ্রহণকারীর হাজিরা
Attendance of FGD participants:

তারিখ ঃ ০৮/১২/২০১৯
Date:

ক্রমিক নং Sl. no	নাম ঠিকানা মোবাইল নম্বর Name, address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।	মোঃ সোলেমান খান 01677506321	চাকুরী	
২।	[illegible] 01930512830	"	
৩।	মোঃ [illegible] 01926[illegible]	"	
৪।	মোঃ কাওছার হোসেন 01816079979	চাকুরী	
৫।	মোঃ আজিজুল ইসলাম 01741758175	"	
৬।	মোমী খান 01769335757	গৃহিনী	
৭।	আছিয়া আক্তার 01721136091	গৃহিনী	
৮।	মোঃ সেলিমুর রহমান	ঠিকাদারী ব্যবসা	
৯।	মোঃ খুরশেদ আলম 01915584506	চাকুরী	
১০।	ডালিয়া আক্তার	গৃহিনী	

(৭)

প্রকল্পের নামঃ-

উপজেলা/সিটিকর্পোরেশন/পৌরসভা

Name of Sub-project: Dhamrai Powashova Master plan .

ফোকাস গ্রুপ আলোচনায় অংশগ্রহণকারীর হাজিরা
Attendance of FGD participants:

তারিখ ঃ ০৮/১২/২০১৯
Date:

ক্রমিক নং Sl. no	নাম ঠিকানা মোবাইল নম্বর Name, address and mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১।	Suba AKter 01741758107	[illegible]	Suba
২।	Beauty akter Dhamrai powashava 01718-679760	Sub-Asst. Engr.	
৩।	[illegible] 01717304170	[illegible]	
৪।			
৫।			
৬।			
৭।			
৮।			
৯।			
১০।			

Appendix 9: Sample Grievance Registration Form
(To be available in Bangla and Other Local Language, if any)

The _____Project welcomes complaints, suggestions, queries and comments regarding project implementation. We encourage persons with grievance to provide their name and contact information to enable us to get in touch with you for clarification and feedback.
Should you choose to include your personal details but want that information to remain confidential, please inform us by writing/typing *(CONFIDENTIAL)* above your name. Thank you.

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

FOR OFFICIAL USE ONLY

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

Appendix 10: 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 11: 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

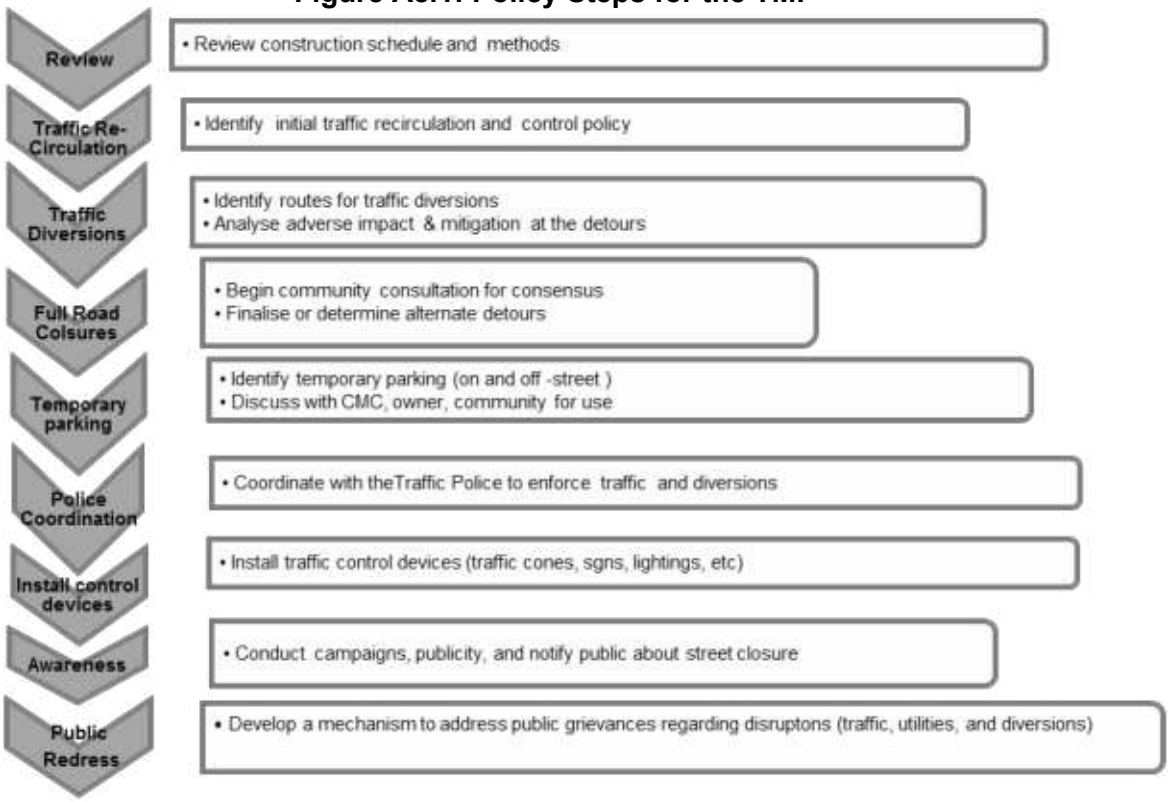
3. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

- 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”).

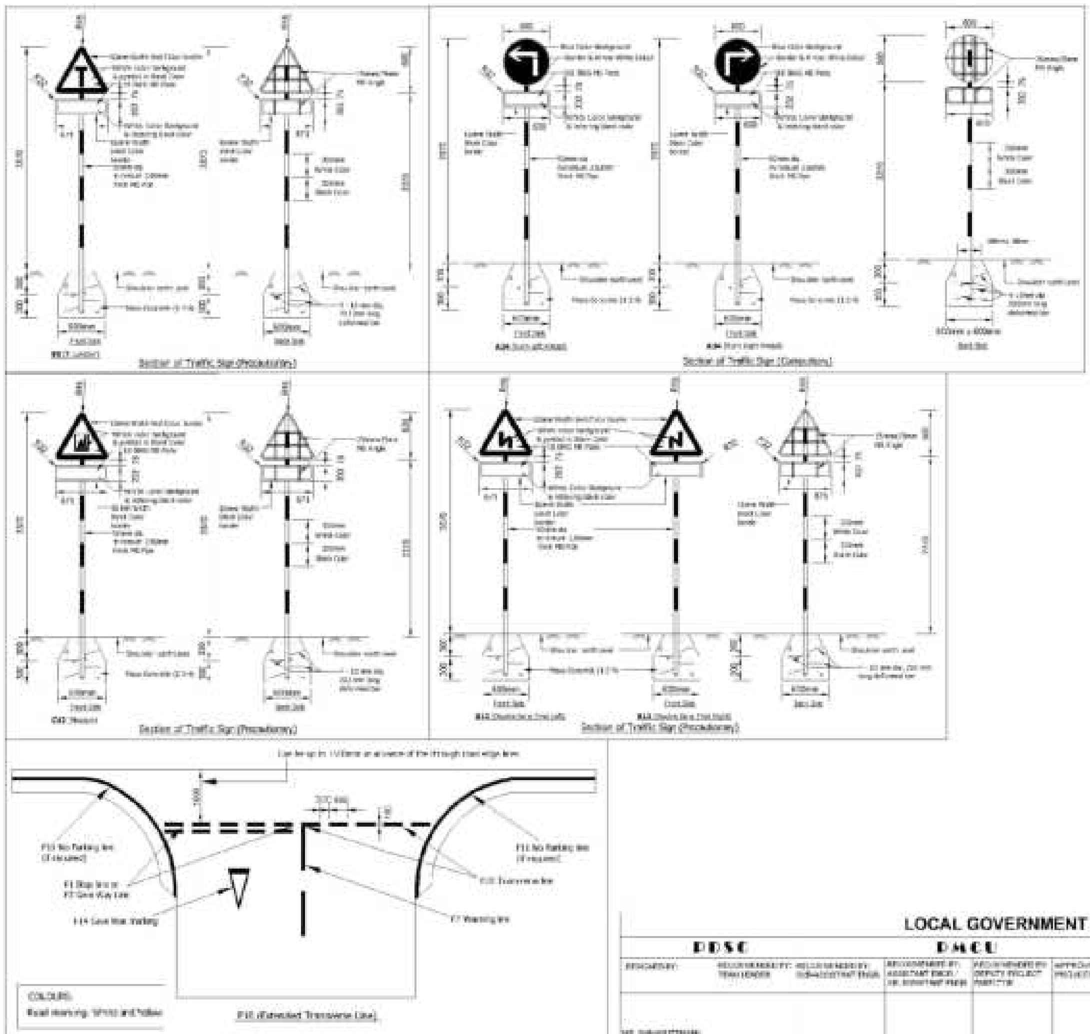
13. The work zone should take into consideration the space required for a buffer zone between the workers and the traffic (lateral and longitudinal) and the transition space required for delineation, as applicable. For the works, a 30 cm clearance between the traffic and the temporary STOP and GO signs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

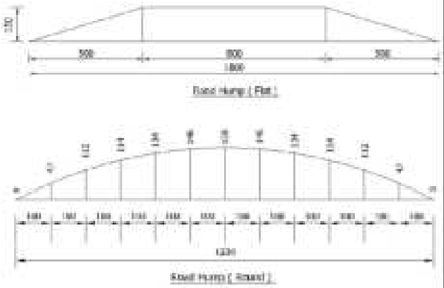
14. Traffic police should regulate traffic away from the work zone and enforce the traffic diversion result from full street closure in certain areas during construction. Flaggers/ personnel should be equipped with reflective jackets at all times and have traffic control batons (preferably the LED type) 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 4(four) candidate subproject roads are shown and described in the figures below:





Note:

1 (i). Improvement of Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (1.565 km)

Ch. 0+000Km = B5
Ch. 0+275Km = B12 (Right Turn First)
Ch. 0+450Km = B12 (Right Turn First)
Ch. 1+350Km = C13
Ch. 1+435Km = C13
Ch. 1+440Km = A34 (Turn Left)
Ch. 1+510Km = A34 (Turn Left + Right) (on main)

2 (i). Improvement of Road from Kallagar Protiva School to Islampur Rishipara (0.920 km)

Ch. 0+000Km = B5
Ch. 0+275Km = C13
Ch. 0+375Km = C13
Ch. 0+650Km = B12 (Left Turn First)
Ch. 0+770Km = B12 (Left Turn First)
Ch. 0+900Km = B5

4 (i). Improvement of Road from Dhamrai Bazar to Bangshi River at Kagojipara Including 430m Link Roads (1.295 km)

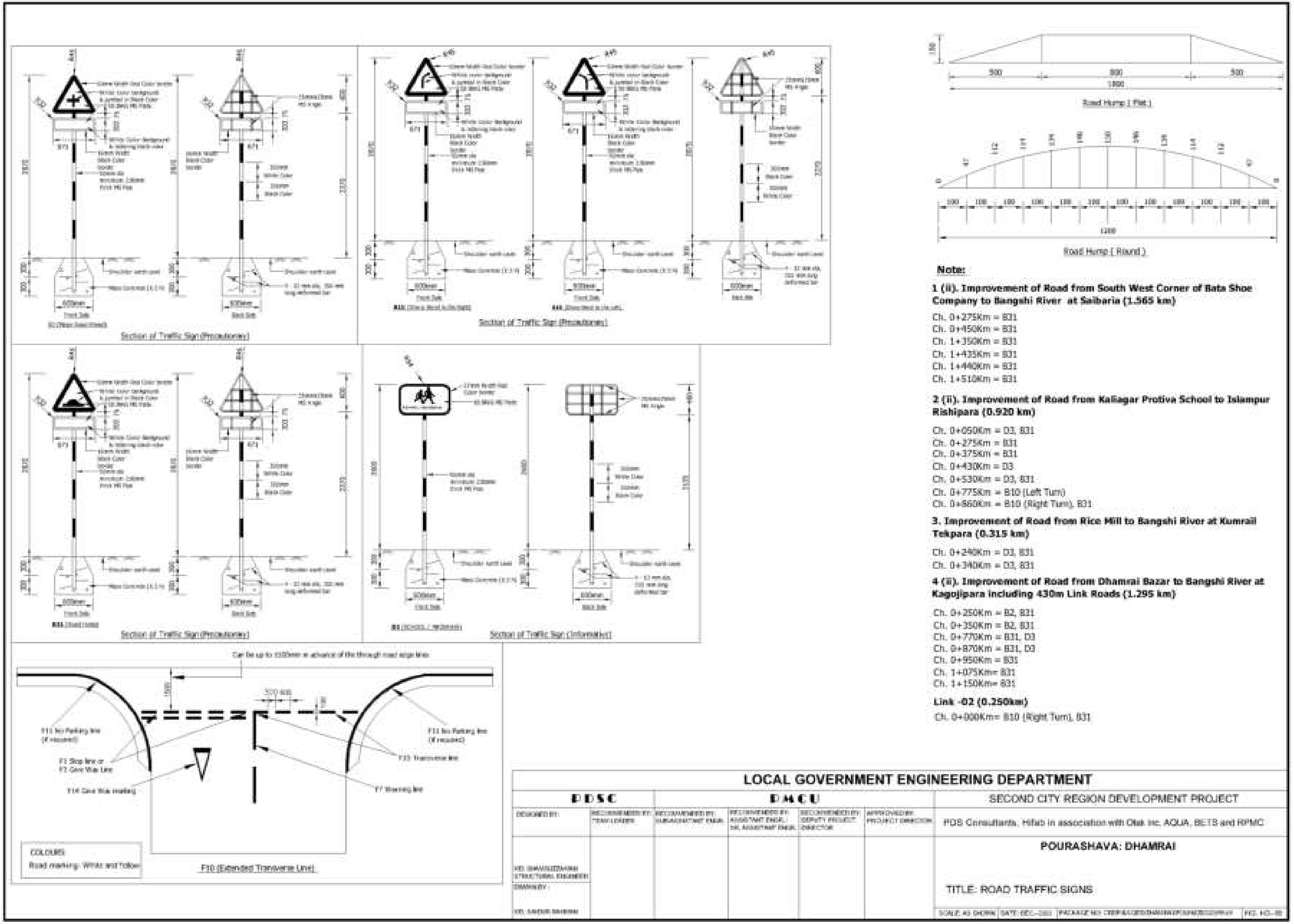
Ch. 0+000Km = B5
Ch. 0+770Km = C13
Ch. 0+870Km = C13
Ch. 0+950Km = A34 (Turn Left)
Ch. 1+070Km = A34 (Turn Left + Right) (on main)
Ch. 1+075Km = C13
Ch. 1+150Km = C13

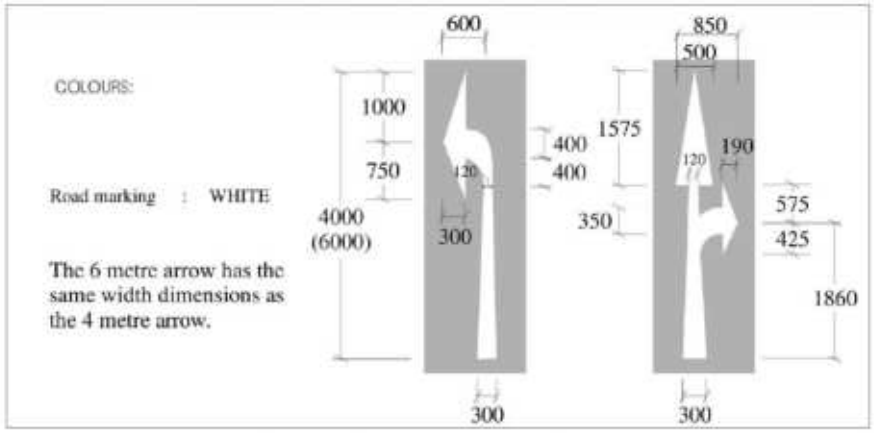
Link -01 (0.180km)

Ch. 0+000Km = B5
Ch. 0+180Km = B5

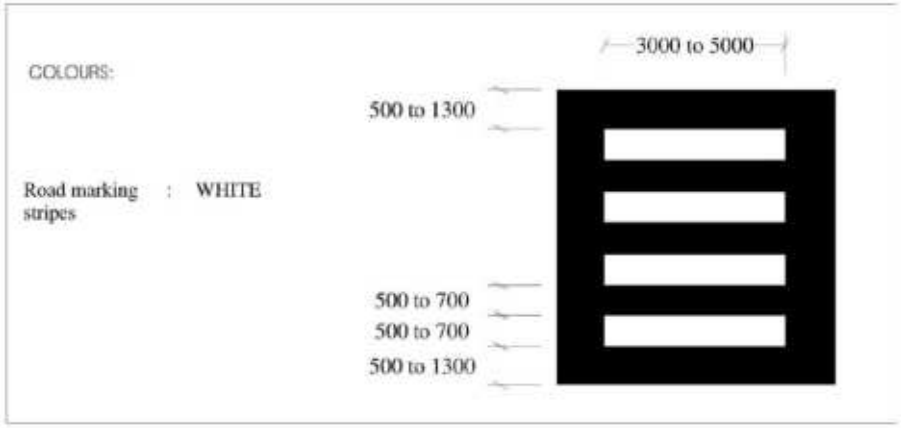
LOCAL GOVERNMENT ENGINEERING DEPARTMENT

PDSC		PMCU				SECOND CITY REGION DEVELOPMENT PROJECT
DESIGNED BY:	RECOMMENDED BY: TEAM LEADER	RECOMMENDED BY: SUB-ASSISTANT ENGR.	RECOMMENDED BY: ASSISTANT ENGR. / SR. ASSISTANT ENGR.	RECOMMENDED BY: DEPUTY PROJECT DIRECTOR	APPROVED BY: PROJECT DIRECTOR	PDS Consultants, HifAb in association with Oitak Inc, AQUA, BETS and RPMC
						POURASHAVA: DHAMRAI
STRUCTURAL ENGINEER						TITLE: ROAD TRAFFIC SIGNS

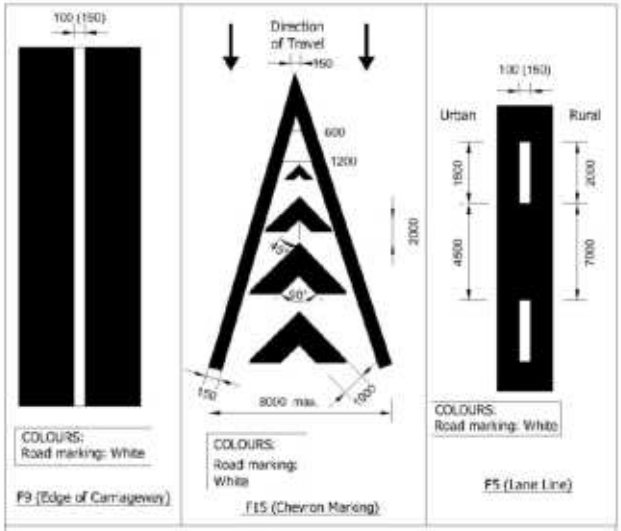

Road Hump (Flat)
Road Hump (Round)
Section of Traffic Sign (Precautionary)
Section of Traffic Sign (Informative)
F10 (Extended Transverse Line)
COLOURS
Road marking: White and Yellow
Note:
1 (ii). Improvement of Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (1.565 km)
Ch. 0+275Km = B31
Ch. 0+450Km = B31
Ch. 1+350Km = B31
Ch. 1+435Km = B31
Ch. 1+440Km = B31
Ch. 1+510Km = B31
2 (ii). Improvement of Road from Kaliagar Protiva School to Islampur Rishipara (0.920 km)
Ch. 0+050Km = D3, B31
Ch. 0+275Km = B31
Ch. 0+375Km = B31
Ch. 0+430Km = D3
Ch. 0+530Km = D3, B31
Ch. 0+775Km = B10 (Left Turn)
Ch. 0+860Km = B10 (Right Turn), B31
3. Improvement of Road from Rice Mill to Bangshi River at Kumrail Tekpara (0.315 km)
Ch. 0+240Km = D3, B31
Ch. 0+340Km = D3, B31
4 (ii). Improvement of Road from Dhamrai Bazar to Bangshi River at Kagojipara including 430m Link Roads (1.295 km)
Ch. 0+250Km = B2, B31
Ch. 0+350Km = B2, B31
Ch. 0+770Km = B31, D3
Ch. 0+870Km = B31, D3
Ch. 0+950Km = B31
Ch. 1+075Km= B31
Ch. 1+150Km= B31
Link -02 (0.250km)
Ch. 0+000Km= B10 (Right Turn), B31
LOCAL GOVERNMENT ENGINEERING DEPARTMENT
PDSC
PMCU
SECOND CITY REGION DEVELOPMENT PROJECT
PDS Consultants, Hifab in association with Olak Inc, AQUA, BETS and RPMC
POURASHAVA: DHAMRAI
TITLE: ROAD TRAFFIC SIGNS

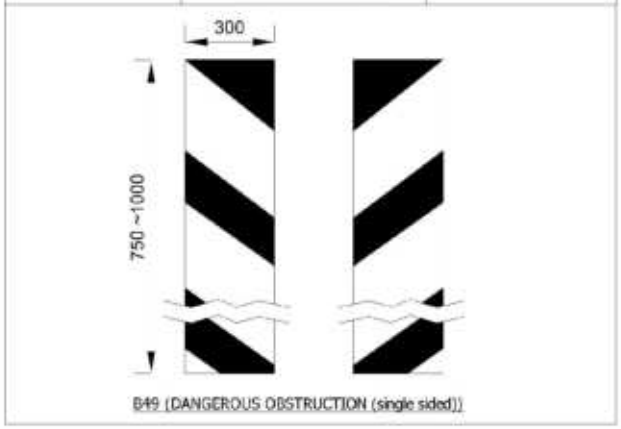


F12 (Traffic Lane Arrows)



F3 (Pedestrain Crossing)





LOCAL GOVERNMENT ENGINEERING DEPARTMENT

DDSC	DMCU	SECOND CITY REGION DEVELOPMENT PROJECT
		PDS Consultants, Hitas in association with Otak Inc, AQUA, BETS and RPMC
		POURASHAVA: DHAMRAI
		TITLE: ROAD TRAFFIC SIGNS

Appendix 12: Sample Daily Monitoring Sheet for Contractors
CITY REGIONS DEVELOPMENT PROJECT II
Contractor Monitoring Sheet

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

Summary of Findings

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

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

Other Issues: _____

_____

_____

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

Prepared by: _____
Name, Designation and Signature

Appendix 13: 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				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	vehicle is in current use?				
4.	Community Safety	Yes	No	NA	
	a) Are excavation areas provided with barricades around them?				
	b) Are safety signages posted around the sites?				
	c) Are temporary and safe walkways for pedestrians available near work sites?				
	d) Is there a record of treated wastewater quality testing/measurement?				
5.	Solid Waste Management	Yes	No	NA	
	a. Are excavated materials placed sufficiently away from water courses?				
	b. Is solid waste segregation and management in place?				
	c. Is there a regular collection fo solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	a) Are there separate sanitary facilities for 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?				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	c. Is there a speed control for vehicles at construction sites?				
	d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	e. Are construction vehicles carrying soils and other spoils covered?				
	f. Are generators provided with air pollution control devices?				
	g. Are all vehicles regularly maintained to minimize emission of black smoke? Do they have valid permits?				
8.	Noise Control	Yes	No	NA	
	a) Is the work only taking place between 7 am and 7 pm, week days?				
	b) Do generators operate with doors closed or provided with sound barrier around them?				
	c) Is idle equipment turned off or throttled down?				
	d) Are there noise mitigation measures adopted at construction sites?				
	e) Are neighboring residents notified in advance of any noisy activities expected at construction sites?				
9.	Traffic Management	Yes	No	NA	
	a) Are traffic signages available around the construction sites and nearby roads?				
	b) Are re-routing signages sufficient to guide motorists?				
	c) Are the excavation sites along roads provided with barricades with reflectors?				
	d) Are the excavation sites provided with sufficient lighting at night?				
10.	Recording System	Yes	No	NA	
	a) Do the contractors have recording				

MONITORING/INSPECTION QUESTIONS		FINDINGS			COMMENTS / CLARIFICATIONS
	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 14: Environmental Clearance Certificate (ECC)

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

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

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

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

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

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

10.02.2019

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

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

Copy Forwarded to :

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

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

Environmental Clearance Certificate

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

Clearance Certificate Number: 53

File number: DOE/Clearance/5194/2013/

Clearance Certificate Issue Date: 10 February 2019

Renewal date not later than: 09 February 2020

A. Clearance Certificate Type
Environmental Clearance Certificate

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

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

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

E. Terms and Conditions for Environmental Clearance Certificate

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

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

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

3. Operating conditions:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.1 Monitoring and Recording conditions:

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

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

4.2 Requirement to monitor concentration of pollutants discharged

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

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

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

F. <u>Recording of pollution complaints</u>

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

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

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

G. **Validity of the Clearance Certificate**

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

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

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

10.02.2019

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

Appendix 15: Renewal of Environmental Clearance Certificate (ECC)

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

Memo No: DoE/Clearance/5194/2013/ 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.

11.05.2022

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

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

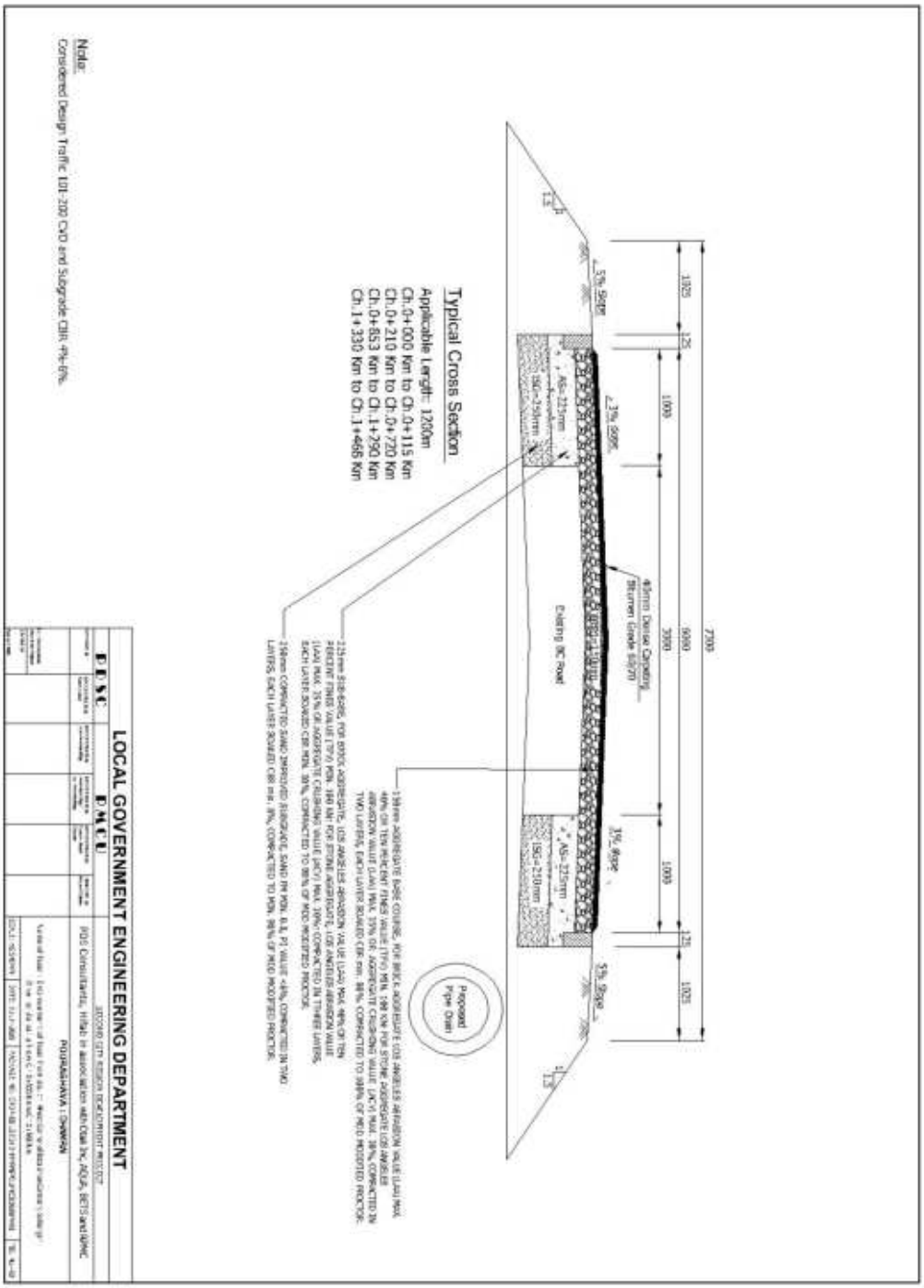
Copy Forwarded to :

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

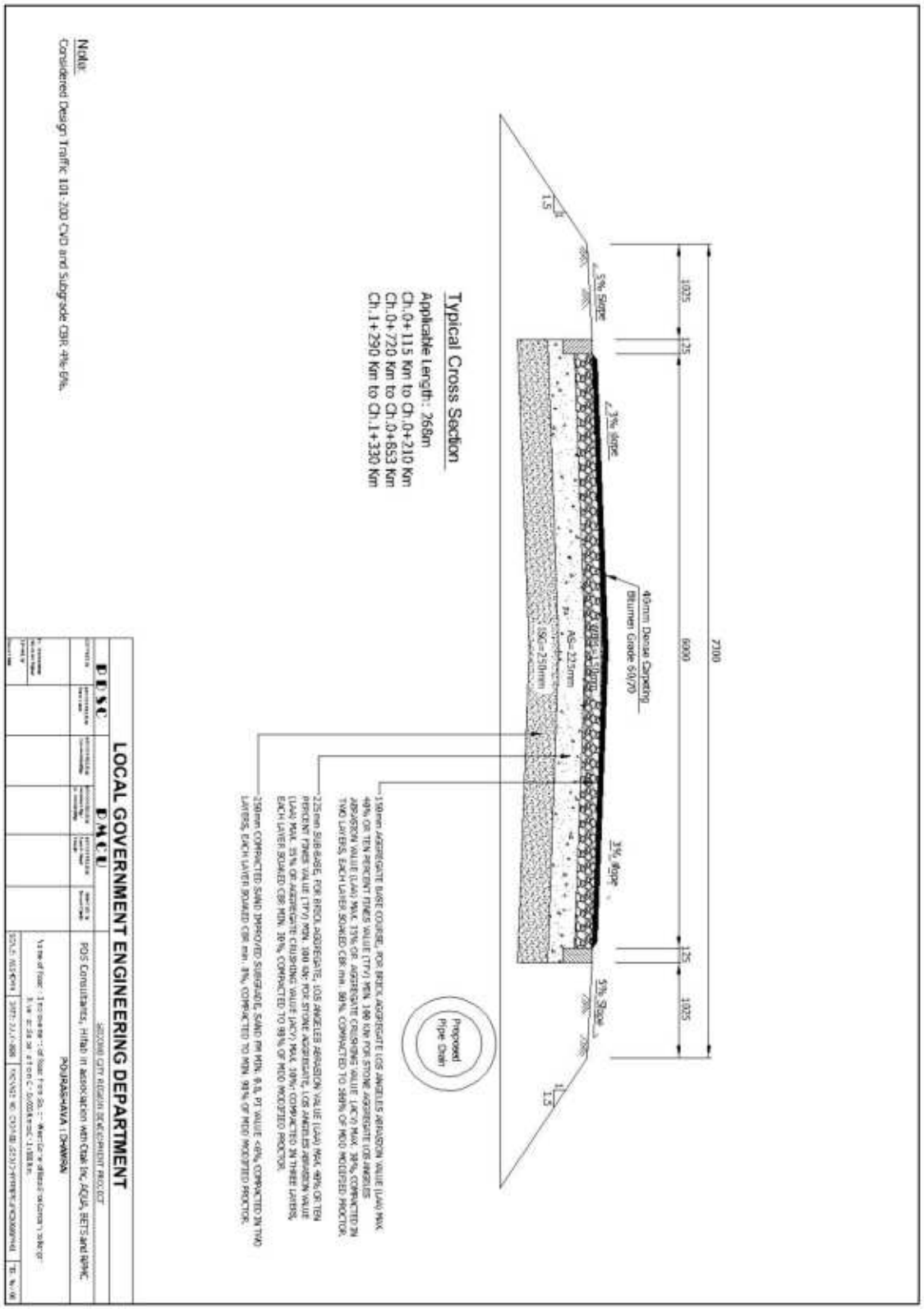
Appendix 16: Typical Cross Sections of Subproject Interventions

(A). Road-1: Typical cross section of **Improvement Works for Road from South West Corner of Bata Shoe Company to Bangshi River at Saibaria (Road: Rd-01)**

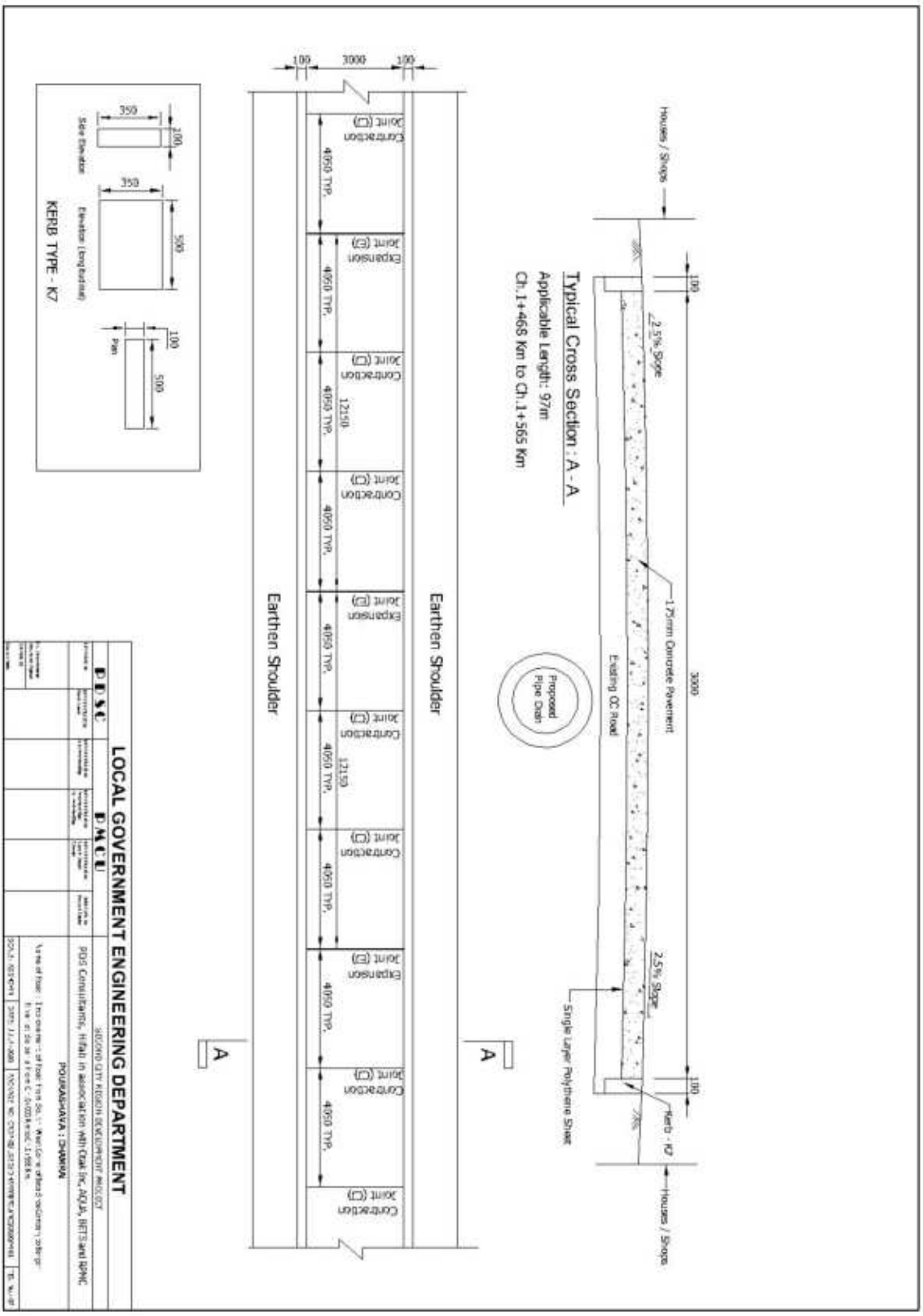
Typical cross section (Ch. 0 - 115m, 210 - 720m, 853 - 1290m & 1330 - 468m)



Typical cross section (Ch. 115 - 210m, 720 – 853m & 1290 - 1330m)

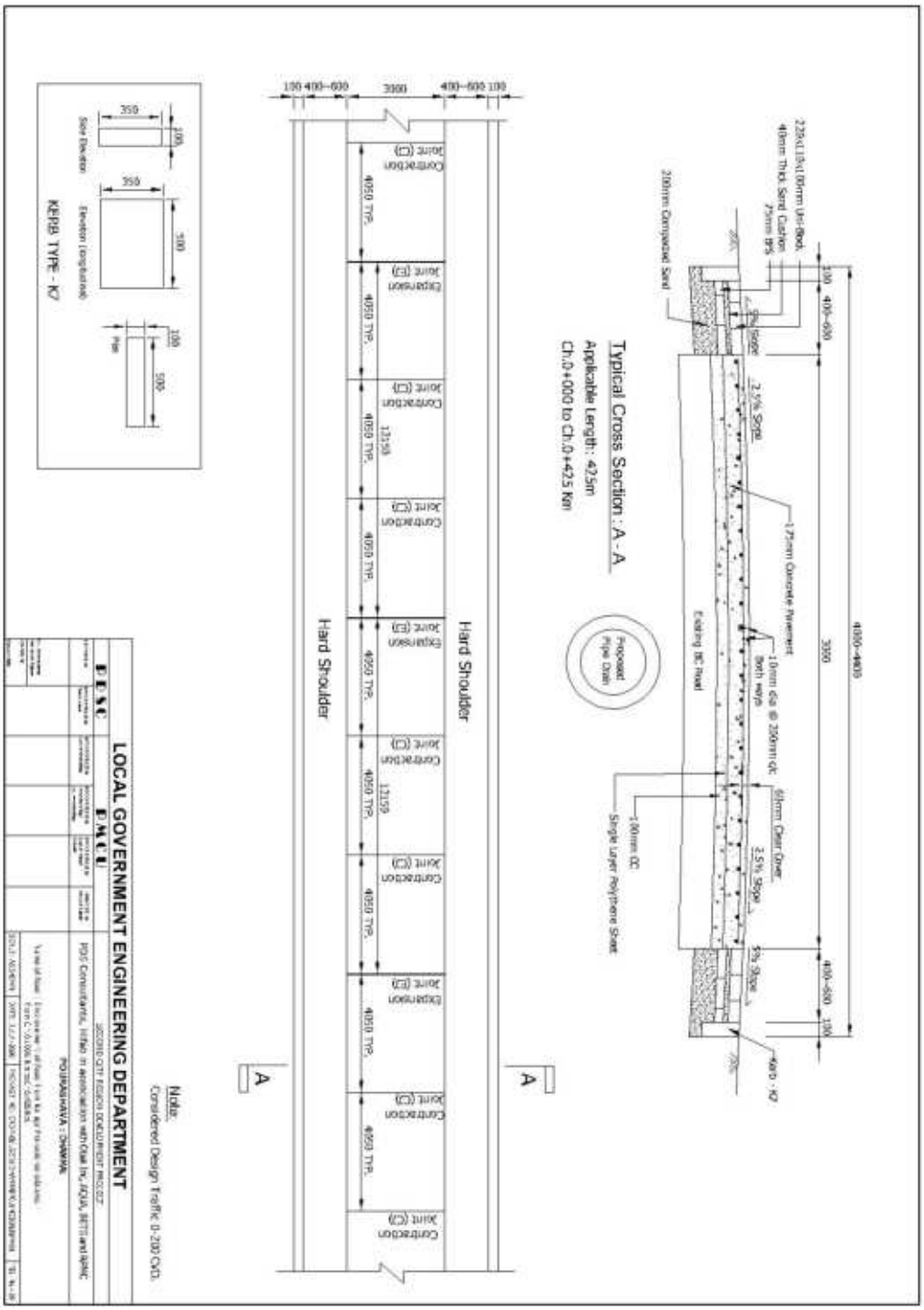


Typical cross section (Ch. 1468 – 1565m)

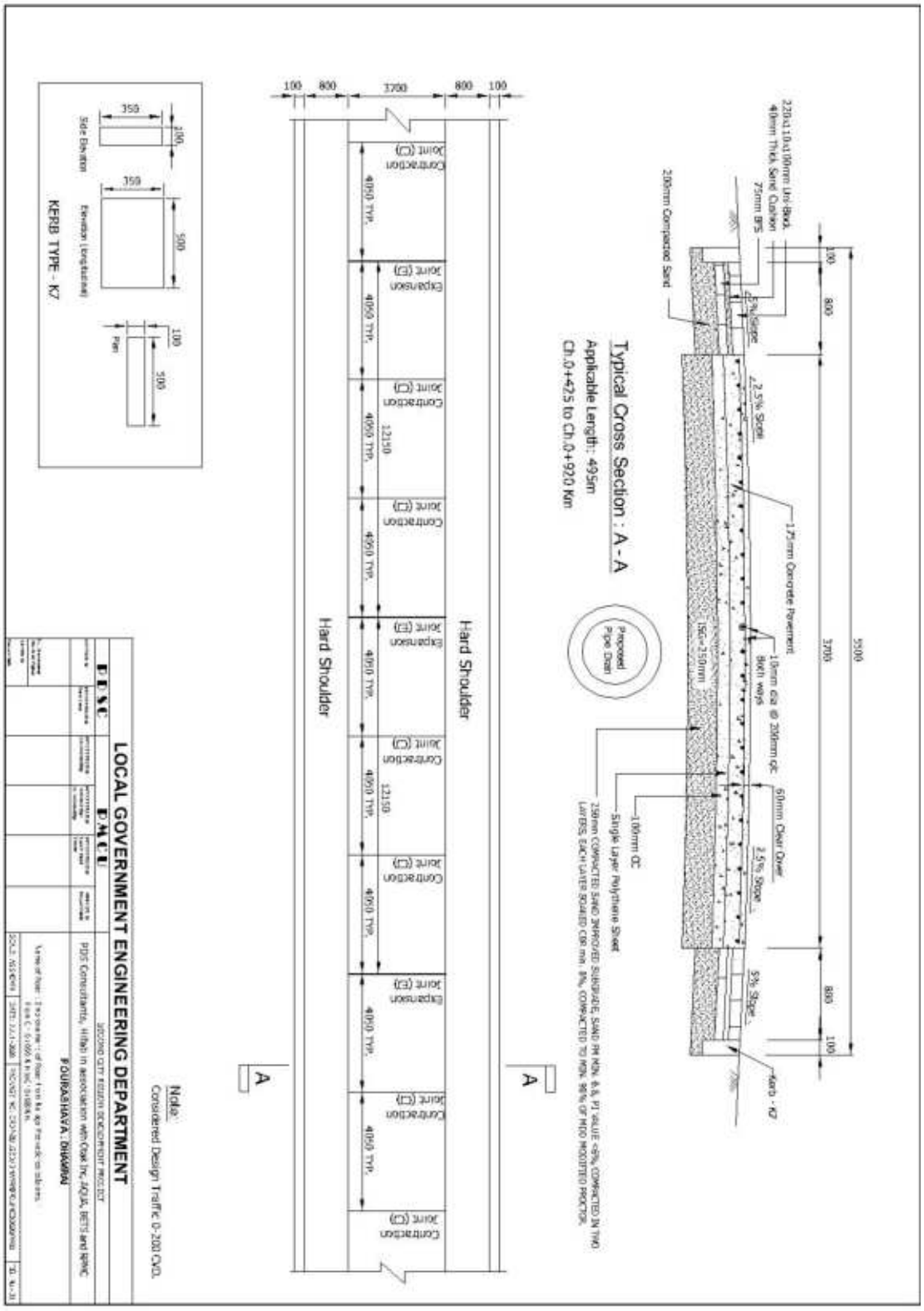


(B). Road-2: Typical cross section of **Improvement Works for Kaliagar Protiva School to Islampur Road (Road: Rd-02)**

Typical cross section (Ch. 0 - 425m)

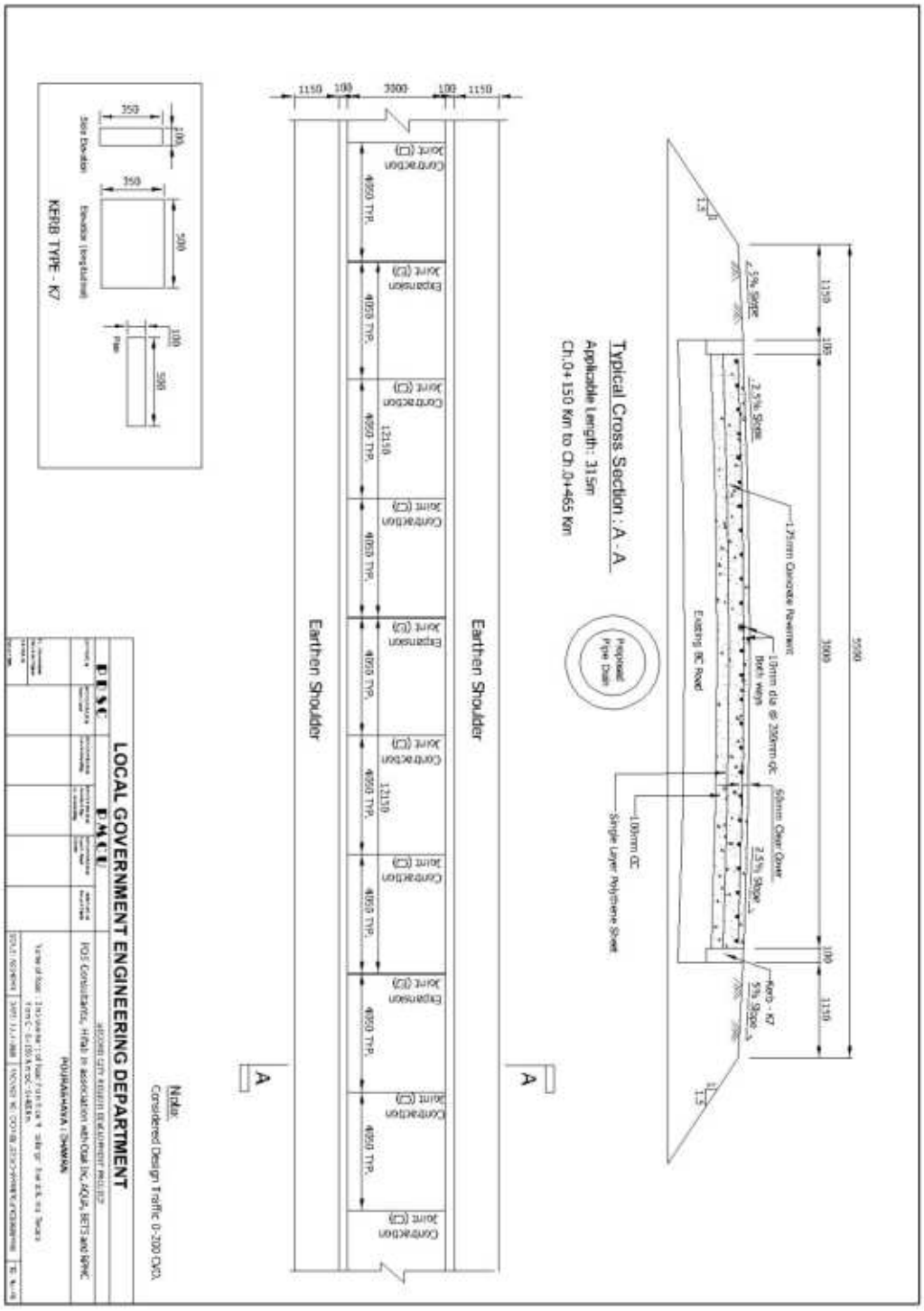


Typical cross section (Ch. 425 - 490m)



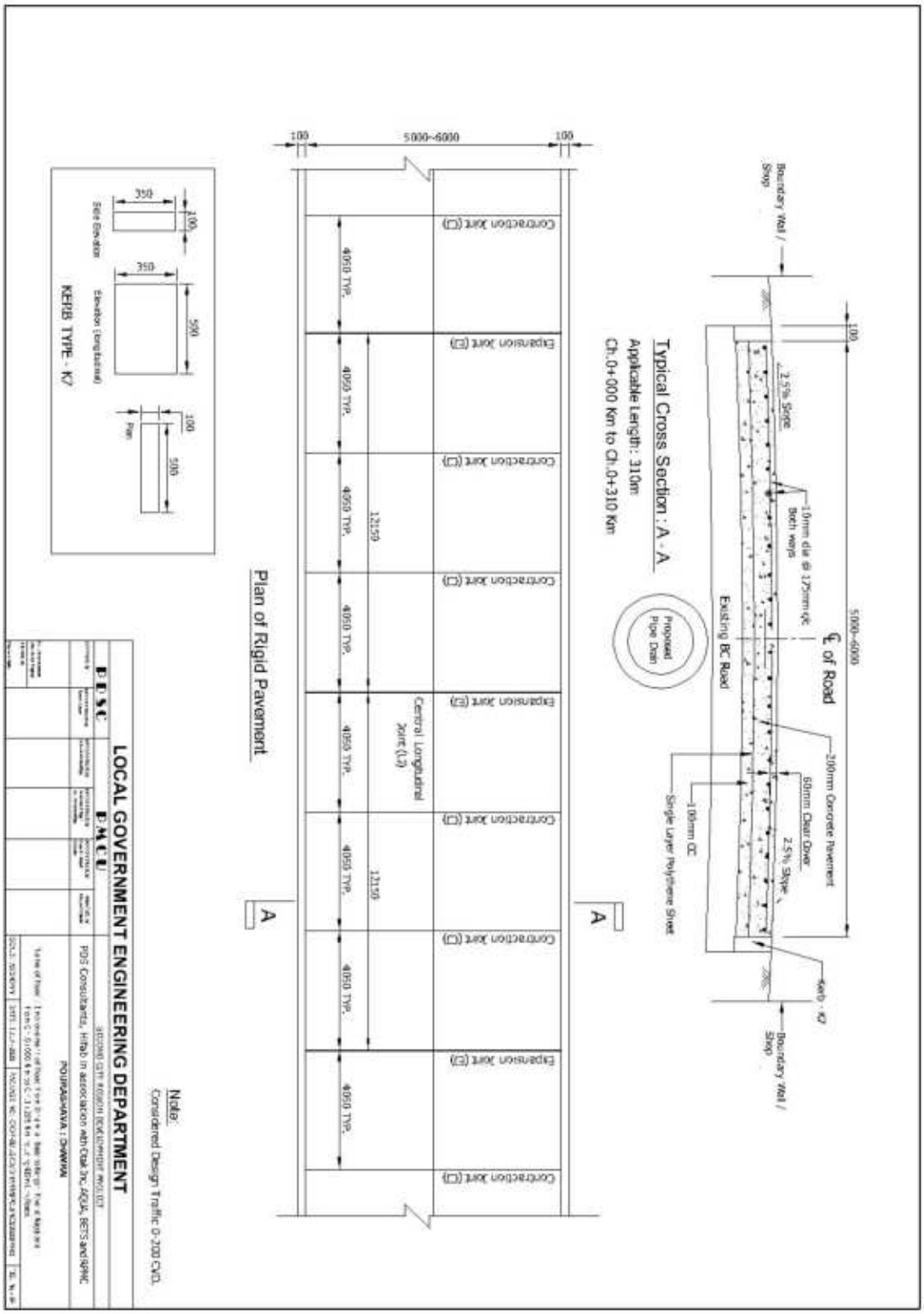
(C). Road-3: Typical cross section of **Improvement Works for Road from Rice Mill to Bangshi River at Kumrail Tekpara (Road: Rd-03)**

Typical cross section (Ch. 150 - 465m)

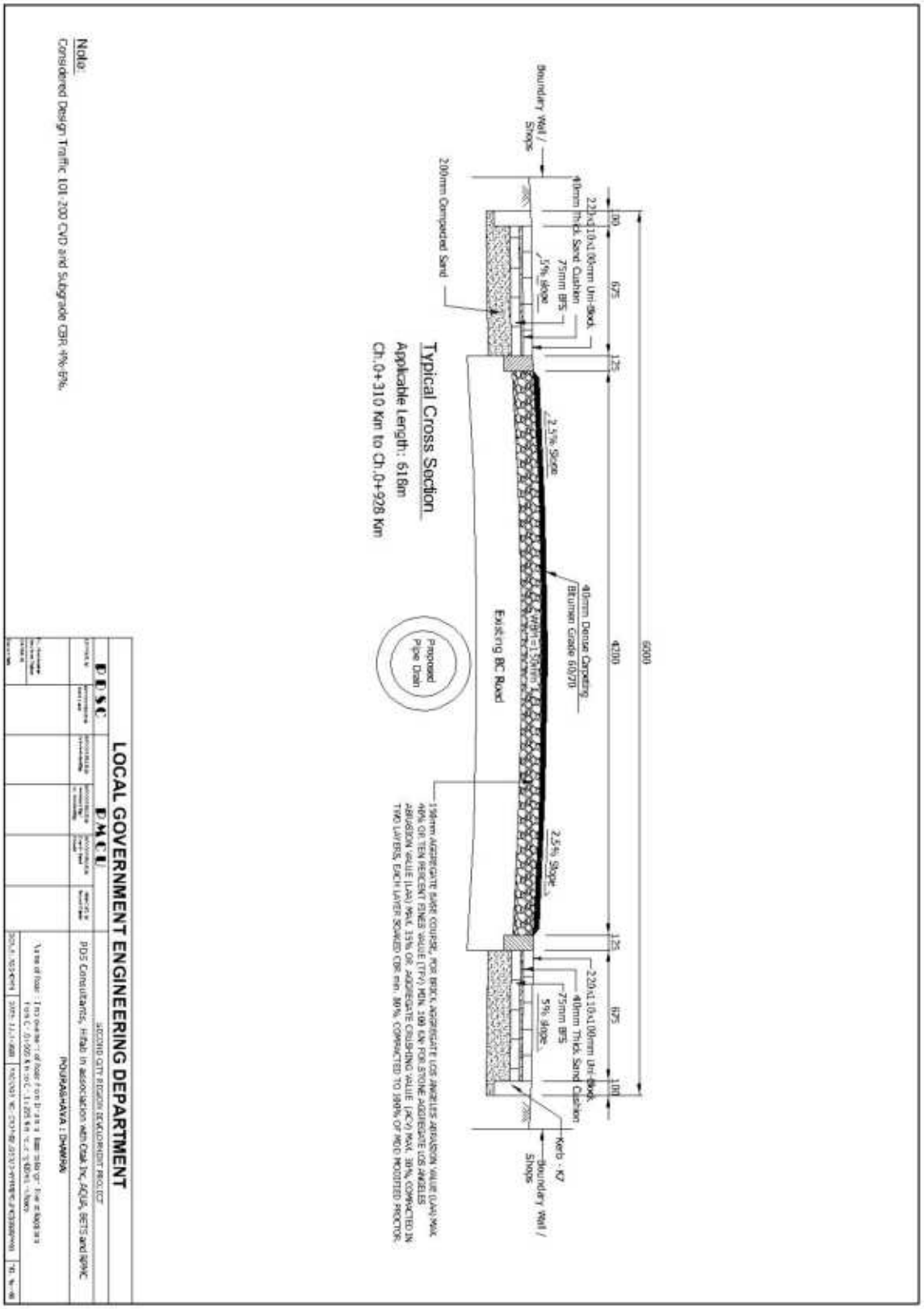


(D). Road-4: Typical cross section of **Improvement of Road from Dhamrai Bazar to Bangshi River at Kagojipara (Road: Rd- 04)**

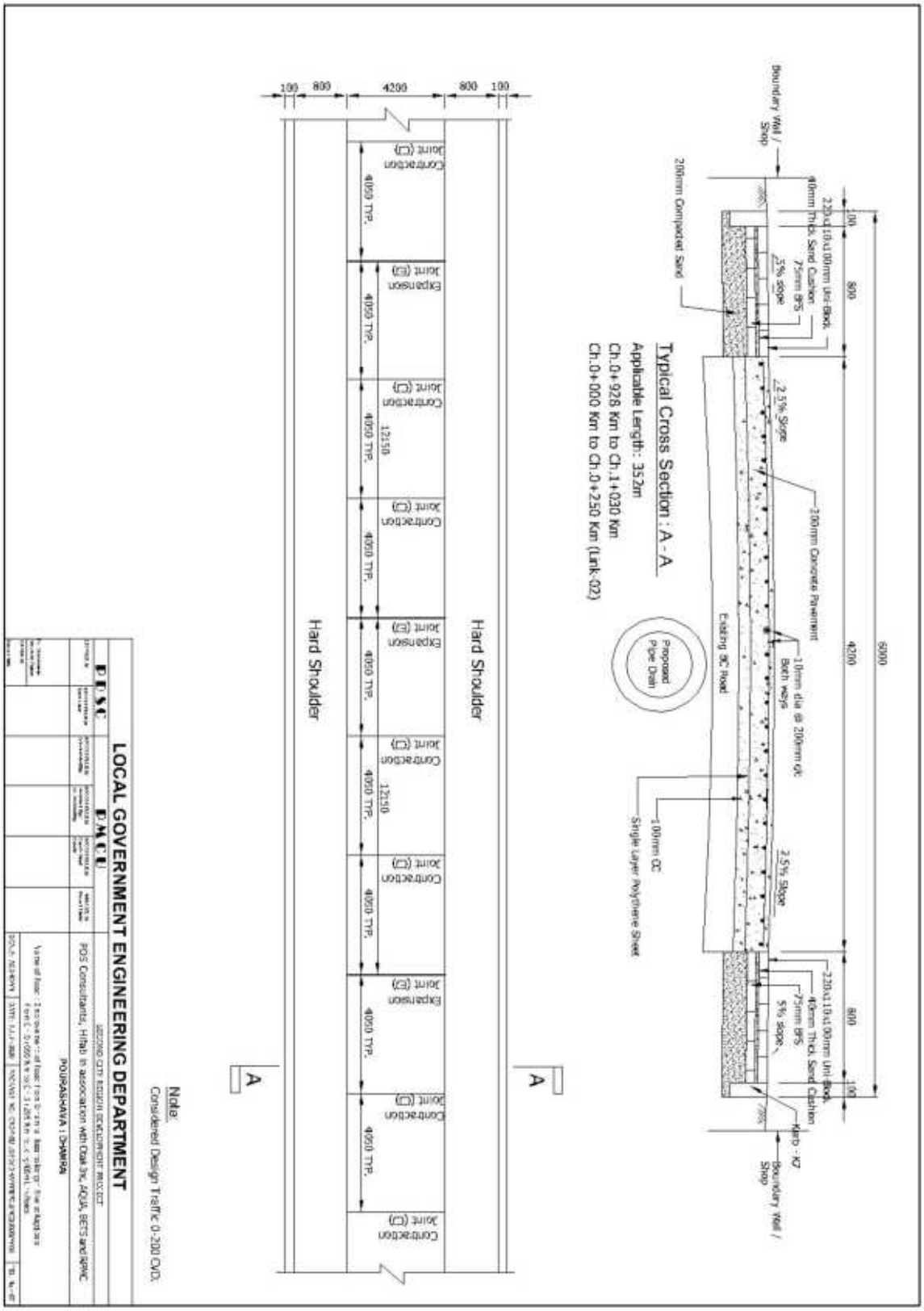
Typical cross section (Ch. 00 – 310m) & Plan of Rigid Pavement



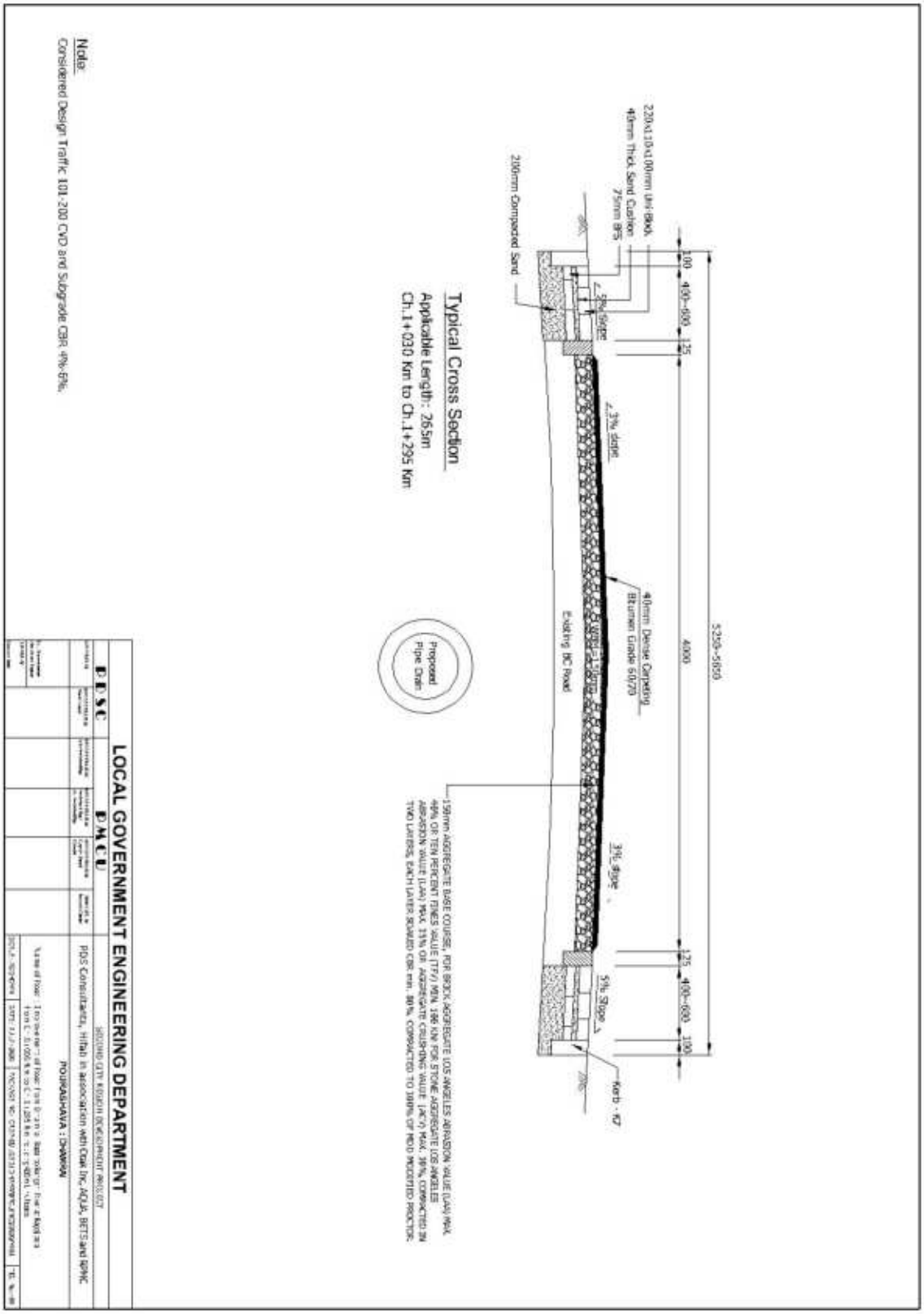
Typical cross section (Ch. 310 - 928m)



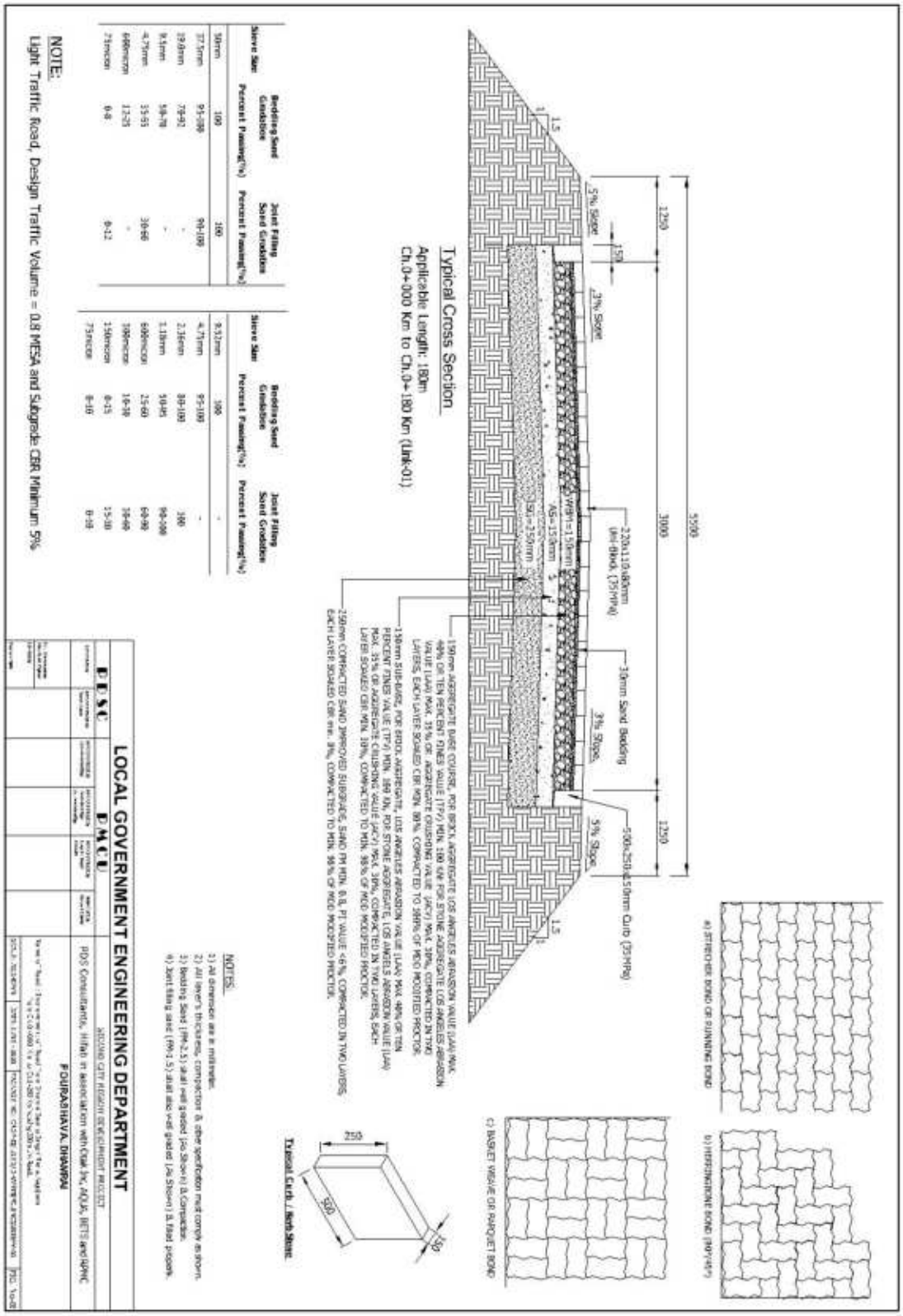
Typical cross section (Ch. 928 – 1030m & Link 2: 00 – 150m) & Plan of Rigid Pavement



Typical cross section (Ch. 1030 - 1295m)



Typical cross section (Link 1: Ch. 00 – 180m)



Sieve Size	Bedding Sand Gradation Percent Passing(%)	Joint Filling Sand Gradation Percent Passing(%)
50mm	100	100
37.5mm	95-100	90-100
19.0mm	70-92	-
9.51mm	50-70	-
4.75mm	35-55	30-95
600micron	12-35	-
75micron	0-8	0-12

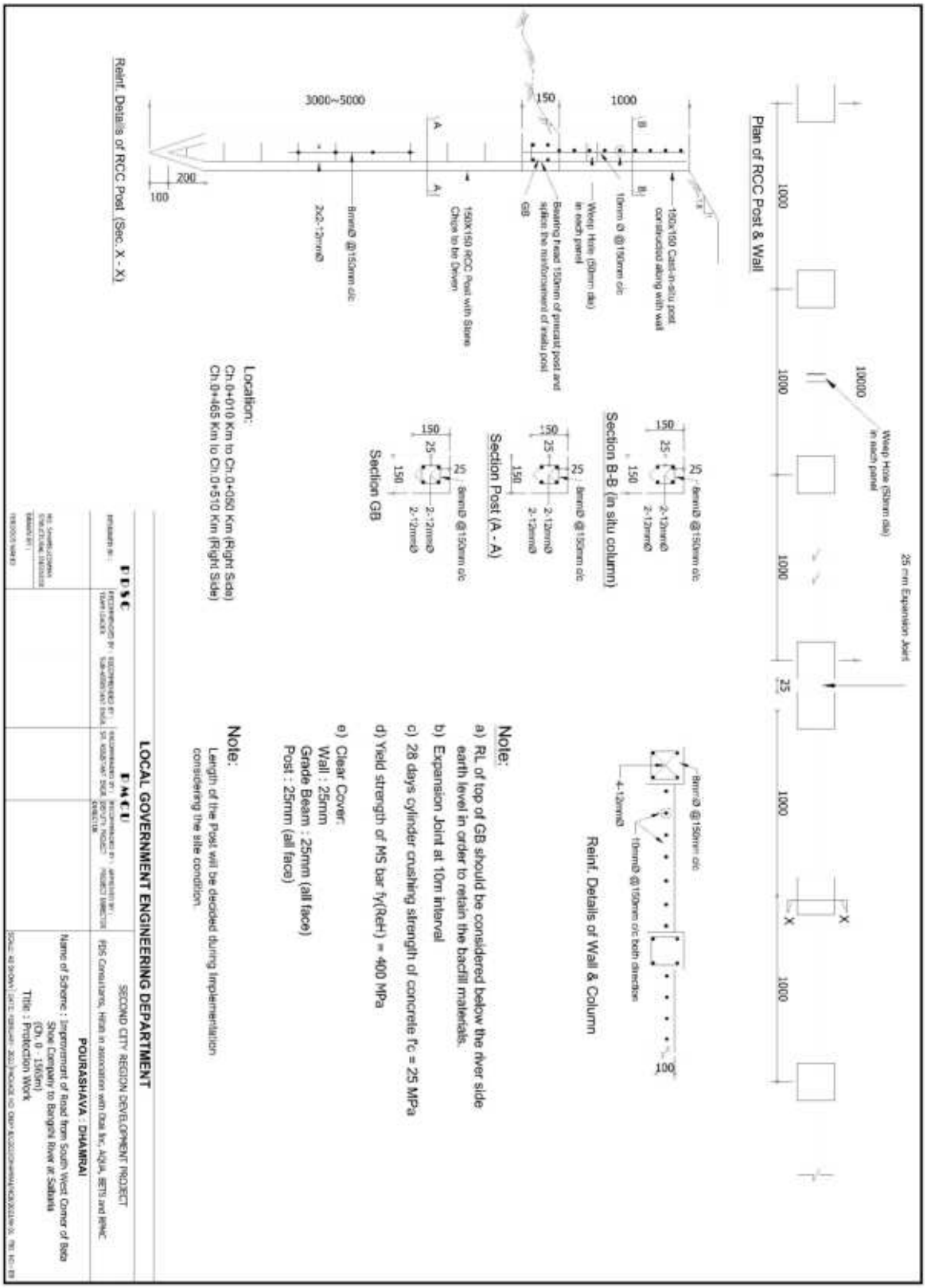
Sieve Size	Bedding Sand Gradation Percent Passing(%)	Joint Filling Sand Gradation Percent Passing(%)
9.52mm	100	-
4.75mm	95-100	-
2.36mm	80-100	100
1.18mm	50-85	90-100
600micron	25-60	60-90
300micron	10-30	30-60
150micron	0-15	15-30
75micron	0-10	0-10

NOTE:
Light Traffic Road, Design Traffic Volume = 0.8 MESA and Subgrade CBR Minimum 5%

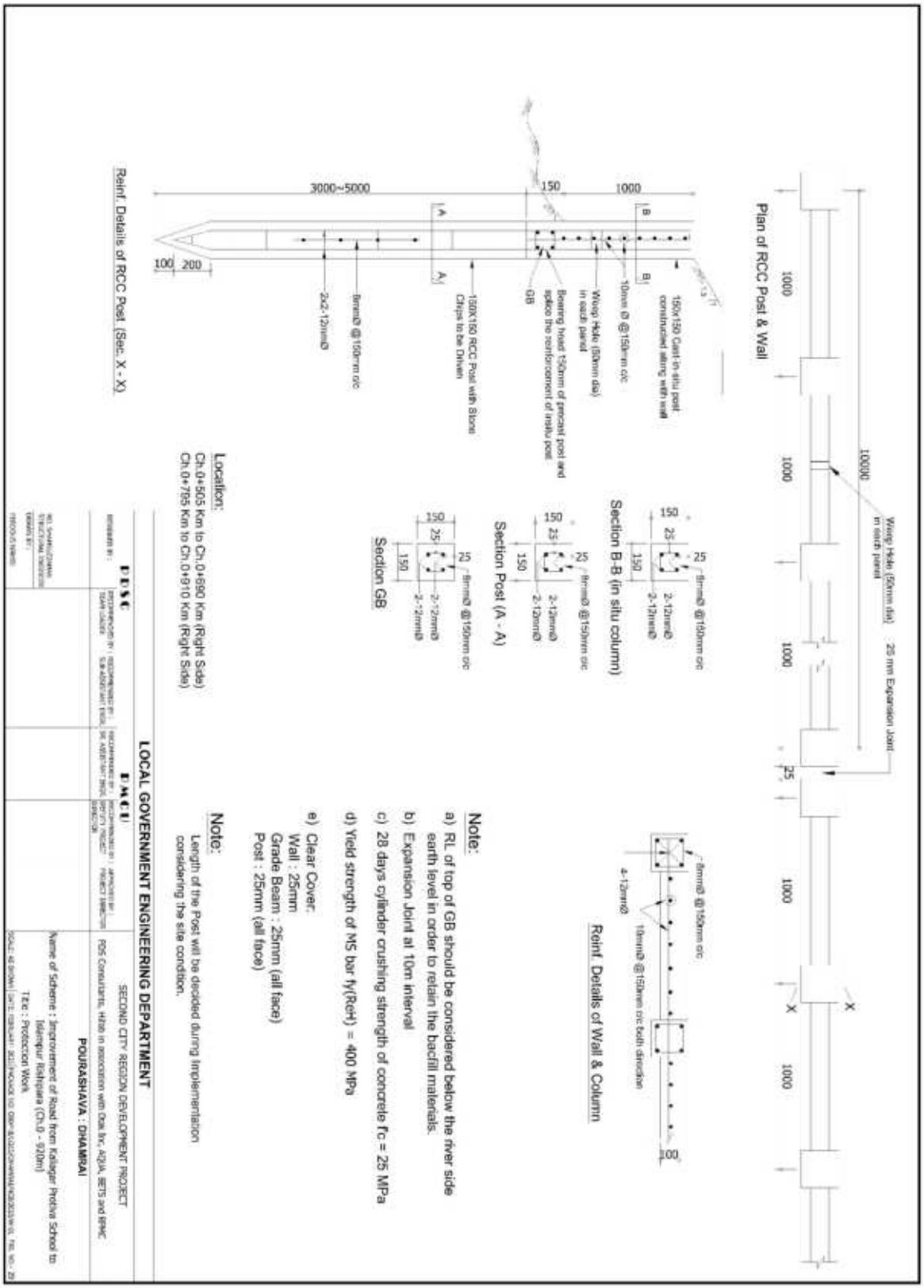
NOTES:
1) All dimension are in millimetre.
2) All levels thickness, compaction & other specification must comply as shown.
3) Bedding Sand (PM 2.5) shall well graded (As Shown) & Compaction.
4) Joint filling sand (PM 1.5) shall also well graded (As Shown) & Filled properly.

LOCAL GOVERNMENT ENGINEERING DEPARTMENT
LGED
DMCU
ADDING CITY REGION DEVELOPMENT PROJECT
RDS Consultants, Hillah in association with Coal Inc./AQUA, BETS and NPPC
FOUJRASHAVA, DHAMRAI

Design of Protection works (Palisading) for Road Scheme # 1



Design of Protection works (Palisading) for Road Scheme # 2



Appendix 17: Sample outline of OHS, COVID-19 H&S Plan and Waste Management Plan

i. Sample outline of OHS Plan

Sl 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	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

	Surfacing, Scarify & hard bed preparation painting works					
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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C) Sample outline of Waste Management Plan

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Appendix 18: Environmental 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 (advarse) impact (HN); Moderately negative impact (MN); Insignificant impact (I); Highly positive (beneficial) impact (HP); Moderately positive impact (MP); No impact (NI)*

Risk Screening Methodology:

This screening matrix is a part of the environmental impact assessment process, focusing on the potential environmental impacts during the design, construction and operation phases. The matrix examines the interaction of the project activities with various components of the environment. The impacts are broadly classified as physical, biological and social and each category was then further divided into different aspects. The potential impacts thus predicted are characterized as follows:

 Highly negative (adverse) impact
 Moderately negative impact
 Insignificant impact
 Highly positive (beneficial) impact
 Moderately positive impact

The negative impacts predicted in this manner are the ‘unmitigated’ impacts. Appropriate mitigation measures have been recommended as part of this EIA, thus reducing the occurrence possibility and severity of the potentially adverse impacts.