Initial Environmental Examination

Project No. 49329-006
May 2023

Bangladesh: Second City Region Development Project

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

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

CURRENCY EQUIVALENTS

(As of 21 February 2019)

Currency Unit	=	taka (Tk)
Tk1.00	=	$ 0.0119
$1.00	=	Tk 83.89

ABBREVIATIONS

ADB	-	Asian Development Bank
CRDP	-	City Region Development Project
DOE	-	Department of Environment
EARF	-	Environmental assessment & review frame
ECC	-	Environmental Compliance Certificate
ECR	-	Environmental Conservation Rules\
EHS	-	Environmental, health and safety
EIA	-	Environmental impact assessment
EMP	-	Environmental Management Plan
GRC	-	Grievance redress committee
GRM	-	Grievance redress mechanism
IEE	-	Initial environmental examination
LGED	-	Local Government Engineering Department
PDSC	-	Preparation, design and supervision consultant
NGO	-	Nongovernment organization
NOC	-	No objection certificate
O&M	-	Operation and maintenance
PIU	-	Project implementation unit
PMCU	-	Project management and coordination unit
REA	-	Rapid environmental assessment
ROW	-	Right-of-way
SPS	-	Safeguard Policy Statement

WEIGHTS AND MEASURES

°C	-	degree Celsius
ha	-	hectare
km	-	kilometer
m	-	meter
mm	-	millimeter

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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 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 5-year period.

Subproject Scope. This initial environmental examination (IEE) report has been prepared for one of the subprojects of the project in the municipality of Manikganj that is covered under package number CRDP-II/LGED/MANIKGANJ/NCB/2021/W-01. This subproject is composed of activities for the rehabilitation of the Manikganj Khal ("khal" is the local term for "canal"), which are: (i) Re-excavation of Manikganj Khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m); (ii) Construction of 18m bridge at Ch.2425m on Manikganj Khal; (iii) Construction of 18m bridge at Ch.2787m on Manikganj Khal; (iv) Construction of 36m bridge at Ch.3023m on Manikganj Khal; (v) Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal;. All construction, rehabilitation and improvement works will be undertaken within existing rights of way.

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 SPS, 2009.Using ADB rapid environmental assessment checklist, the subproject is classified as Environmental Category B per the 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 (EHS) 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 EMP is included as part of this IEE, which discusses the following:

mitigation measures for environmental impacts during implementation; and
an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting.

The subproject alignments are not within or located near any ecologically critical areas, and will not have any significant negative 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 drainage itself occupies existing rights-of-way (ROW). There will be no drainage 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 to Manikganj project implementation unit (Manikganj PIU) for approval. These will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practices: (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. 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 andadverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process.

Implementation Arrangement. The executing and implementing agency is the Local Government and Engineering Department (LGED) of the government of Bangladesh. The LGEDwill establish 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 local level where subprojects are located. Manikganj Pourashava is the PIU for this subproject. The PMCU and Manikganj PIU have the responsibility for overseeing project 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 Manikganj PIU for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved EMP; and (v) implement any corrective or preventive 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 Manikganj PIU, with support of external experts or consultants. Contractors will submit monthly reports to Manikganj PIU, while Manikganj 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 and Recommendations. The overall finding of this IEE is that the subproject will result in significant environmental benefits because the current conditions of the Manikganj Khal will be improved and will be much better for local residents, particularly in areas surrounding thedrainage canal. Flooding due to clogging at the Manikganj Khal will be avoided or prevented especially during monsoon season. The provision for safety infrastructure such as guide posts for walkways alongside the bank of the khal will ensure

protection for pedestrians and local people. Ultimately, the subproject will result in significant economic and social benefit to the people and the *pourashava* as a whole.
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.

However, this IEE has been prepared based on final detailed designs of the subproject. The PMCU and Manikganj PIU shall update this draft IEE based on any change of design and submit to ADB for review and disclosure. The following have been included in the final detailed design and updating of this IEE:

(i) Final detailed design on the construction and rehabilitation of Manikganj Khal, including the details on the provision of safety infrastructures such as guide posts alongthe footpaths on the embankment of the canal and areas adjacent to residential and commercial establishments;
(ii) Final calculations of the volume of soil that will be excavated from the Manikganj Khal; and
(iii) the location of the spoil disposal site (footprint of the spoil disposal site identified and approved by Manikganj PIU during implementation of the subproject).

The approved updated 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 Manikganj 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 or any design change and/or non- compliance during subproject implementation period, the IEE shall be updated to include assessment of the unanticipated impact and corresponding mitigation measures, or information on the design change and assessment of associated environmental impacts, if any, and/or (iii) corrective actions, associated cost and schedule.

I. INTRODUCTION

A Background

1. The Second City Region Development Project (the project) will support development in the city regions of Dhaka and Khulna by building upon infrastructure and capacity building initiatives implemented during the first City Region Development Project (CRDP)[1] funded by the Asian Development Bank (ADB). The project will finance additional crucial infrastructure in urbanand 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 5-year period. Specifically, the project will support the (i) construction, upgrade and rehabilitation of selected Dhaka city region roads, bridges and culverts, including drainage; (ii) construction, upgrade and rehabilitation of drainage in Khulna city region; and (iii) development of a Khulna city corporation comprehensive solid waste management plan and small works.

2. The project will be implemented over a 5-year period. The indicative list of subprojects is summarized in the environmental assessment and review framework drafted for the project. Thesubprojects 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) comprehensive solid waste management planning.

3. The project has been classified as environmental category B per ADB Safeguard Policy Statement (SPS), 2009.[2] Project preparation was supported by (i) a project preparatory technical assistance (TA);[3] and (ii) a project design advance loan of $5 million to finance preparation, design and supervision consultancy services. Part of the preparatory work was the preparation of the environmental assessment and review framework (EARF) and initial environmental examination (IEE) reports for sample subprojects in accordance with the requirements of ADB SPS, 2009. Further support was provided by ADB in preparing the EARF and IEE reports to meet the requirements for projects proposed under a sector loan modality.

4. This initial environmental examination (IEE) report has been prepared for the subproject covered by package number CRDP-II/LGED/MANIKGANJ/NCB/2021/W-01, which includes development program for the Manikganj Khal of Manikganj town in the form of (i) Re-excavation of Manikganj Khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m); (ii) Construction of 18m bridge at Ch.2425m on Manikganj Khal; (iii) Construction of 18m bridge at Ch.2787m on Manikganj Khal; (iv) Construction of 36m bridge at Ch.3023m on Manikganj Khal; (v) Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal;

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

B Purpose of the Initial Environmental Examination

5. The purpose of this IEE is to describe the assessment of environmental impacts due to the proposed subproject based on the detailed design developed under the project, and to specify measures to address these impacts. This IEE is based on engineering design information, a field visit, and secondary data to characterize the environment within and around the subproject area. It contains the results of interviews and consultations with stakeholders. This IEE includes an environmental management plan (EMP) outlining mitigation measures for the potential environmental impacts of the subproject and describes the monitoring and reporting requirementsper ADB Safeguard Policy Statement (SPS), 2009 and applicable government laws and regulations. This IEE will form part of the civil works contract documents of the subproject.

6. Screening using ADB's rapid environmental assessment (REA) checklist for roads and drainage was initially conducted, and results of the rapid assessment show that the project is unlikely to cause 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 described in Section III.

C Subproject Justification

7. During monsoon season, stormwater run-off from community areas together with the overflowing river water from the upstream of the Kaliganga River, flow into the low-lying catchment area and enters the Manikganj Khal. Major portion of the stormwater at the Manikganj Khal then flows back to Kaliganga River through an outfall with sluice gate in Beautha Bazar, and the rest through another outfall with sluice gate at the other end in Shonakandor, which drains out to the downstream portion of Kaliganga River. The stormwater run-off from the community and catchment area within the Manikganj Town flows either straight into the Manikganj Khal or through the town's internal canals that eventually drains to Manikganj Khal. This scenario justifies the need to maintain the Manikganj Khal in order for it to serve its purpose as a major flood control infrastructure for Manikganj town. Without this maintenance initiative, the volume capacity of Manikganj Khal may decline through time and flooding in the town becomes an imminent threat in the future.

D Extent of the Study

8. This IEE has been carried out based on the up-to-date subproject details developed by the design team of the project. The scope of the IEE has been confined to project related activities associated with design, construction (e.g., site clearing, excavation, raw materials and spoils storage and transport, paving, camping, disposal sites) andoperation stages. As such, this IEE has been updated based on the final detailed design. This IEE has been updated based on the final detailed design and no civil works will commence unless this updated IEE is approved by both ADB and government of Bangladesh.

E Methodology

9. 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/meeting/discussions with various stakeholders including local community.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

10. ADB will not finance any project if it does not comply with ADB SPS, 2009 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's policies exist, the stricter policy will prevail. Moreover, ADB SPS, 2009 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.

III. ADB Safeguard Policy Statement

11. ADB SPS, 2009 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, 2009.[4]

12. **Screening and Categorization.** Subprojects are to be screened for their expected environmental impacts and are assigned to a specific category (footnote 2). Categorization is to be based on the most environmentally sensitive component. However, for subproject(s) with component(s) that can trigger Category A or with potentially significant adverse impacts that are diverse, irreversible, or unprecedented, 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.

13. **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 drainage subprojects.

14. **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.

15. **Public Disclosure**. The 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]

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

16. **Consultation and Participation.** The PMCU and PIUs carried out meaningful consultation[6] with affected people and other concerned stakeholders, including civil society, and facilitate their informed participation. The consultation process and its results are documented and reflected in this initial environmental examination report.

17. **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 the project, a grievance redress mechanism (GRM) has been established and discussed in detailin Section VI below.

18. **Monitoring and Reporting.** The PMCU shall monitor, measure and document the progress of implementation of the EMP. If necessary, PMCU will identify the necessary correctiveactions, 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 projectcompletion report.

19. **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.

20. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMCU and Manikganj 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

[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 issue Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to the subproject. When the government's 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.

21. **Occupational Health and Safety.** The 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. 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]

22. **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.

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

24. **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.

25. **Bidding and Contract Documents.** IEEs and EMPs are to be included in bidding and contract documents and verified by Manikganj PIU. The PMCU and Manikganj PIU shall also

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[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.

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

26. **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 designand 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 under the 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.

A National Environmental Impact Assessment Law

27. **Environmental Conservation Act, 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 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.

28. **Environmental Conservation Rules, 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 Environmental Clearance Certificate (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.

[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

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

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

[a] A Guide to Environmental Clearance Procedure, DOE, Bangladesh Ministry of Environment and Forests, August2010.

29. 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 itslikely classifications based on this schedule.

Table 2: Government of Bangladesh Classification of the Subproject

Subproject	Component	Equivalent in Schedule I of Environmental Conservation Rules	Department of Environment Classification
Drainage	Drainage	Construction/reconstruction/ expansion of flood control embankment, polder, dike, etc.	Orange – B[a]
	Bridges and culverts	Construction, re-construction and extension of bridge/culvert (length below 100 meters)	Orange – B

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

B Application for Environmental Clearance

30. The application and requirement for issuance of ECC are described in the ECR, 1997 and summarized in Table 1 above. 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. The accomplished applicationform is submitted to DOE together with requirements as enumerated in Table 1 above. The proponent is also required to pay equivalent application fee prescribed in Schedule 13 of ECR, 1997.

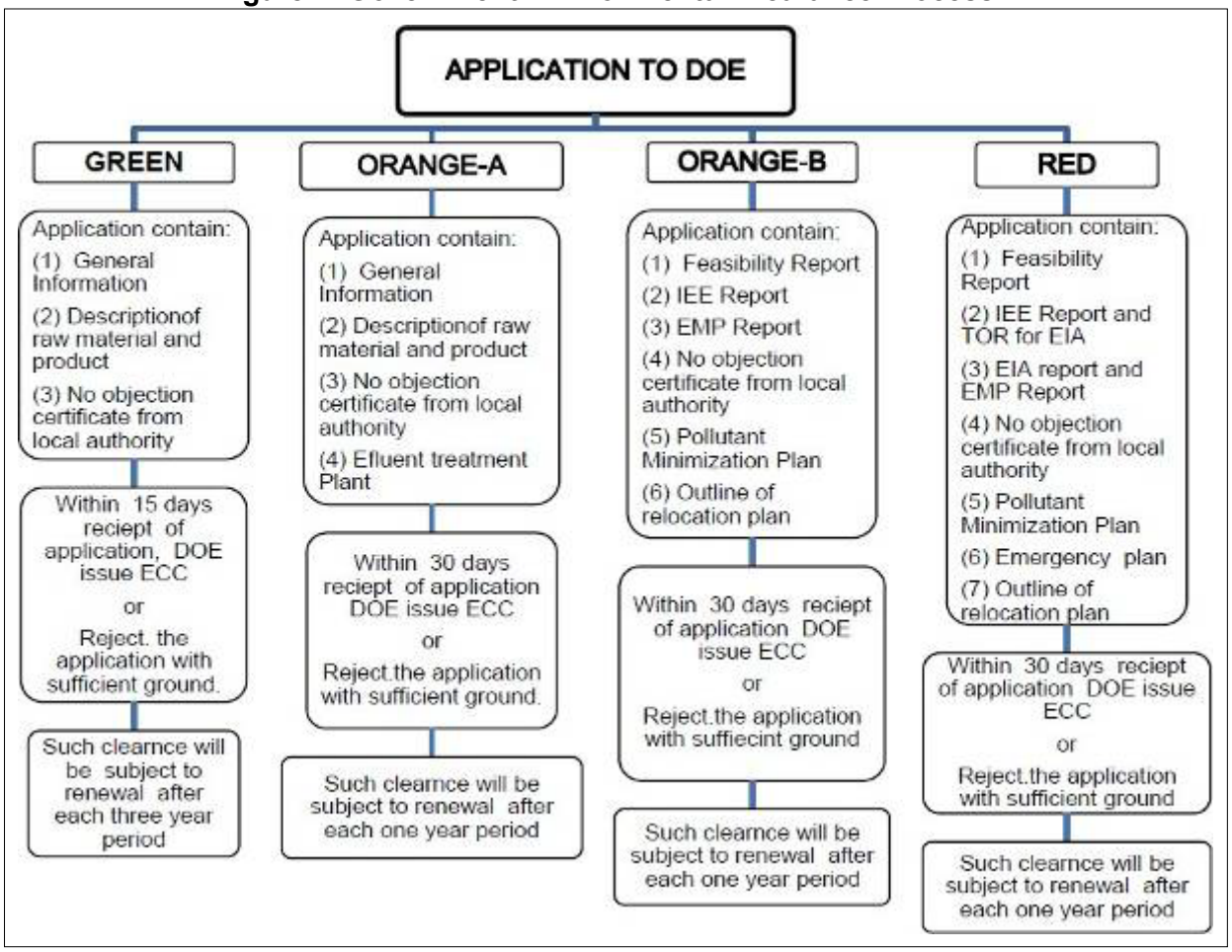
31. For the purpose of obtaining the environmental clearance certificate (ECC) from DOE for the Second CRDP, an application was filed by PMCU vide LGED memo 46.02.000.913.99.001. 1-07; dated 30/08/2020 and 27/12/2020. Accordingly DOE issued an Environmental Clearance Certificate for Second CRDP subprojects (up through Orange B) involving construction and rehabilitation of roads and associated drainage subprojects in Dhaka region by means of a letter No. DOE/ Clearance/5194/2013/ (clearance Certificate Number 53)/ issue Date 10/02/2019 (**Appendix 9**). Manikganj Drainage subproject is categorized as Orange B category projects, and are exempt from further review requirements under DOE rules.[12] As the validity of the issued ECC (Ref . Letter No. DoE/ Clearance/5194/2013; clearance Certificate Number 53)/ issue Date 10/02/2019) has been expired, an application of renewal was filed by the PMCU vide LGED memo 46.02.0000.913.99.001.18-1006, dated 07/12/2020. Accordingly, DoE has renewed the subject ECC, and this renewal is valid up to February 9, 2022. (Ref: Memo No. DoE/clearance/5194/2013/61; dated 24/03/2021) (**Appendix 10**).

[11] Government of Bangladesh. *Department of Environment.*

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

Figure 1 shows the summary of review process and timelines set under ECR, 1997, leading to the issuance of ECC by DOE.

Figure 1: Government Environmental Clearance Process



DOE = Department of Environment, ECC = Environmental Compliance Certificate, EMP = environmental managementplan, IEE = initial environmental examination, TOR = term of reference.

C Applicable Environmental Standards

32. The ECR, 1997 also provides the environmental standards applicable to the project. Schedule 2 of the ECR presents the national standards for ambient air quality and Schedule 4 ofthe ECR presents the national standards for ambient noise. Following requirements of ADB SPS,2009, the subproject shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in Environmental Health and Safety (EHS) Guidelines. When the government regulations differ from these levels and measures, the subproject shall achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific subproject circumstances, LGED through PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009. In view of this, Table ***3*** and Table 4 show the ambient air quality standards and noise level standards tobe followed by the subproject.

Table 3: National Air Quality Standards

(Bangladesh Ambient Air Quality Standard as adopted in 2005)

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

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

Ambient air quality standards for Bangladesh and WHO Guideline

Pollutant	Bangladesh standard	WHO Guideline	Averaging time
Carbon Monoxide (CO) (mg/m^3)	10 (9 ppm)	10	8 hours(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:
Not to be exceeded more than once per year.
The objective is attained when the annual arithmetic mean is less than or equal to 50 ug/ m^3.
The objective is attained when the expected number of days per calendar year with a 24- hour average of15 µg/ m^3 is equal to or less than 1.
The objective is attained when the expected number of days per calendar year with the maximum hourly average of 0.12 ppm is equal to or less than

Table 4: Ambient Noise Quality Standards

(According to the Bangladesh Noise Pollution (Regulation and Control) Rules, 2006)

Receptor/ Source	Bangladesh Noise Pollution (Regulation and Control) Rules, 2006[a] (dBA)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_q in dBA)		Applicable Per ADB SPS[c] (dBA)	
	Day	Night	07:00 – 22:00	22:00 – 07:00	Day time	Night time
Industrial area	75	70	70	70	70	70
Commercial area	70	60	70	70	70	60
Mixed Area	60	50	55	45	55	45
Residential Area	55 *(6 am to 9 pm)*	45 *(9 pm to 6 pm)*	55	45	50	40
Quiet Zone	50	40	55	45	45	35

[a] Bangladesh Noise Pollution standard

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

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

Surface Water quality Standards

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

Ground Water quality Standards

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

D Other Relevant National Laws

33. The implementation of subprojects proposed under the project will be governed by government Environmental Acts, Rules, Policies, and Regulations. Table 5 summarizes the applicable national and local laws, regulations, and standards for environmental assessment andmanagement.

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

Laws, Regulations, and Standards	Details	Relevance/Applicability
The Embankment and Drainage Act (1952)	This Act describes the protection of embankments and drainage facilities	The Embankment and Drainage Act (1952) is applicable to CRDP-2 as the project will support drainage improvement of Pourashavas
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.

Laws, Regulations, and Standards	Details	Relevance/Applicability
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 Chalna Pourashava (as the LGI) achieve or fulfill these mandates.
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.

Laws, Regulations, and Standards	Details	Relevance/Applicability
Occupational Health And Safety Laws And Rules In Bangladesh, June 2015	At the national policy level, the National Occupational Safety and Health (OSH) Policy, the National Labour Policy and the National Industrial Policy deal with the issues of workplace accident prevention. The National Occupational Safety and Health Policy include a number of provisions/obligations to prevent accident at workplace. These are: • Necessary measures to ensure workplace safety and health protection in light of international Conventions/Declarations/Recommendations/Instruments (Article 3.a.1). • Implement national laws and regulations in relation with workplace safety and occupational health (Article 3.a.2). • Setting up national standards on OSH (Article 3.a.14). • Review and updating of all laws relating to OSH (Article 3.a.15, Art. 4. A.20). • Development and implementation of national policies and legal framework (Art. 4. A.2). • Developing Strategy and Action plan to ensure proper implementation of national laws and regulations (Art. 4. A.3). • Inclusion of OSH issues in the policies and programs of all related Ministries and agencies (Art. 4. A.13). • Establish labour courts in the industrial zone as the workers and trade unions can have easy access to the courts for implementing the mandatory provisions of OSH (Art. 4. A.15). • Impose mandatory terms and conditions upon the Construction agencies to follow the OSH polices during govt. run construction works (Art. 4. A.22). • Providing financial support to the establishments that maintain and practice the rules and regulations of OSH (Art. 4. A.24). • To ensure maximum safety standards during factory construction and implement all standards and regulations on internal safety environment (Art. 4. D.1).	The Occupational Health And Safety Laws And Rules In Bangladesh, June 2015 is relevant to CRDP-2 as it shall promote safe work environment in relation to Occupational Health And Safety.

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

E International Environmental Agreements

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

Table 6: International Environmental Agreements Relevant to Second CRDP

International Environmental Agreement	Year Ratified	Details	Relevance
United Nations Framework Convention on Climate Change (UNFCCC)	1997	Parties to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects.	The subproject is subject to impact of climate change. Engineering designs of the subproject consider climate change impacts, such as flooding and river water level rise. A climate change vulnerability assessment has been conducted for the geographic coverage of the entire Second CRDP, which covers the location of the subproject.
Paris Convention on Protection of the World Cultural and Natural Heritage, 1972	1983	Parties to ensure the protection and conservation of the cultural and natural heritage situated on territory of, and primarily belonging to, the State	The road and drainage works may impact undiscovered cultural and natural heritage relics during construction phase. The subproject EMP ensures measures for chance finds.
Ramsar Convention on Wetlands of International Importance, 1971	1992	Parties to conserve and wisely use wetlands (i.e., maintaining their ecological character) as a contribution towards achieving sustainable development locally and throughout the world	Road and drainage construction works may impact wetlands. The subproject EMP ensures measures are in place to protect significant wetland and prevent draining or filling into the wetlands during construction.
Convention on Biological Diversity, 1992	1997	Parties to require the environmental assessment of projects that are likely to have significant adverse effects on biological diversity with a view of avoiding or minimizing such effects	Biodiversity sites and species not previously identified might be discovered during construction works along the alignments. The subproject EMP ensures measures to protect biodiversity, if any, during construction and post-construction activities.

IV. DESCRIPTION OF THE SUBPROJECT

A. Subproject Scope and Components

34. The proposed Manikganj Khal Development subproject is composed of five schemes, namely: (i) Re-excavation of Manikganj Khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m); (ii) Construction of 18m bridge at Ch.2425m on Manikganj Khal; (iii) Construction of 18m bridge at Ch.2787m on Manikganj Khal; (iv) Construction of 36m bridge at Ch.3023m on Manikganj Khal; (v) Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal. Details of the development schemes are presented in Table 7. All construction, rehabilitation and improvement works will be undertaken within existing right of ways. The location of the subproject is shown in *Figure* 2 and Figure 3.

Table 7: Details of Manikganj Khal Development Schemes

Sl. No.	Name of Schemes	Outfall of Khal (km)	Length of Khal/ Bridge	Remarks
1	Re-excavation of Manikganj Khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m);	Kaliganga River	6.15 km	Re-excavation to allow uninterrupted flow of and accommodate stormwater runoff from the different areas of Manikganj town, the Manikganj Khal will need to be desilted and excavated to its original depth. Apart from siltation brought by stormwater runoff, landslides at various sections also contributed to the increase of silt level. Slope protection to stabilize the eroding concrete cement protection and soil slopes, the following have been proposed: (i) rehabilitation of existing but eroding concrete cement protection at some sections, (ii) construction of slope protection for the remaining sections of the canal, and (iii) walkways or footbridges as selected sections. Landscaping to provide the recreation along the banks of the existing khal within the town center, walk way or footpath has been proposed on either or both banks of the khal. This scheme will also avoid illegal encroachment of the khal lands by the local people
2	Construction of 18m bridge at Ch.2425m on Manikganj Khal;	NA	18 m	
3	Construction of 18m bridge at Ch.2787m on Manikganj Khal;	NA	18 m	
4	Construction of 36m bridge at Ch.3023m on Manikganj Khal;	NA	36 m	
5	Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal;	NA	NA	

Figure 2: Location of the Manikganj Khal Development Subproject

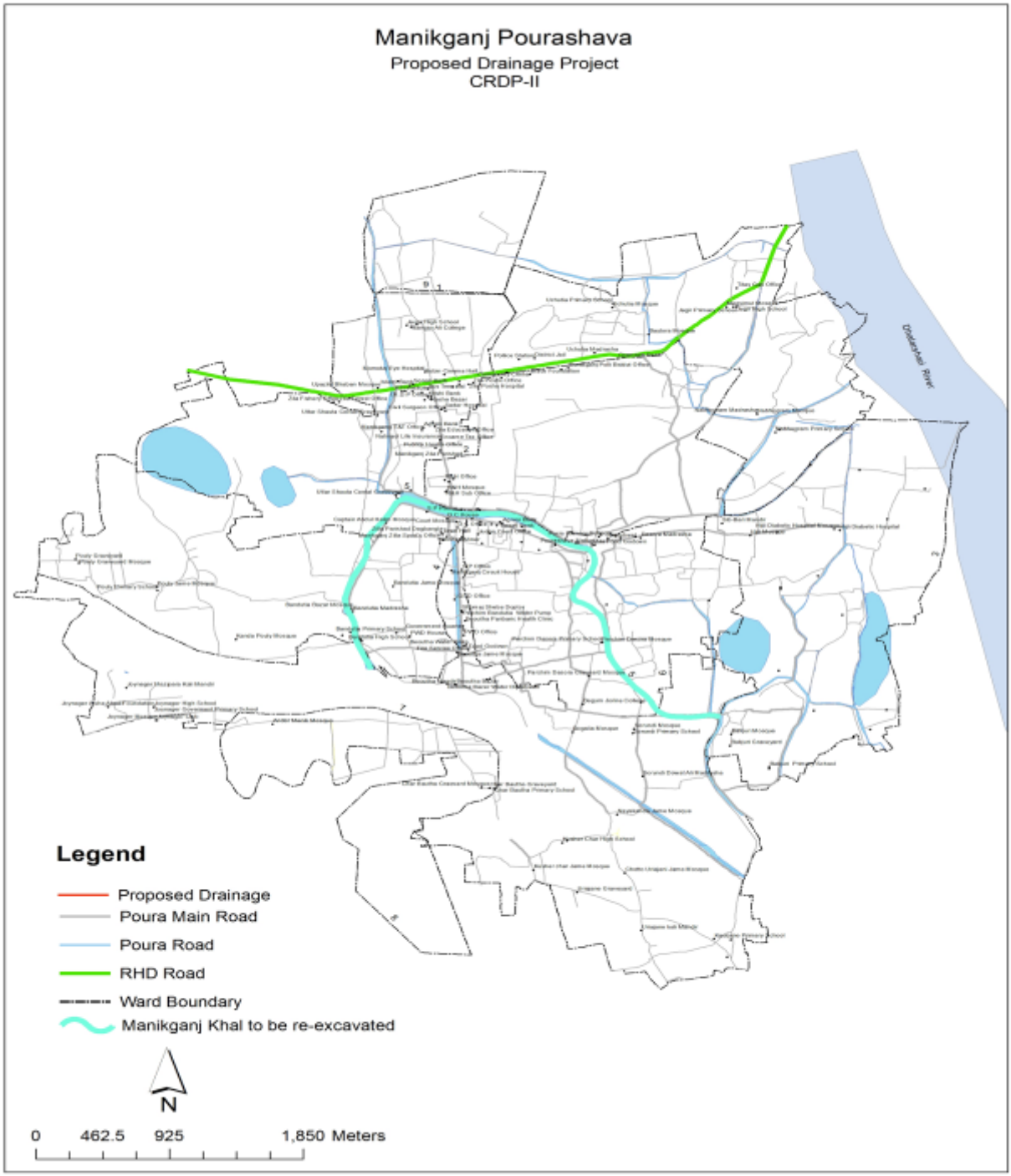


Figure 3: Manikganj Khal Subproject Location Map on Google Earth (Blue Line)

Source: Google Earth.

B. Existing Condition of Subproject Components

Scheme 1 (Khal): Re-excavation of Manikganj Khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m)

35. **Khal Existing Location**. The subproject is 6.15 km long drainage canal, which is one of the main drainage canal of Manikganj Town. This drainage canal passes through the middle of the Manikganj Town. It starts from Beautha Sluice Gate at Ch. 0+000 km (start coordinate: N $23^0$50' 56.18", E 89^0 59' 41.97") and ends at Shonakandor Sluice Gate at Ch. 6+150 km (end coordinate: N 23^0 50' 13.12", E 90^0 01' 15.61"). Both ends of the Manikganj Khal is connected to the Kaliganga River. One end of Manikganj Khal meets directly with the upstream portion of Kaliganga River while the other end merges to a branch khal that flows to the downstream of theKaliganga River. There is a 3-vent sluice gate at the start point (Ch. 0+000 m) near Beautha Bazar, known as Beautha sluice gate, and another 2-vent sluice gate near Sonakandor at the downstream end point (Ch.6+150 m), known as

Sokandor/Nayakandi sluice gate. There are also two inlet channels which meets the Manikganj Khal at Ch.1+600 meters (m) near Eidgah Area and at Ch.5+100 m near Bokjuri area.

36. **Khal Existing Condition**. Major parts of the canal traverse through residential lots, trade and commercial areas. This khal is currently in poor condition, and in many locations are silted up thus hindering drainage flow of storm water run-off. Sometimes, it is being used as a garbage dumping site by some of the unconscious town dwellers and some sections of the embankment are illegally encroached by local people, either as settlement or as area for business activities. Photos of existing condition of the subproject khal are shown in Figure 4.

37. While this canal is full of storm water during monsoon season, it almost dries up during summer season. Growth of grasses is observed during the dry season. Some trees are also observed to have grown on the banks of the canal and deemed to help stabilize and protect the embankments from being eroded. As such, these trees will be preserved during the slope rehabilitation and construction activities. Majority of the vegetations along the stretch of this canal are the naturally grown bamboo grasses and other perennial grasses found in the area.

38. The municipality envisions to make a section of the canal (about 1.5 km section that is located within the town center) as a recreational area in the future. The design will ensure that the canal will not totally dry up during summer season and that flow of water will be maintained. Hence, the excavation and desiltation of the canal is necessary.

Figure 4: Actual Photos of Existing Condition of the Manikganj Khal


Town Center Area

Typical Outlet from Community Canals to the Manikganj Khal

Outfalls at both ends of Manikganj Khal Leading to Kaliganga River


Scheme 2 (Bridge): Construction of 18m bridge at Ch.2425m on Manikganj Khal

39. Under this scheme, a 18m long bridge will be constructed on Manikganj khal at Ch. 2425m (**Figure 5**). The bridge will be constructed within the available vacant land within the khal bank. At present there is a bamboo made footbridge on this location of the canal.

Figure 5: Photograph of Construction of 18m bridge at Ch.2425m on Manikganj Khal

Existing condition of the bridge construction location (Ch. 2425m)

Scheme 3 (Bridge): Construction of 18m bridge at Ch.2787m on Manikganj Khal

40. Under this scheme, a 18m long bridge will be constructed on Manikganj khal at Ch. 2787m (**Figure 6**). The bridge will be constructed within the available vacant land within the khal bank. At present there is a bamboo made footbridge adjacent to the proposed bridge location on the canal.

Figure 6: Photograph of Construction of 18m bridge at Ch.2787m on Manikganj Khal

Existing condition of the bridge construction location (Ch. 2787m)

Scheme 4 (Bridge): **Construction of 36m bridge at Ch.3023m on Manikganj Khal**

41. Under this scheme, a 36m long bridge will be constructed on Manikganj khal at Ch. 3023m (**Figure 7**) in parallel with an existing narrow RCC bridge for smooth traffic management. The bridge will be constructed within the available vacant land of the canal.

Figure 7: Photograph of Construction of Construction of 36m bridge at Ch.3023m on Manikganj Khal

Existing condition of the bridge construction location (Ch. 3023m)

Scheme 5 (Public Toilet): Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal

42. Under this scheme, a public toilet will be constructed on Manikganj khal at Ch. 2525m (**Figure 6**). The toilet will be constructed within the available vacant land within the khal bank. At present there is no public toilet in close proximity of this location.

Figure 8: Photograph of Construction Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal

Existing condition of the public toilet construction location (Ch. 2525m)

C. Proposed Interventions or Development

Scheme 1 (Khal): Re-excavation of Manikganj Khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m)

43. The khal will be re-excavated starting from Beautha Sluice Gate to Shonakandor Sluice Gate (Ch.0-6150m). Slope protection works will be done and walkways and landscaping will be constructed at the banks along the existing canal of the urbanized area only. All interventions and constructions will be done along the existing alignment alignment and within available vacant width of the khal. The proposed interventions for the development of the subproject are displayed in 2 cross sections as shown in **Appendix 13**. As free flow wetland has been proven effective for the treatment of wastewaters, pollution control and environmental enhancement, it has been introduced to evade eventual pollution of Manikganj Khal. Proposed free flow wetland includes: a) Nolkhgra plant to treat wastewater, b) duckweeds to control pathogens, and c) water lilies for the removal of soap and detergent ingredients from the waste water. However, the Typical Free Flow Wetland at section Ch.0+500 to 1+650 & Ch.3+070 to 4+000 km is displayed in **Appendix 13**.

Scheme 2 (Bridge): Construction of 18m bridge at Ch.2425m on Manikganj Khal

44. A 18m long bridge will be constructed at Chainage 2425m over this khal. The bridge will be constructed within the available vacant land within the khal bank. A drawing (plan and elevation) of the proposed bridge according to the detailed updated design is displayed in **Appendix 13**. The proposed RCC bridge will be constructed according to the design.

Scheme 3 (Bridge): Construction of 18m bridge at Ch.2787m on Manikganj Khal

45. A 18m long bridge will be constructed at Chainage 2787m over this khal. The bridge will be constructed within the available vacant land within the khal bank. A drawing (plan and elevation) of the proposed bridge according to the detailed updated design is displayed in **Appendix 13**. The proposed RCC bridge will be constructed according to the design.

Scheme 4 (Bridge): Construction of 36m bridge at Ch.3023m on Manikganj Khal

46. A 36m long bridge will be constructed at Chainage 3023m over this khal. The bridge will be constructed within the available vacant land within the khal bank. A drawing (plan and elevation) of the proposed bridge according to the detailed updated design is displayed in **Appendix 13.** The proposed RCC bridge will be constructed according to the design.

Scheme 5 (Public Toilet): Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal

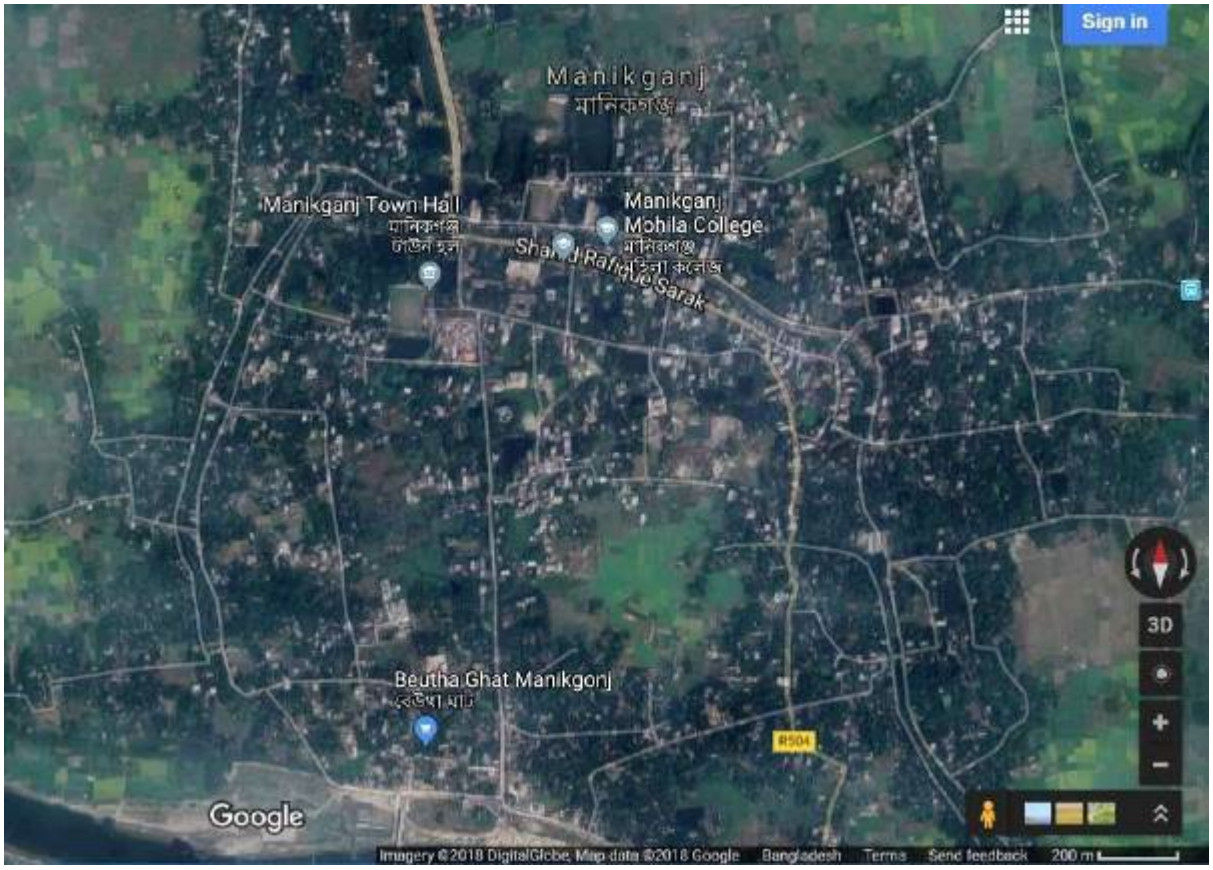
47. The proposed Public Toilet will be constructed on Manikganj khal at Ch. 2525m. The toilet will be constructed within the available vacant land within the khal bank. There is no Public toilet near close proximity of the proposed location. A drawing (plan) of the proposed toilet including septic tank and soak well according to the detailed updated design are displayed in **Appendix 13**. The proposed toilet block is comprised of male and female zones. Both the zones of toilet facilities have provision for differently abled people. A pump house will be installed at the premise of the toilet block consisting of an overhead water tank for continuous water supply. The toilet block will have drinking water facility. There will be proper lighting system both inside and outside of the premises. For management of fecal sludge and toilet wastewater, septic tank and soak pit/well has been considered in the proposed toilet infrastructure.

V. DESCRIPTION OF THE ENVIRONMENT

A. Physical Resources

48. **Location and Extent.** The subproject is located in Manikganj *pourashava*, which is in Manikganj District as shown in Figure 16 below. Manikganj Municipality was established in 1972 and consists of nine wards and 49 mahallas. The area of the town is 20.59 square kilometers (km^2).

Figure 16: Map of Manikganj Town Using Google Maps



Source: Google Earth.

49. **Topography, Soil and Geology.** The area is flat and poorly drained with elevations ranging from 9-15 m above sea level. Soils are somewhat porous allowing for some seepage of surface water into the soil. The district is subject to seasonal flooding. Channelized drainage covers most of the land, through which storm water runoff flow to local rivers, including Kaligonga River. Conversely, those rivers are part of a regional network that, once flooded, will also cause flooding in the locality. Manikganj is one of the most flood-vulnerable districts of Bangladesh, and Manikganj town is more vulnerable to flood than other places in the district.

50. **Climate.** The temperature at Manikganj ranges from 12 to 32 degrees Celsius (°C), and the monthly rainfall averages at 430 millimeters (mm) during monsoon and 10 mm during the winter dry season.

51. **Air Quality.** Since there are few industries in the area and vehicle usage is slight, the area is not expected to have significant issue on ambient air quality. Close vegetation is observed in and around the project area. Prior to construction activities, subproject

contractors will conduct air quality measurements as baseline. During construction, contractors will be required to conduct air quality measurements and ensure that the subproject does not cause deterioration of ambient air quality. This is included in the environmental management plan.

52. **Noise Level.** No information is available on local noise level from the secondary information source. The baseline noise level will be measured by the subproject contractors prior to commencement of work. During construction, contractors will be required to conduct noise level measurements and ensure that the subproject does not cause deterioration of ambient noise quality. This is included in the environmental management plan.

53. **Surface Water.** There are two main river channels that drain the area. One is the Dhaleswari River that flows from north to south along a channel that is located east of Manikganj Municipality. Another one is the Kaliganga River that is located to the south and west. The subproject drainage system converges directly with the Kaliganga River. The baseline surface water quality of the subproject canals will be tested before the commencement of the work, and the test results will be documented in the relevant SEMR.

Water flow in Manikganj khal: Water flow in the khal depends on the water level and flow discharge of the river Kaliganga and rain water run-off from the adjacent catchment area during monsoon. The Bangladesh Water Development Board (BWDB) has a regular monitoring station to observe water level and discharge in the Kaliganga River near Manikganj town. There is no monitoring station on the Manikganj Khal. Thus, BWDB data recorded at Kalinganga river near the khal represents the water flow of Manikganj Khal. In dry season (November to March), the water level and flow in the river is very low. No water flow from the river is observed onto the khal. However, in monsoon (April to October), the water level and subsequent discharge in river Kaliganga is high. In the monsoon, water flow is observed in the subproject khal. Monitoring station near the canal at Taraghat of BWDB shows that the water levels were 2.48 m, 2.88 m and 1.97 m on January in the years 2010, 2013 and 2017, respectively. Levels of water on August 2010, 2013 and 2017 were 6.2 m, 7.03 m and 6.72 m, respectively. There are about 4 m of water level variations during a year.

A Drainage Master Plan (DMP) for Manikganj Pourashava has been prepared based on the modeling study, technical assessments and field visits. Following are some recommendations of the DMP related to flooding:

- It has been found that the Manikganj khal, though controlled by two sluice gates at its two ends, is flooded by overland flow from Kaligonga River during the monsoon through the inlets of two other khals, one at Edgah Mosque area and the other at Bogar bridge area and thus silted up regularly. So, it is essential to conduct re-excavation of the khal. This will increase the carrying capacity of the khal.
- To increase water flowing areas, to avoid urban flooding and for the enhancement of the stability of the slope, bank protection should be proposed using vertical retention wall and walkway for the different segment of Manikganj khal and other khals.
- During dry period the water stages in the Rivers go down almost below the bed level of the Main Manikganj Khal and thus the khal becomes almost empty and dry.

54. **Groundwater.** Groundwater is abundant in Bangladesh. Water tables are generally shallow and aquifers are productive. The main aquifer that provides water supply is found at a depth of greater than 50 m.

B. Ecological Resources

55. **Flora Resources**. The ecological setting is mostly a settled countryside with typical homestead and roadside vegetation. There are no extensive forested areas within or near the vicinity. Tree cover in the area are mostly from cultivated species which could be as high as 30%of the land area. Trees growing at homesteads also provide easy access to fuel wood, fodder and other products. A large number of multipurpose trees (fruit, timber, fodder, medicine) are also grown in the area.

56. The Genetic alluvium occupies the greater part of Manikganj District where Manikganj town is located. The soils of the district are mainly loamy on ridges and clay in basins. The cropping pattern is largely similar to that of adjoining districts. The major agricultural crops are rice, jute, wheat, pulses, oil seeds, vegetables, spices, potato, sweet potato, cheena and kaun. Among rice crops, aman covers the largest area followed by aus and boro.[13]

57. The village homestead of the district is usually concealed by the dense and lush green foliage of a wide variety of trees, shrubs, and thickets of bamboos and bananas. Main feature ofthe landscape is the palm. The most common is the date palm then followed by the Palmyra palm, betel nut palm and the coconut palm. These are commonly found in the vicinity of the village dwellings (footnote 13).

58. The homestead flora is an important asset for the rural poor and plays a vital role in the household economy as it is the source of food, fuel and fodder. Homesteads are protected by shrubby plants like kata mehedi *(Lawsonia inermis*), fonimonasha (*Opuntia dillenii*), arhar (*Cajanas cajan*), dhoincha *(Sesbania spp*.) etc. Besides, the floating macrophytes which are commonly seen in the ponds include kachuripana (*Telanthera philoxeroides*), topa pana (*Pistiastratiotes lemnaspirodela*), khudi pana (*Lemnapaucicos tata*), panifall (*Trapa bispinosa*), the floating ferns like azolla pinnata, salivinia cucullata etc. In the shallower ponds are found species of panchuli (*Nymphoides*), padma *(Nelumbo nucifera)*, the water lilies, shapla (*Nymphaea pubescens*), kalmi (Polygonum), helencha (*Tilanthera philoxcroides*) etc. (footnote 13).

[13] Bangladesh Bureau of Statistics. December 2013. District Statistics 2011 for Manikganj.

59. Moreover, some climbers and twiners like shim or pea, satamuli, pui, gulancha, kumarilataetc., grow with the support of homestead thickets, shrubberies and backyard trees. Also, a variety of epiphytic such as orchids and epiplytic ferns grow on large trees. In addition, many plants are grown at the homesteads mainly for aesthetic purposes. Such plants are hasnahena (Cestrum nocturnum), patabahar, gandhoraj (Gardenia augusta), dolon champa, kamini, jaba (hibiscus rosa sinnunsis), madhumalaati, halde karabi (Theveti peruviana), togor (*Tabernaemontona coronaria),* shefali *(Nyctanthes arbor tristis*), beli (*Jasminun scandens*), aparajaya, sandhya malati etc. (footnote 13).

60. Other common trees found in the District include sheel koroy (*Albizzia procera*), khari koroy (*Albizzia lucidior*), pitraj (*Aphanamixls polystachia*), chatim (*Alstonia scholarsis*), sil bhadi *(Garuga pinnata*), kadam (*Anthocephalus cadamba*), palash (*Butea monosperna*), hijol (*Barringtonia acutangula*), shimul (*Bombax ceiba*), sonalu (*Cassia fistula*), neem (*Azadirachta indica*), gamar (*Gmelina arborea*), sajna (*Moringa obifera*), tetul (*Tamariandus indica*), arjun (*Terminalia arjuna)*, sheora (*Streblus asper*), raintree *(Samanca saman*), jarul (*Legerstroemia speciosa*), mandar (*Erythrina variegata), s*isoo (*Dalbergia sissoo*) etc. (footnote 13).

61. Fruit trees are also abundant, which include amloki (*Phyllanthus emblica),* ata (*Anona squamosa*), lotkan (*Baccaurea ramiflora*), bel (*Aegle marmelos*), mango (*Mangifera indica*), jack- fruit (*Artocarpus heterophyllus*), papaya (*Carica papaya*), kamranga (*Averrho karambola*), chalta (*Dillenia indica*), guava (*Psidium guajava*), dalim (*Punica granatun*), dumur (*Ficus sp*), amra (*Spondias pinnata*), black-berry *(Syzygium cumini*), kat badam (*Terminalia catappa*), boroi *(Zizyphus mauritiana)*, olive (*Elaeocarpus tectorius*), gab (*Diospyros precatorius*) etc. are also found in the area. Common wayside trees are banyan, (*Ficus benghalensis*), ashatha (*Ficus religlosa*), debdaru (*Polyalathia longifolia*), akashmoni (*Areica auriculiformis*), mehogani (*Swietenia macrophylla*) (footnote 13).

62. **Fauna Resources (Mammals)**. The mammalian fauna that are commonly seen in Manikganj District are Bengal fox (*Vulpes bengalensis*), common mongoose (*Herpestes edwardsi*), five striped palm squirrel (*Funambulus pennanti*), common otter (*Lutra perspicillata*), common house rat (*Rattus rattus*), house mouse (*Mus musculus*), Indian porcupine (*Hystrix indica*), rhesus monkey (*Macaca mullata*), and a few species of bat. Some of the mammals that were once usually seen in this area have now become rare. These are jungle cat (*Felis chaus*), small Indian civet (*Viverricula indica*), large bandicoot (*Bandicota indica*), jackal (*Canis aureus*) etc. (footnote 13).

63. **Fauna Resources (Avian)**. Few birds are commonly found in both rural and urban areas. These are the crow (*Corvus splendens*), sparrow (*Passer domesticus*), bhat shalik (*Acridotherestristis*), black drango (Dicurus macrocercus), and reduinted bulbul (*Picnonotus cafer*), other common birds include magpie (*Copsychus saularis*), babui (*Ploceus phillippinus*), common kingfisher (Alcedo atthis), lesser golden backed woodpecker *(Picus myrmecophoneus*), spotted dove (*Streptopelia chinensis*), brahminy kite (*Haliaster Indus*), pond heron (*Ardeola grayii),* little cormorant (*Phalacrococan niger*), white breasted water hen (*Amaurornis phoenicurus*), common hawk cuckoo (Cuculusus varies) and barn owl (*Tyto alba*). The song birds like bush lark, halde pakhi, warblers, purple sun bird etc. are also found (footnote 13).

64. Various species of migratory birds also enter into Bangladesh mainly during the winter season. These are fantail snipe (*Gallinago gallinago*), pintail snipe (*Gallinago stenura), c*ommonteal (*Anas crecca*), common slelduck (*Tadorna ferruginea*), grey leg goose (*Anser anser), c*ommon sandpiper (*Tringa hypoleucos*), grey wagtail (*Motacilla cinerea)* pied harrier (*Circus melenoleucos*), brown headed gull (*Larus brunicephalus*), common pochard (*Aythya ferina*), little

ringed plover (*Charadrius dubius*), common tern (*Sterna hirusdo*), large pariah kite (*Milvus migrant*) etc. (footnote 13).

65. **Fauna Resources (Amphibians and Reptiles).** Among the reptilia, there are many species of lizards, of which the house geckoes or tik-tiki (*Hemidactylus brooki*.) are definitely the most common and best known. The larger tokay gecko (*Gekko gecko*) is also common.Other species of lizards are yellow water monitor, stripped skink, grey land monitor etc. Few species of snakes that are found here are ghargini shap (Lycodon jara), dhora shap (Xenoclrophispiscator), paina shap (*Enhydris enhydris*), gokhra (*Naja naja*), rat snake (*Ptyas nigromarginatus*), banded krait (*Bungarus fasciatus*). A few species of turtles tortoises such as pond tortoise, common roof tartle, Peacock (Pavo cristatus) Soft Shell turtle etc. are also found. Most common amphibians include kuno bang (*Bufo melanostictus*), bhawa bang (*Rana tigerina*), kotkoti bang (*Rana cyanophlyctis)* etc.

66. **Fauna Resources (Fishes).** Various types of water bodies like ponds, big tanks, bezels, rivers etc, are the habitats for fish population. The principal types of fish that are available in thisDistrict are ruhi (*Labeo rohita*), katla (*Catla catla*), mrigel (*Cirrhinus mrigala*), airh (*Mystus aor*), kalboush (*Labeo calbasu*), magur (Clarias-batrachus), koi (Anabas testudineus) shoil (*Channa striatus*), hilsa (Hilsa ilisa), sorputi (Puntius *sarana*), chitol (*Notopterus chitala*), pabda or butter (Ompok pabda), bacha (*Eutropichthys vacha*), pangas (*Pangasius pangasius*), bele (*Glossogobius giuris*), tengra (*Mystus vittatus*), etc. (footnote 13).

67. Some exotic varieties of fishes like grass carp *(Cteopharyngodon idella),* silver carp *(Hypophthalmicthys molitrix),* telapia *(Oreochromis mossambicus),* nilotica *(Oreochromis niloticus),* etc. have also been introduced for commercial pisciculture in ponds and tanks.

68. From these flora and fauna resources, none is considered endangered or critical per list from IUCN Red List. The subproject area is considered a developed and modified urban setting. From various field visits conducted by the PMCU in 2018, it was confirmed that no critical habitatswithin and around the subproject area.

C. Economic Development

69. **Land Use.** Total cultivable land 16,700 hectares (ha) with about 48% under irrigation. Some 9% of agricultural land is under single cropping; 61% is double cropped and 28% triple cropped. About 21% of peasant farmers are landless, and 65% are considered marginal in termsof land holdings. The market value of the land of the first grade is Tk8,500 per 0.01 ha. There are21 hats and bazaars.

70. **Industry and Agriculture.** There are few large industries in the area and those present are of the traditional type, such as jute, textile and tobacco. The town has a good range of small scale manufacturing and service enterprises such as repairing shops for rickshaw, construction industry, furniture and metal work units, and electrical and mechanical repair workshops. The major agricultural and horticultural products include rice, potato, wheat, lentils, maize, jackfruits, papaya, chilly, sweet potato, spinach, sweet gourd, gourd, bitter gourd, bean, eggplant, cucumber, banana and wax apple. Moreover, good quality milk and milk products including ghee (clarified butter) and sweetmeats are produced in the locality.

71. **Infrastructure, Transport and Communications.** Existing infrastructure in Manikganj Upazila includes roads of varying degrees of maintenance. Some are degraded in condition and often impassable except at very slow speeds. Roads inventoried based on one source include 92 km of pucca, 15 semi-pucca and 498 km of mud roads. For

management of solid waste of the Pourashava there is a disposal site located at Gazaria Chak, Dighulia Union, and 1.50 km west of Manikganj town and 150 m south of Muljan Bus stand on Dhaka-Aricha Highway. This site is approximately 1 ha and owned by the Manikganj *pourashava*. This site has been approved as thedesignated disposal area for the subproject. Figure 18 shows the actual photograph of the locationof the disposal site.

D. Social and Cultural Resources

72. **Demography.** The present Population is around 238,000 of which 50.23% are males. Religious affiliation is as follows: Muslim 85.65%, Hindu 14.2% and Christian 0.02%. Local Market and Bazar: There are 28 hats and bazaars, 12 fairs, most noted of which are Joyra Cattle market, Tora Biltu Smriti Hat, Manikganj Bazar, Bus-stand Bazar, Beutha Bazar, Betila Rash Mela, Sivabari Mela, Garpara Imambari Maharram Mela etc.

73. **Health and Educational Facilities.** There are numerous health facilities like hospital 1, Upazila health complex 1, maternity and child care center1, eye hospital 1, clinic 7, satellite clinic 1 and family planning center 10 etc. There are numerous educational facilities within the Upazila like college 9, Law College 1, B Ed college 1, PTI 1, vocational institute 1, secondary school 43, primary school 107, kindergarten 30, madrasa 13.

74. **Water Supply and Sanitation.** There is no piped water supply system in the Upazila. The sources of drinking area include tube-well (87.50%), tap (8.64%), pond (0.29%) and others 3.57%.; and the sanitation facilities are available in the form improved sanitary latrine in 53.44%(rural 45.94% and urban 83.36%) dwelling households of the upazila and 43.31% (rural 50.38% and 15.09%) of dwelling households use nonsanitary latrines; 3.25% of households do not havelatrine facilities.

75. **Access to Electricity.** All the unions of the upazila are under rural electrification network.However, 37.79% of the dwelling households have access to electricity.

E History, Culture and Tourism

76. Heritage sites are generally of local interest only. Also, there are numerous religious institutions in the Upazila. List of these archaeological heritage and relics[14] include Manikganj Jami Mosque, Sree Sree Anandamayee Kalibari (1895), Rajani Bhaban and Jhovat Bhaban (Gangadhar Patti), Matta Math (1894), Narayan Sadhu Asram (1348 BS), Kachari (revenue office)of Ishu Babu (Hijlain), Sivabari Mandir, and Neel Kuthi at Baimail. None of these are located adjacent the subproject sites and will not be affected by the civil works. A map showing the locations of these points of interest are in Figure 17.

[14] Banglapedia. National Encyclopedia of Bangladesh. *Manikganj Sadar Upazila.*

Figure 17: Map Showing Location of Heritage Sites in Manikganj

Source: Google Earth.

F Baseline and Climate Change Status

77. A climate change vulnerability and disaster risk assessment was conducted for the various subprojects under the project.[15] Results of this assessment have been used to design the various subprojects, including the Manikganj Khal Development Subproject. The current climatic status of rainfall and temperature has been produced based on the historical data available in the MARCSIM DSSAT Weather File Generator Portal and future climate change projections are generated using average median values of the following IPCC AR5 (CMIP5) models for 2050. The base line generated from the historical data refers to 1985. The following models results are used for RCP 6.0 which represents medium representation concentration pathway characterizing GHG emission. It shows that temperature is projected to rise by around 1°C for maximum temperature (Tmax) and around 1.5 °C for minimum temperature (Tmin). Rainfall shows increase in all months except December. Increase is relatively high in July, August and September depicting higher probability of monsoon floods (footnote 15).

[15] LGED. 2017. Climate Change Vulnerability and Disaster Risk Assessment: Design Options for Dhaka Region Roads Subprojects. CRDP-II.

Figure 9: IPCC AR5 (AMIP-5) Models Used for the Climate Change Assessment

Models	Models
BCC-CSM1-1	HadGEM2-ES
BCC-CSM1-1-M	IPSL-CM5A-LR
CSIRO-Mk3-6-0	IPSL-CM5A-MR
FIO-ESM	MIROC-ESM
GFDL-CM3	MIROC-ESM-CHEM
GFDL-ESM2G	MIROC5
GFDL-ESM2M	MRI-CGCM3
GISS-E2-H	NorESM1-M
GISS-E2-R	

The following tables show annual progression of baseline and projected for 2050 Minimumand maximum temperature (Tmin and Tmax) and rainfall and projected changes in these parameters (footnote 15).

Table 8: Baseline and Projected for 2050 Maximum Temperature

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Baseline Tmax(°C)	25	27. 9	32. 3	34.4	33.4	31.6	31.1	31.2	31.5	31	28. 6	25. 8
Baseline Tmin(°C)	12	13. 9	18. 7	22.8	24.3	25.3	25.7	26	25.8	23.5	18. 1	13. 5
Tmax-50 (°C)	26. 1	29. 1	33. 6	35.6	34.5	32.7	32	32.2	32.6	32.2	29. 5	26. 8
Tmin-50 (°C)	13. 6	15. 5	20. 3	24.3	25.7	26.6	27	27.2	27.1	25	19. 7	15. 1
Baseline Rainfall (mm)	8.5	18. 9	46. 5	113. 8	241. 6	353. 9	350. 3	303. 8	261. 9	161. 9	28. 3	4.6
Rainfall-50 (mm)	10. 1	20. 1	48. 2	114. 4	248. 8	356. 3	373. 5	323. 6	267. 5	165	29. 2	4.3

°C = degree Celsius, mm = millimeter, Tmax = maximum temperature, Tmin = minimum temperature.

Table 9: Baseline and Projected change of Tmax, Tmin and Rainfall by 2050 relative to Baseline on Monthly Basis

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tmax (°C)	1.1	1.2	1.3	1.2	1.1	1.1	0.9	1	1.1	1.2	0.9	1
Tmin (°C)	1.6	1.6	1.6	1.5	1.4	1.3	1.3	1.2	1.3	1.5	1.6	1.6
Rainfall (mm)	1.6	1.2	1.7	0.6	7.2	2.4	23.2	19.8	5.6	3.1	0.9	-0.3
Rainfall (%)	18.8	6.3	3.7	0.5	3.0	0.7	6.6	6.5	2.1	1.9	3.2	-6.5

°C = degree Celsius, mm = millimeter, % = percent, Tmax = maximum temperature, Tmin = minimum temperature.

Table 10: Baseline and Projected Change of Tmax, Tmin and Rainfall by 2050 Relative toBaseline on Seasonal Basis

Seasonal	Dec, Jan,Feb	Mar, Apr,May	Jun, Jul,Aug	Sept, Oct,Nov	Annual
Change of Tmin	1.6	1.5	1.4	1.3	1.5
Change of Tmax	1.1	1.2	1.1	1.0	1.1
Rainfall Change (mm) by 2050	2.5	9.5	45.4	9.6	67
Change (%)	7.8	2.4	4.5	2.1	3.5

Tmax = maximum temperature, Tmin = minimum temperature.

78. For river hydrology, 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 foundation stability of riverbank and submersible dam (footnote 15).

79. Hot days temperature is also an important walkway or footpath design consideration, particularly for walkway of asphalt or uniblocks, due to its effect on stiffness of the walkway. The stiffness modulus of asphalt is affected by temperature. Migration or bleeding of liquid asphalt isa concern at sustained air temperatures above 32°C (footnote 15).

VI. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

A Compliance with Subproject Selection Criteria

80. The subproject was selected based on the selection criteria in the EARF of the project. Table 11 below is a summary of the assessment of compliance with the subproject selection criteria under the project.

Table 11: 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 environmental assessment and review framework (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, 2009). 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 environmental management plan(EMP).
8. Reflects inputs from public consultation and disclosure for site selection.	Complied. Also, to be complied in future consultations. The initial environmental examination (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 toerosion from construction sites.	Complied. Included in the EMP.
11. Provides for appropriate protection/mitigation measures to addressnoise 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 project management and coordination unit (PMCU), project implementation unit (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.

EARF = environmental assessment and review framework, EMP = environmental management plan, IEE = initial environmental examination, PIU = project implementation unit, PMCU = project management and coordination unit, and SPS = Safeguards Policy Statement.

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

81. **Impacts Due to Location.** The subproject does not involve any special considerations regarding planning and location, since all of the components involve khal re-excavation and reconstruction of submersible dam or spar within the existing khal section. and occupy existing right of way that is generally clear, and for which no acquisition or easement for land is required.There is a high degree of certainty that the improvements can be made without affecting permanent structures.

82. In this drainage subproject, there are minor impacts that result from the planning, designor location, because:

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

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

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

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

85. Mitigation Measures. The impacts of climate change will be mitigated upfront during the design and planning stage for the infrastructures. Among these measures are the following:
(i) Due to climate change, the river water level will rise and as a result may overflow causing flooding of roads and establishments. Therefore, the appropriate base depth level of the canal for desilting and excavation should be determined;
(ii)The differences in water level between base and future time should be computed as it is needed to estimate the additional drainage embankment height required. This is in addition to the resulting depth of the canal after excavation or desilting;
(iii) The drainage canal is expected to drain a significant additional discharge due to climate change-induced higher rainfall during monsoon seasons. Therefore, widening of some sections of the drainage should be considered. However, any widening activities should also consider any social safeguard implications; and
(iv)Maximum possible efforts have to be made for minimizing cutting of trees while designing the rehabilitation and protection of the drainage canal walls and embankments

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

86. 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 illustratedin Table 12 below.

Table 12: Issues, Concerns and Mitigation Measures During Design Phase

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
Detailed design			
1. Consideration of sloped areas in subproject design	Soil erosion and slope instability	Incorporate measures and sites for handling excessive spoil materials	Project management and coordination unit (PMCU) and preparation, design and supervision consultant (PDSC)
2. Community canal outlets along the Manikganj Khal	Not properly designed outlets will wash down silts and solid wastes, from community canals straight to the Manikganj Khal. This will cause heavy accumulation of silts and solid wastes in the Manikganj Khal in the medium to long term. Not properly monitored household connections to the community drains may cause direct discharge of domestic wastewater and septic effluent to these canals and lead to the Manikganj Khal. This will eventually pollute the Kaliganga River.	Manikganj Pourashava authority to prevent any septic effluent to the canal. Two drains have been designed to carry domestic wastewater, a 1800 mm dia. pipe drain along right side of the canal and a 1400 mm dia. pipe drain along left side of the canal which will prevent access of domestic wastewater to the canal.	PMCU, PDSC, Manikganj project implementation unit (PIU)
3. Incorporation of community health and safety measures in the design	Impacts to community health and safety, including incidents of accidental fall of people or vehicles into the canal	Incorporate in the design safety protection along the drainage canals, especially at sections located in the town center and residential or commercial areas. Ensure to include in the design the following: (i) signages in critical areas of the drainage canal; (ii) barricades or similar structures in	PMCU, PDSC

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

Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Responsibility
		inspection and maintenance of the drainage canal, conduct of repairs, etc.	
7. Site selection of sources of construction materials such as sand and gravels.	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion; Disturbance in natural drainage patterns, ponding and water logging, and water pollution.	Procure construction materials such as sand, gravels, or aggregates from government-authorized dealers only. If quarrying is to be the source, ensure to conduct at sites authorized by the government such as the Bangladesh Water Resources Development Board for sand quarrying.	PMCU, PDSC
8. 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.	PMCU, PDSC
9. Construction camps	Inappropriate location for construction camps will impact the general welfare and health and safety of the workers.	Identify construction camp sites that are strategically located relative to the work sites. Ensure these camp sites can be easily provided with the basic amenities for the workers.	PMCU, PDSC

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

C Assessment of Environmental Impacts and Mitigation Measures – Construction Phase

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

1. Construction Method

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

89. **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, approvalstatus, and consent.

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

2. Impact on Physical Resources

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

92. **Sources of Materials**. Significant amount of gravel, sand and aggregate, will be requiredfor this subproject. The contractor will be required to:
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 Resources Development Board for sand quarrying;
No new quarry sites shall be used for the subproject;
Verify suitability of all material sources and obtain approval of implementing agency; and
Document all sources of materials and include in the monthly reporting to the PIU.

93. **Surface Water Quality.** The civil works will have direct impact to surface water quality ofKaliganga River since these are location in the Manikganj canal. The construction works will expose the Kaliganga river to risks of pollution caused by: (i) poorly managed construction sediments, and waste materials; (ii) poor sanitation practices of construction workers; and (iii) improper storage of petroleum products or chemicals used during construction such as fuel, oil and lubricants. Although construction works will be scheduled during dry season, any unavoidable excavation or construction works during monsoon season will wash down these pollutants to the Kaliganga river.

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

- follow World Bank's Environmental Health and Safety (EHS) Guidelines onConstruction and Decommissioning Activities;[17]
- dispose excess spoils per the Spoil Management Plan attached in (Appendix-2)
- locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water);
- shield temporary storage areas with sandbags;
- provide adequate water supply and sanitation facilities at work sites;
- provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants;
- provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean-up of equipment, and response measures in case spills or emergencies using a well prepared emergency response plan; and
- ensure no refueling within 100 m from surface water.

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

- follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17)
- collection of recyclable solid wastes and supply to scrap vendors;
- ensure all the camp wastes and construction wastes are placed in the designatedwaste collection pits (lined to ensure no seepage of leachate) away from receivingwater;
- establishment of separate bunded and lined areas with 110% volume for the storage of all the toxic material wastes, including batteries, oil filters, mobil, burnt oils, etc. at the construction site; and
- consultation with PIU on the proper disposal of all residual wastes.

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

96. 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:

- follow World Bank's EHS Guidelines on Construction and Decommissioning
- Activities (footnote 17);
- provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. This will ensure these chemicals will not seep into the ground and eventually affecting groundwater quality. Contractors will provide construction camps with portable toilets for use of the workers and will ensure that handling of the septic wastes generated will be done by authorized handlers and transporters only; and
- no toilets shall be put up within 500 m from groundwater wells, if any.

97. **Air Quality**. While most construction works will be conducted during the dry season, thereis 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) emissions from construction vehicles, equipment, and machinery used for excavation and construction, which may contain pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons, and (v) burning of firewood for cooking and heating in work and labor camps.

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

- follow World Bank's Environmental Health and Safety (EHS) Guidelines onConstruction and Decommissioning Activities (footnote 17);

- confine earthworks according to excavation segmentation plan that should be partof site-specific environmental management plan (SEMP);

- prepare and implement a dust management plan that should be part of the SEMP;
- consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials (ideally about 500 m from residential areas);

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

- bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites;
- damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary;
- if re-surfacing of disturbed roads cannot be done immediately, spread crushed 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 per hour;
- 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; and
- prohibit open burning of solid waste.

99. **Noise Levels.** Noise-emitting construction activities include earthworks, concrete mixing, demolition works, movement and operation of construction vehicles and equipment, and loading and unloading of coarse aggregates. The significance of noise impact will be higher in areas where noise-sensitive institutions such as health care and educational facilities are situated. Noise levels should not exceed the national standards for noise or WHO noise level guidelines, whichever is more stringent, or result in increase in background noise level of 3 decibels at the nearest receptor location off-site.[18] The comparative illustration of national standards versus WHO guidelines is in Table 4 in Section II hereof.

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

- follow World Bank's EHS Guidelines on Construction and Decommissioning Activities (footnote 17);
- if applicable to subproject alignment, prepare and implement a noise and vibration management plan that should be part of the SEMP;
- 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;
- 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.

101. **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.

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

- dispose excess spoils per the Spoil Management Plan attached in Appendix-2;
- 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.

[18] World Bank Group. 2007. *Environmental, Health, and Safety (EHS) Guidelines. General EHS Guidelines: Environmental – Noise Management*. Washington, D.C.

103. **Disposal of spoils and debris.** Consistent with the Spoil Management Plan, all dredged or excavated silts and soil from the Manikganj drainage, including any demolished concrete fromrehabilitation of existing drainage walls will be disposed to appropriate disposal site approved bythe local government or *pourashava*. Expectedly, dredged materials from the drainage canal willbe ordinary soil and uprooted grasses or shrubs with some amount of non-biodegradable wastesthat have accumulated in the drains for years. For proper handling of the spoils, the following actions will be followed by the contractor:
Recover or collect the non-biodegradable waste materials from the mixture of excavated materials. This includes broken glasses and any other hazardous materials found in the dredged mixture, if any;

- Handle and haul the non-biodegradable wastes and hazardous materials separately from the excavated soil;
- Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints;
- Haul all wastes using transport equipment such as dump trucks with proper cover(e.g., tarpaulin) to avoid accidental release along the route to the disposal site; and
- Utilize haulers that are authorized to handle and transport these kinds of wastes.

104. The disposal site is located at Gazaria Chak, Dighulia Union, and 1.50 km west of Manikganj town and 150 m south of Muljan Bus stand on Dhaka-Aricha Highway. This site is approximately 1 ha and owned by the Manikganj *pourashava*. This site has been approved as thedesignated disposal area for the subproject. Figure 18 shows the actual photograph of the locationof the disposal site.

105. The disposal site is currently being used as disposal site for solid wastes by the Pourashava. This is also the only site available for the subproject construction spoils and debris. In order to manage these spoils and debris separately, a specific location within the disposal sitewill be designated for these spoils and debris and prevent from mixing with the municipal solid wastes. The PIU will monitor this specific location at the disposal site during the project implementation period. For the disposal of subproject excavated spoils, the contractor shall submit the Spoil management plan showing disposal site before commencing of the work. It is to point out that as per estimation, 110415.15 cubic meter excavated spoil will generate from the excavation of subproject khal. The cost for disposing excavated soils has been included in the BoQ.

Figure 18: Location of Disposal Site

Location: at Gazaria Chak, Dighulia Union, and 1.50 km west of Manikgani town and 150 m south of Mulian Bus stand on Dhaka-Aricha Highway.

3. Impacts on Ecological Resources

106. Subproject sites are located within the town area. While various flora and fauna resources are found in the municipality, there are no biodiversity sites, protected forests, natural or critical habitats per ADB SPS, 2009 definitions are found in the area. As such, no impacts on sensitive ecological resources is envisaged.

107. **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. Although the town has numerous flora and fauna resources, none of these will be impacted because activities will only be undertaken within the existing drainage canals. Only perennial shrubs and grasses grow in this canal during dry season and these are common local plants in Bangladesh and not protected species. For trees found along the drainage canal embankments that will be used for footpaths or drains, the design will ensure that these trees will not be cut.

108. To mitigate the impact of tree cutting, contractors will be required to:

- avoid, or minimize when avoidance is not possible, tree cutting;
- for any tree cut, conduct replacement planting at a ratio of 1:10 consistent with the approved EARF for the project and social forestry program of LGED (see **Appendix-3** for LGED Tree Plantation Program);
- protect giant trees and locally-important trees (for religious reasons), if any, during implementation;
- prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; and
- prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.

109. **Aquatic Ecology.** The subproject site is the Manikganj canal, which is connected to the Kaliganga river. This river is used by many locals for fishing, either for domestic consumption or livelihood. All aquatic species found at the Kaliganga river are not protected species. Nevertheless, the construction of the subproject may affect Kaliganga river due to siltation and therefore may impact the quality of the water and eventually the productivity and harvest of theseaquatic resources.

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

- 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); and
- not undertake construction works near these sites during the spawning and breeding period between June and September.

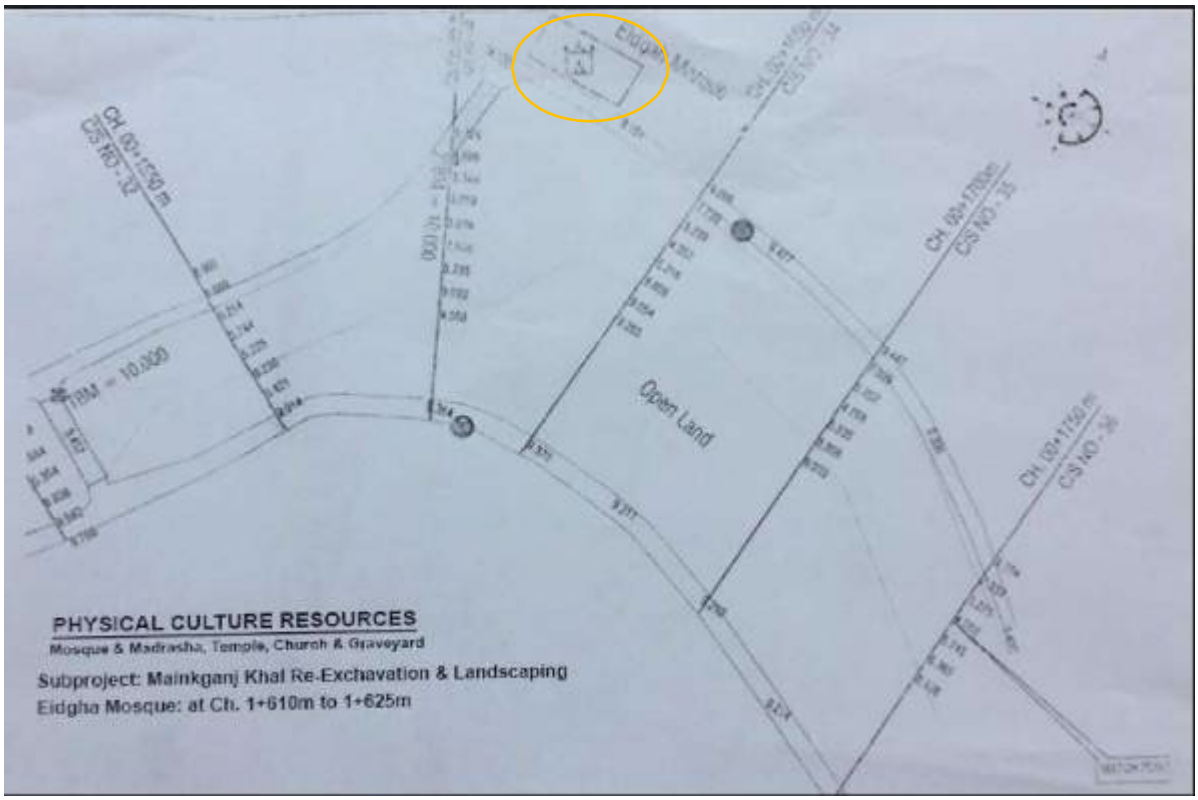
4. Impacts on Physical Cultural Resources

111. The subproject will not encroach or run over into any physical, and cultural resources. Aswell, 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:

- strictly follow the protocol by coordinating immediately with Manikganj 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.

112. As for religious establishments in the area, there is one identified mosque (an Eidgah Mosque) along the alignment of the khal as shown in the strip map in **Figure 19** below. However, the mosque will not be impacted as the rehabilitation works will be confined at the existing canal only. The contractor will ensure that the site-specific EMP will include safety measures when working at this section where the mosque is located. Likewise, consultation activities will ensure to include representatives from this particular religious establishment.

Figure 19: Strip Map Showing Location of Mosque Along the Manikganj Khal



5. Impacts on Socioeconomic Activities

113. **Traffic and disturbance to community.** The impacts will result from excavation works near roads, 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).

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

- prepare and implement a traffic management plan in collaboration with local authorities;
- where traffic congestion will likely occur, place traffic flagmen during workinghours;
- 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.

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

116. 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 17). As a minimum and whichever is applicable, the community health and safety plan shall ensure the following:

- implement risk management strategies to protect the community and structures like bridges along the Manikganj Khal (including institutional establishments such as schools, hospitals and mosques) from physical, chemical, or other hazards associated with sites under construction and decommissioning;
- 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;
- 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 trenchesor excavations, or locked storage of hazardous materials; and
- implement measure to prevent proliferation of vectors of diseases at work sites;
- adequate space and lighting, temporary fences, shining barriers and signage atactive work sites;
- contractor's preparedness in emergency response;
- adequate dissemination of GRM and contractor's observance and implementation
- of GRM; and
- upon availability, local people should be given an opportunity for work in the subproject activities.

117. **Occupational health and safety hazards.**

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

118. 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 practiceson occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities (footnote17). As minimum and whichever are applicable, the occupational health and safety plan shall ensure the following:

119. **Communication and Training**

Training of all workers on occupational health and safety prior to construction works; Conduct of orientation to visitors on health and safety procedures at work sites; Signages strategically installed to identify all areas at work sites, includinghazard or danger areas;
Proper labeling of equipment and containers at construction and storage sites; and 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;

120. **Physical Hazards**

- 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;
- 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;
- Use of bracing or trench shoring on deep excavation works;
- Adequate lighting in dark working areas and areas with night works;
- 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;
- Specific site traffic rules and routes in place and known to all personnel, workers, drivers, and equipment operators; and
- Use of air pollution source equipment and vehicles that are well maintainedand with valid permits;

121. **General Facility Design and Operation**

- Regular checking of integrity of workplace structures to avoid collapse or failure;
- Ensuring workplace can withstand severe weather conditions;
- Enough work spaces available for workers, including exit routes during emergencies;
- Fire precautions and firefighting equipment installed;
- 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;
- Secured storage areas for chemicals and other hazardous and flammablesubstances are installed and ensure access is limited to authorized personnel only;
- Good working environment temperature maintained;
- 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 welfarefacilities; and
- 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.

122. **Assessment of Environmental Impacts And Mitigation Measures For Bridge Construction**

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

Activity / Issues	Potentials Impacts	Proposed Mitigation Measures
Dismantle work of existing pedestrian bridges and excavation/earth work for sluice gate, and walkway	Generation of solid &Construction wastes due to the dismantle works of the existing foot over bridges. /sluice	Cover exposed loose dry soil and wastes materials before disposal; Ensure re-use of the solid wastes and other forms of the wastes materials that are suitable for re-use; Disposal of un-used soil, unsuitable materials and construction wastes at designated dump site.
	Generation of loose soil, waste materials	

	Accidents from careless work by the workers and careless use of hammer and excavator	Operate the hydraulic excavator carefully; Operate the hummer carefully for the dismantle work.
	Air pollution due to black smoke emission from excavator	Regular maintenance of the equipment.
Sand filling/Back filling work	Air and dust pollution affecting nearby settlements	Maintain adequate moisture content of soil and sand during transportation, and handling; Use cover for carrying sand and soil.
Cutting & welding of the reinforcement	Noise pollution due to steel cutter and welding machine if any	Avoid using of rod cutter and wielding machine at night; Avoid prolonged exposure to noise (produced by equipment) by workers.
	Potential health and safety risks from steel cutter and welding machine if any	Ensure use of the personal protective equipment's (helmet, goggles, gloves, safety boot) during cutting and welding of the reinforcement; Availability and access to first-aid equipment and medical supplies in case of any accidents.
RCC (reinforcement cement concrete) work	Air pollution due to black smoke emission from concrete mixer machine and vibrator machine	Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission.
	Noise nuisance from concrete mixer machine and vibrator machine	Avoid operation of the concrete mixer and vibrator machine at night; RCC work should be avoided at schooling time; Inform local people about casting work and potential impacts.

D Assessment of Environmental Impacts and Mitigation Measures – Operation and Maintenance Phase

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

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

- Establish a program of regular visual inspection to identify problems early, before they become critical (breakage, plugging, etc.);
- Ensure that all remedial action is implemented promptly, including clearing sediment and other material that could cause blockage, and conducting any required physical repairs to the drains to prevent leaks;
- Ensure regular cleaning and maintenance of drains and proper solid waste management measures and Include in the *pourashava* budget a permanent allocation for undertaking the above tasks.

VII. CONSULTATION, INFORMATION DISCLOSURE, AND GRIEVANCE REDRESS MECHANISM

A Consultation

125. 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.

126. **Preliminary Consultation.** Public consultations were conduct on 4 separate occasions and locations on 11 December 2017, 29 June 2018 an on 14 September 2021 with updated design, which was attended by various stakeholders. The summary of consultation meeting and attendance is attached as **Appendix 4**. The following are some of the concerns discussed:

- The consultees will support the project activities;
- With the heavy traffic congestion in the town, the consultees believe that the project will bring benefit to the people residing along the roads;
- 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;
- 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;
- It was confirmed with the local stakeholders that there is no protected areas in andaround the project areas; and
- It was also confirmed with the local stakeholders that the project will not impact on natural water body and will not contaminate the soil resources.

127. **Future consultations**. The stakeholder consultations will continue to discuss about the subproject, including the implementation of the EMP and SEMP developed for the subproject. PMCU, Manikganj PIU and PDSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS, 2009 (footnote 6). The Manikganj PIU, PDSC and contractors will ensurethat public consultations will include representatives from all institutional establishments found along the Manikganj Khal such as schools, hospitals and the prior-identified Eidgah mosque as shown in **Figure 19**.

B Information Disclosure

128. 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 inthe 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:[19]

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

129. 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.

130. For the benefit of the community, the summary of the IEE will be translated in Bangla andmade available at: (i) office of PMCU; and (ii) office of Manikganj PIU. Hard copies of the IEE will be available in the PMCU and PIUs, and accessible to citizens as a means of disclosing the document and at the same time creating wider public awareness. On demand, the person seekinginformation can obtain a hard copy of the complete IEE document at the cost of photocopy from the offices of the PMCU or PIUs, 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 approvalof 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 PIUs in local newspapers one month ahead of the implementation works. This will create awareness of the project implementation among the public. PMCU and Manikganj PIU will consider other additional means of information disclosure depending on practicability, such as the distribution of posters to libraries within the locality to mass campaign the basic tenets of the IEE.

c Grievance Redress Mechanism

131. 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.

132. Affected people are to be informed about the mechanism through information caravan and orientation in the community to be conducted by the project officers and staff, printing of pamphlets and brochures, media and public outlets. To ensure wider coverage, complaints or 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 localdialects) 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 cannotread 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 12 for the outline.

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[19] 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.”

133. **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 officersand project manager (or equivalent), with assistance from the environmental and social safeguard specialists of the preparation, design and supervision consultant (PDSC). The contact phone number will be posted in the project areas and at PMU and PIU websites and notice boards. Grievances will be resolved through continuous interactions with affected persons and the PIU will answer queries and resolve grievances regarding various issues including EMP implementation, land acquisition, structures acquisition, livelihood impacts, entitlements, and assistance. Corrective measures will be undertaken at the field-level itself within five days and feedback provided to the complainant on actions taken for resolution. All grievances will be documented with full information of the person and issue. A sample grievance form that may be used is in **Appendix 5**. The suggested format for record-keeping of grievance is in **Appendix 5.**

134. **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 ity 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.

135. 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.

136. **Third Level**. Should the grievance 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 directorwill sign off on all grievances received by the PMCU.

137. 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

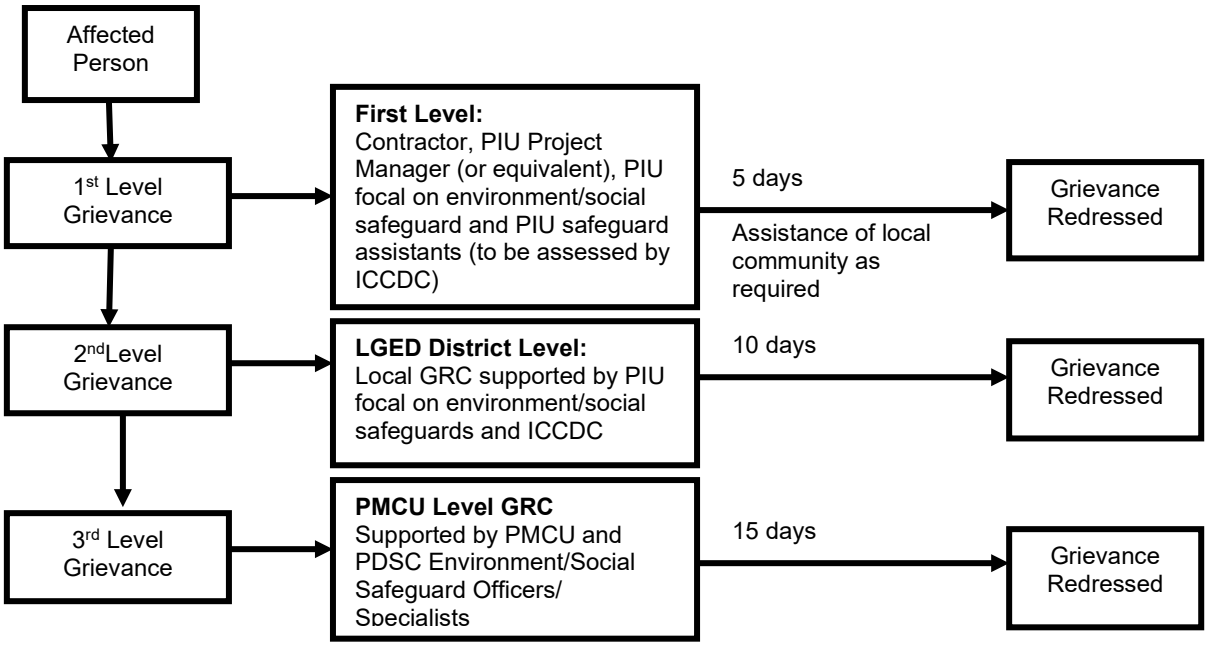
decisions, issuing minutes of the meetings and taking follow up action to see that formal orders are issued and the decisions carried out, and final decision conveyed to the complainant.

138. 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.

139. If 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.

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

Figure 20: Project Grievance Redress Mechanism[2]



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

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

VIII. ENVIRONMENTAL MANAGEMENT PLAN

A Institutional Arrangements

141. **Project Management and Coordination Unit**. The LGED will be the executing agency responsible for overall guidance of the project and implementation of urban roads and solid waste management subprojects. The PMCU, headed by a project director will be responsible[20] for planning, management, coordination, supervision and progress monitoring of the project 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, 2009. 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 will primarily be responsible for the compliance to the statutory and legal requirements, including overall supervision of the implementation of the environmental management provisions in the IEEs/EMPs for the subprojects. The PDSC assists the PMCU in this regard.

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

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

144. **Contractors**. The contractors will have specific roles in the implementation of the EMPs. Each contractor shall have at least one full time environmental health and safety supervisor (or equivalent) responsible for implementing applicable measures in the EMP. All these specific roles and responsibilities are discussed in this IEE report which shall form part of the contract documents. Manikganj PIU will monitor contractors’ environmental performance.

145. Table 13 summarizes the overall roles and responsibilities of PMCU, Manikganj PIU, and Urban Management Support unit ADB.

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

Table 13: Institutional Roles and Responsibilities

Project Management Coordination Unit	Project Implementation Unit	Contractor	ADB
Pre-construction stage			
Environmental officer of the project management coordination unit (PMCU), with assistance from the Environmental Specialist(s) of the preparation, design and supervision consultant (PDSC) 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 Safeguard Policy Statement (SPS), 2009. Submit all categorization forms to ADB.	PDSC will assist the project implementation unit (PIU) and conduct initial environmental examination (IEE) (or update existing IEE) for all Category B subprojects, which will include an environmental management plan (EMP). PIU with assistance from the Environmental officer of the PMCU and the environmental specialist of the PDSC 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 PDSC to disclose the IEE and EMP to public information as required by ADB's SPS. PDSC, 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 Environmental Compliance Certificate (ECC) under the Environmental Conservation Rules (ECR) and other necessary clearances such as for example tree cutting	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 PDSC 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		ADB to ensure that the clearance requirements are included in the contract provisions/EMP.

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.	clearance certificate from DOE, the environmental support staff will interact with the DOE on a regular basis and Provide necessary documentation/clarifications as required.		
Environmental officer of PMCU to ensure that the IEE containing the EMP of each subproject is included in the bid and contract documents. At the same time, the environmental officer of PMCU to ensure that the total budget for implementing the EMP is included in the bid and contract documents.	The environmental support staff of PIU to ensure that: (i) each contractor prepares its SEMP based on the EMP in the subproject IEE, and (ii) budget is included in the SEMP.		
Construction stage			
PMCU to review PIU monthly monitoring reports 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 to conduct environmental monitoring and implement EMPs. 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.	Contractors to prepare /implement Site-specific Environmental Management Plan (SEMP) (covering haul routes, spoil sites, dust/erosion control, workers housing, Community health & safety, Workers Health & Safety etc.). Further contractors are to minimize negative impacts of construction on community environment, provide basic guarantees for construction workers. In order to implement the subproject work in an environmentally sound manner, the contractor to conduct close supervision and monitoring at regular intervals. The contractor to prepare	ADB to review the reports and provide necessary advice/guidance needed to the PMCU.

		Site-specific COVID-19 Health and Safety Plan before start of construction.	
Operation Stage			
LGED and PIUs to conduct monitoring, as specified in the environmental monitoring plan of EMP. The DOE to monitor the performance, if required and as specified in monitoring plan of EMP.			ADB to review semi-annual environmental monitoring report and disclose on its website. ADB to prepare Project Completion Report
PMCU to continue submission of semi-annual environmental monitoring report to ADB until ADB issues a Project Completion Report.			

ADB = Asian Development Bank, DOE = Department of Environment, ECC = Environmental Compliance Certificate, ECR = Environmental Conservation Rules, EIA = environmental impact assessment, EMP = environmental management plan, IEE = initial environmental examination, PDSC = preparation, design, and supervision consultant, NOC = no objection certificate, PIU = project implementation unit, PMCU = project management and coordination unit, REA = rapid environmental assessment, SPS = safeguards policy statement.

B Environmental Management Plan

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

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

148. The contractor will be required to (i) carry out all of the mitigation and monitoring measures set forth in the approved EMP; and (ii) implement any corrective or preventive actions set out in safeguards monitoring reports that PMCU will prepare from time to time to monitor implementation of this IEE, EMP and site-specific EMP (SEMP). The contractor shall allocate budget for compliance with these IEE, EMP and SEMP measures, requirements and actions. The contractor will be required to submit to PIU, for review and approval, SEMP including (i) proposed sites/locations for construction work camps, storage areas, hauling

roads, lay down areas, disposal areas for solid wastes and excavation spoils; (ii) specific mitigation measures following the approved EMP; and (iii) monitoring program per EMP. No works can commence prior to approval of SEMP. The contractor will prepare Site-specific COVID-19 Health and Safety Plan before commencement of construction following the guidelines of ADB and Government of Bangladesh.

Table 14: 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, Manikganj 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 proposed subproject improvement interventions will take place within the right-of-way and available vacant space, no utilities will be affected or disrupted.)*	PMCU, Manikganj 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)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
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 Khal and pollute the Kaliganga River. Also, the silts and solid wastes from the community canals may be washed down to the subproject khals, which could result to heavy siltation of the Khal and obstruct flow along the khal in the medium to long term.	The design to consider the following: The inlet design to ensure that only storm or rain water flows into the drainage system; Prevent households from connecting outlets of septic tanks and grey water to the community canals; Provide siltation or sedimentation chambers (or similar structures) at all outlets of community canals along the Subproject Khal to prevent accumulation of silts and solid wastes in the said canal. This will also prevent potential pollution of the Kaliganga River; and Position the outlets of community canals enough to have space for the provision of siltation or sedimentation chambers (or similar structures), including accessibility during operation and maintenance (O&M) phase.	PMCU, PDSC, Manikganj Pourashava	Incorporated in the drainage master plan and in the final detailed design. Testing of water quality of subproject khal	During detailed design phase During post construction phase Once in a year (Manikganj Pourashava will bear the cost)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
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.	Manikganj 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 Manikganj PIU on monthly basis
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.	Manikganj 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 Manikganj 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, Manikganj PIU, PDSC, Contractor's EHS Supervisor (or equivalent)	Record of completion of training (Safeguards Compliance Orientation). Contractor records for EMP implementation at worksites.	During the detailed design phase and before the mobilization of workers to site
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, Manikganj PIU, and PDSC	Testing of Ambient air quality; Surface water quality ; Ground water quality and Noise level	Once before construction activities commence (sampling will take place at the start and end part of the khals
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	Contractor	Records of sources of materials.	Manikganj PIU on a monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		the subproject. Verify suitability of all material sources and obtain approval from implementing agency. Document all sources of materials and include in the monthly reporting to the PIU.			
10. Construction of component of the subproject (Bridge, sluice gate, walkway etc.)	Construction related impact Dust emission Noise pollution Pedestrian and vehicle movement	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.	Manikganj PIU on a monthly basis
11. Water quality	Pollution of Kaliganga River due to: (i) poorly managed construction	Dispose excess spoils as per the sample Spoil Management Plan attached in **Appendix 3** of IEE.	Contractor	Areas for stockpile storage of fuels and lubricants and waste	Visual inspection by Manikganj PIU and PDSC on weekly

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	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.	Locate temporary storage areas on flat grounds and away from any surface drainage routes (ideally at least 100 m from surface water). Shield temporary storage areas with sandbags. Provide adequate water supply and sanitation facilities at work sites. Provide impervious bunded areas with 110% volume for storage of petroleum products used during construction, such as fuel, oils, and lubricants. Provide orientation and training to assigned workers on the correct handling of petroleum-based products, clean up of equipment, and response measures in case spills or emergencies. Ensure no refueling within 100m from surface water.		materials. 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.	basis 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 latrines is to be used, contractors to ensure it follows the guidelines set by the government on installation of latrines and/or follow international best practice requiring latrines to be least 30 m from any receiving body of water or drinking water source depending on the type of soil in the area.	Contractors	Areas for stockpile storage of fuels and lubricants. Availability of sanitary latrines at construction camps.	Visual inspection by Manikganj 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;	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	Contractor	Location of stockpiles; Number of complaints from sensitive receptors; Heavy equipment and machinery with air pollution control devices; A certification that	Visual inspection by Manikganj 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
	and concrete mixing. Smoke emission from construction vehicles and burning of fuels from labor camps may contain pollutants such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons that are dangerous to human health.	construction site as and when required to avoid heavy stockpiling at the sites. Damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. If re-surfacing of disturbed roads cannot be done immediately, spread crushed 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.		vehicles are compliant with air quality standards. Results of ambient air quality testing.	
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	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;	Contractor	Number of complaints from sensitive receptors; Use of silencers in noise- producing equipment and sound barriers;	Visual inspection by Manikganj 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
	construction sites, especially in noise-sensitive areas such as near health care facilities, educational institutions and places of worship.	restrict noisy activities to day time; avoid use of noisy equipment or doing noisy works at night time; limit engine idling to a maximum of one minute; spread out the schedule of material, spoil and waste transport; minimize drop heights when loading and unloading coarse aggregates; and not use horns unless it is necessary to warn other road users or animals of a vehicle's approach.		Results of ambient noise level 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 2 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 Manikganj PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
B. Ecological Resources					
16. Terrestrial ecology including terrestrial biodiversity	Removing and damaging flora and fauna by the construction workers	Prevent workers or any other person from removing and damaging any flora and fauna found in the subproject sites; Prohibit employees and workers from poaching animals and cutting of trees for firewood at the subproject sites or their vicinities.	Contractor	Complaints from sensitive receptors on disturbance of vegetation, poaching fishing, etc.	Visual inspection by Manikganj PIU and PDSC on monthly basis
17. Aquatic ecosystem	Construction and rehabilitation works at the subproject Khal will degrade the quality of water flowing to the Kaliganga River. As such, aquatic species found at the Kaliganga river will be affected.	avoid excavation and other civil works during monsoon season; store spoils away from the canal to avoid being washed down back to the canal; and not undertake construction works near these sites during the spawning and breeding period between June and September.	Contractor	Reports of Contractors to Manikganj PIU.	Visual inspection by Manikganj PIU and PDSC on monthly basis
18. Slope erosion and canal sedimentation	Sedimentation of surface drainage networks, biological systems disruption	Retaining the existing plants and vegetation of canal bank and palisading, Scheduling to avoid heavy rainfall periods Contouring and minimizing length and steepness of slopes Mulching to stabilize exposed areas Re-vegetating areas promptly Designing channels and ditches for post-construction flows Lining steep channel and slopes (e.g. use jute matting)	Contractor	Visual Inspection	Monthly in the segment of construction.
19. Disposal of excavated spoil	Indiscriminate disposal of excavated spoil may affect the landscape and aesthetics of local environment and also	The negative impacts of indiscriminate disposal of excavated spoil may be mitigated by adopting the following measures: • dispose excavated spoils as per the	Contractor	Visual Inspection	Visual inspection by Manikganj PIU and PDSC on monthly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	may cause pollution and nuisance to surrounding environment	Spoil Management Plan attached in Appendix 3; • avoid stockpiling of excess excavated spoils as far as possible; • avoid disposal of excavated spoil/soils in or near water course bodies/watercourses/; • Dispose spoils immediately and avoid stocking for longer period to prevent potential nuisance and complaints; and • Haul all wastes using transport equipment such as dump trucks with proper cover (e.g., tarpaulin) to avoid accidental release along the route to the disposal site			
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 inform through display board about	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	Visual inspection by Maniganj PIU and PDSC on monthly basis

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		nature, duration of construction and contact for complaints complete the work quickly nearby institution, place of worship, business, hospitals, and schools. consult with business and institutions for workschedules. restore damaged properties and utilities		subproject location	
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 Manikganj 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 Restrict work force in designated areas. Identify stockyard areas in consultation with local administration Work on private land requires written permission of landowners and PDSC. Prefer small mechanical excavator for trenching Construct gender friendly toilets for workers Prohibit alcohol and drugs on site Prevent excessive noise; Code of conduct for workers includes	Contractor	The number of permanent signs, barricades, and flagmen on worksites as per Traffic Management Plan (Appendix 10); Number of complaints from sensitive receptors; Number of walkways, signs, and metal sheets placed at the subproject location; Agreement between landowner and	Visual inspection by Manikganj 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
		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		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. COVID-19 hazards as well as the usual construction and transportation hazards	Implement the occupational health and safety plan in the SEMP, which follows international best practices on occupational health and safety such as those in Section 4.2 of World Bank EHS Guidelines on Construction and Decommissioning Activities Comply Labor Act 2006 Exclude public from worksites Provide personal protective equipment to workers and ensure their effective usage Document procedures to be followed for site activities; and Maintain accident reports and records. Make first aid kits readily available Maintain hygienic accommodation in work camps. 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	Contractor	Equipped first-aid stations; Medical insurance coverage for workers; Number of accidents; Records of supply of uncontaminated water; Condition of eating areas of workers; Record of health and safety orientation training; Availability of personal protective equipment at construction site; Number of moving equipment outfitted with audible back- up alarms; Signage for storage and disposal areas; Condition of sanitation facilities for workers; and	Visual inspection by Manikganj 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
		audible backup alarms; Chemical and material storage areas need to be marked clearly; Use of earplugs enforced at work areas with high noise level caused by operating equipment or machineries at the sites. Train all site personnel on environmental health and safety including COVID-19 health 7 safety		Records of results of noise level measurements.	
D. Historical, Cultural, and Archaeological Characteristics					
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 Manikganj 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 Manikganj PIU and PDSC on monthly basis.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
E. Others					
25. Submission of EMP implementation Report	Unsatisfactory compliance to EMP	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 Manikganj PIU; Quarterly report by Manikganj 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 restored; All affected structures rehabilitated /compensated; The construction camp needs to clear of spills; e.g. oil, paint, etc. and other pollutants after dismantling; All hardened surfaces shall be ripped; all imported materials shall be removed and all temporary services shall be cancelled; Request PMCU/PIU in writing that worksites and camps are vacated and restored to pre-project conditions.	Contractor	PMCU and/or Manikganj PIU report in writing that (i) worksite is restored to original conditions; (ii) camp has been vacated and restored to pre-project conditions; (iii) all construction related structures not relevant to O&M are removed, and (iv) worksite cleanup is satisfactory.	Before handover of completed works to Manikganj PIU.
27. Environmental legislation compliance	Lack of awareness in Manikganj PIU about legislations and IEE requirements	Strengthen capacity of Manikganj PIU staffs	PMCU, Manikganj PIU, PDSC	Monitoring reports and checking operations against O&M manuals and	Manikganj PIU - After completion of the drainage subproject

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
				permits/clearances	
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 Khals.	Manikganj PIU	Water quality of discharge at outfalls	Manikganj PIU - Quarterly depending on the situation and capacity Manikganj PIU
29. Operation and Maintenance of the public toilets	Improper maintenance can lead to unhygienic condition and public nuisance	To keep the public sanitation facility fully efficient and operational and in a hygienic acceptable condition, the general cleaning should take place, and it will include the followings: • Regular cleaning and maintenance of the toilet premises; • Floors should be kept clean and dry; • Pick-up litter and sweep floor; • Clean and sanitize commodes and urinals; • Clean and sanitize basins; • Replace all expendable supplies; • Sufficient provision of amenities such as tissue, toilet paper, waste bin or sanitary bin, soap, water and hand wash must be available at/in the toilet-block at all times;	Manikganj PIU; Contracted Operator	Visual Inspection	Visual inspection by Manikganj PIU / contracted operator, and cleaning on 1 to 2 hourly basis.
30. Solid waste generation	Generation of solid waste from the community may cause clogging of the drainage canal/khal	Manikganj pourashava (PIU) shall undertake the following actions to ensure that the subproject operates sustainably:	Manikganj PIU	Visual Inspection	Visual inspection by Manikganj PIU, and cleaning on semi-annually or as and

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		• 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,			when situation demands.

CRDP = City Region Development Project, EARF = environmental assessment and review framework, EHS = environmental, health and safety, EMP = environmental management plan, IEE = initial environmental examination, LGED = Local Government Engineering Department, PDSC = preparation, design and supervision consultant, PIU = project implementation unit, PMCU = project management and coordination unit, SEMP = site-specific environmental management plan.

C Environmental Monitoring Program

149. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist. Table ***15*** shows the proposed environmental monitoring plan for this subproject, which specifies the various monitoring activities, indicating location, frequency of monitoring andresponsibility.

Table 15: 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 leve**l	All subproject sites	Contractor	Sampling & measurement of Ambient air quality (Surface water Ground water quality and Noise level	Once before commencement of construction activities (sampling will take place at the start and end part of the khals)	PMCU, Manikganj 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, Manikganj 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	Manikganj PIU, PDSC
11. Implementation of SMP, Implementation of SMP, which include disposal of spoil material at a location approved to by Manikganj 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	Manikganj 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	Manikganj PIU, PDSC
13. Implementation of Occupational, Health and Safety Plan (OHSP)	Subproject sites	Contractor	Site visits, Contractor records	Weekly or as needed	Manikganj PIU, PDSC
14. Conduct of analytical tests of 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	Subproject sites	Contractor	Contractor records, Results of laboratory analyses	Semi-annually (sampling will take place at the start and end part of the khals)	PMCU, Manikganj PIU, PDSC
15. Develop and apply archaeological protocol to protect chance finds	All subproject sites	Contractor, PMCU, Manikganj PIU, PDSC	Contractor records	Once until protocol is approved	PMCU, Manikganj PIU, PDSC
16. Provide EHS training for all personnel	All subproject sites	Contractor	Contractor records; Interviews to workers	Monthly	Manikganj PIU, PDSC
17. Keep accident reports and records	All	Contractor	Contractor records; Interviews	Monthly	Manikganj PIU,

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
	subproject sites		to workers and community people		PDSC
18. Employ workforce from communities near sites	All subproject sites	Contractor	Contractor records	Monthly	Manikganj PIU, PDSC
19. Implementation of EHS measures at construction camps	Construction camp sites	Contractor	Site visits; Interviews to workers at camps	Monthly	Manikganj PIU, PDSC
20. Management of wastes, aquatic ecosystem, slope erosion, canal sedimentation and reinstatement of sites	All subproject sites	Manikganj PIU	Site observation	Monthly	Manikganj PIU
OPERATION AND MAINTENANCE					
21. Passage of local ordinance prohibiting discharge of wastewater, septage and solid wastes into community drains including the subproject Khal.	Pourashava Office	Manikganj PIU	Records of Pourashava	Start of O & M Phase	Manikganj PIU
22. Maintain safe passage for vehicles and pedestrians during maintenance activities	Subproject road sites	Manikganj PIU	Site observations	Monthly	Manikganj PIU
23. Maintain all (i) safety structures such as railings and footpaths along the drainage embankment; and (ii) warning signages at critical points along the drainage alignment particularly the accident-prone areas and areas near institutional establishments such as schools, places of worship, hospitals.	Subproject road sites	Manikganj PIU	Site observations	Monthly	Manikganj PIU
24. Provide signboards informing nature and duration of maintenance activities	Subproject road sites	Manikganj PIU	Site observations	Monthly	Manikganj PIU
25. Prevent run-off/deposit of foreign materials (oil, grease, solid waste, plastics) into water courses, and clean drain periodically; dispose of materials removed from drains	Subproject road sites	Manikganj PIU	Site observations	Monthly	Manikganj PIU
26. Dispose of material from blocked drain in location away from roadway and drain	Subproject road sites	Manikganj PIU	Site observations	Monthly	Manikganj PIU
27. A proper traffic management plan can be introduced and strictly follow the BRTA rules;	at bridge/road	Manikganj PIU	Site observations	Start of O & M Phase	Manikganj PIU

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
	sites				
28. Establish the speed breaker and safety sign near the bridge site to limit the speed of the vehicle and to reduce the occurrence of accidents	At bridge sites	Manikganj PIU	Site observations	Start of O & M Phase	Manikganj PIU
29. Bridge site should be clean properly after completion of the construction activities so that the natural drainage system may not hampered	at bridge sites	Manikganj PIU	Site observations	Start of O & M Phase	Manikganj PIU
30. Proper removal of construction camp facilities and construction wastes from the bridge site after completion of the works	at bridge sites	Manikganj PIU	Site observations	Start of O & M Phase	Manikganj PIU
31. Ensure no throwing of trashes (empty soft drink cans/bottles and any kind of solid wastes into the khal by installing/hanging trash cans/bins	at bridge sites	Manikganj PIU	Site observations	Weekly	Manikganj PIU

D Capacity Development Training

150. The PMCU safeguards experts (environmental and social) with support from PDSC Environment Specialist and Social Safeguard Specialist will be responsible for training the PIUs' 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:

- Environmental Safeguards
- sensitization on ADB's safeguard policy on environment;
- introduction to environment and environmental considerations in roads, drainage and solid waste management projects;
- review of IEEs and integration into the project detailed design;
- community and occupational health and safety considerations;
- consultation and participation requirements;
- project GRM and ADB's Accountability Mechanism;
- improved coordination within nodal departments; and
- monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior todeployment to work sites.
- Social Safeguards
- sensitization on ADB's policies on Involuntary Resettlement and
- Indigenous People;
- introduction to social safeguards assessment and document requirements;
- Consultation and participations requirements;
- Project GRM and ADB's Accountability Mechanism (AM); and
- monitoring and reporting system.

The proposed training project along with the frequency of sessions is presented in Table 16.

Table 16: 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 Module3: COVID-19 H&S Training and OH&S training program for the contractor and PIU with special emphasis of handling pandemic situation.	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)

151. 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 mitigationmeasures for this subproject, some items need to be incorporated in the Bill of Quantities (BOQ) of this subproject. A substantial part of environmental costs shall be covered under civil works contract. However, exact figures of environmental costs under civil works contract are not included in this IEE. Costs of these items will be dealt elsewhere in the respective subproject component document. The environmental costs presented in Table ***17*** are tentative provisions and suggested to be incorporated in the bill of quantities of bid documents. These figures are estimated based on experience of undertaking similar works under different LGED projects and the assumption of an average of $10,000 per annum as cost of implementing EMP mitigation measures. It is assumed that the environmental cost under civil works contract for each contract package will be more or less same.

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

(The following items need to be incorporated in the BOQ of this sub-project)
Cost Estimates for Environmental Management

Sl. No.	Description of Items	Unit	Quantity	Unit Rate (BDT)	Total Amount (BDT)	Costs covered by
1	Environmental Monitoring a) Air Quality, b) Noise level, c) Water quality, d) Sediment at work site to the entire satisfaction of the engineer-in-charge.	LS			6,00,000.00	Cost included in the BoQ as Provisional sum item (non-competitive item).
2	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the Engineer-in-charge.	LS			1,50,000.00	
3	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge.	LS			1,00,000.00	
4	Proper disposal of camp site wastes to the entire satisfaction of the engineer-in-charge.	LS			1,00,000.00	
5	Maintain First aid box at camp site to the entire satisfaction of the Engineer-in-charge.	LS			20,000.00	
6	Miscellaneous	LS			30,000.00	
Sub-Total :					10,00,000.00	
7	Prevention of spillage, leakages of polluting materials to the entire satisfaction of the engineer-in-charge.					Contractor (GCC Clause 27.1 (a), 27.1(d) of Particular Conditions of Contract)
8	Providing and maintaining adequate potable water supply facilities (Shallow Tube well) at camp site and work site to the entire satisfaction of engineer-in-charge. Water Supply Tube well 04 Nos.	Nos.	4			Contractor (GCC Clause 29.2 of General Conditions of Contract)
9	Providing and maintaining adequate sanitation facilities at camp site and work site to the entire satisfaction of engineer-in-charge. Sanitation Toilet 06 nos. (02 for women and 04 for men)	Nos.	6			Contractor (GCC Clause 29.2 of General Conditions of Contract)
10	**Traffic Management** Maintaining traffic management at worksite from time of commencement of construction activities to time of completion activities, including ensuring that the road is safe for users (this includes providing necessary barricades, warning signs/lights, guide signs, flagmen, maintaining diversion					Contractor (GCC Clause 27.1 (b) of General Conditions of Contract)

	roads by cutting, filling, constructing, etc. or by any other means) in accordance with the full satisfaction of the Engineering-in-charge.					
11	**Spoil Management Facility** Safe transportation and disposal of excavate spoils/ wastes generated out of subproject activities in a manner so that no environmental pollution or hazard to health of workers/local people.	cum	110415.15	90.29	99,69,383.90	Cost included in the BoQ
12	**Installation of signboards/billboards** Precautionary signboards/ danger signals/ billboards in appropriate places to notify people about the project.	sqm	2.16	15207.11	32847.36	Cost included in the BoQ
13	**Working labour shed:** Construction of Labor shed with C.I sheet Roofing, fencing and brick soling floor as per approved plan and to the entire satisfaction of the engineer-in-charge.					Contractor (GCC Clause 29.2 of General Conditions of Contract)
14	**Personal Protection Equipment for Workers** Providing and maintaining appropriate (safe design, fit and comfort) personal protection equipment (PPE) to ensure the highest possible protection for employees in establishing and maintaining a safe and healthful working environment at workplace.					Contractor (GCC Clause 27.1 (a), 29.1 of Particular Conditions of Contract)
15	**Removal of equipment/ surplus materials/ rubbish/temporary structures/fully reinstate** On completion of the Contract, Contractor shall remove the equipment, surplus materials, slope erosion, canal sedimentation, rubbish and temporary structures of all types and shall leave sites in clean condition to the entire satisfaction of the engineer-in-charge and local people					Contractor (GCC Clause 27, 40.3, 80.2 of Particular Conditions of Contract)
16	**Occupational Health and Safety** To ensure safety of health and hazards for construction workers including -Adequate housing for all workers -Safe and reliable water supply; -Hygienic sanitary facilities and sewerage system					Contractor (GCC Clause 27, 29.1 of Particular Conditions of Contract)
17	**Community Health and Safety** To ensure safety of health and hazards on local resources and infrastructures of nearby communities					Contractor (GCC Clause 27 of Particular Conditions of Contract)
18	**COVID-19 Health and Safety** Washable cloth face mask, disposable hand gloves, wash basin & water container, soap, alcohol based sanitizer, pump spray, disinfectant, tissue papers, garbage bin, plastic bag, contactless temperature reader etc.					Contractor (GCC Clause 27.1 (d) of Particular Conditions of Contract)
19	Training on Environmental Management Plan, Health& Safety and COVID-19 related thread for the contractor's workforce					PDS-2 Consultants under CRDP-2

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

Table 18: Indicative Costs for Environmental Quality Tests (Part of EMP Budget in BOQ)

Sl. No.	Environmental Parameters	Analytical Parameter	Unit cost (BDT)	Frequency (times) / Sampling Location	Total cost (BDT)
1	Ambient Air Quality	Suspended Particulate Matter (SPM), Particulate Matter (PM 2.5), Particulate Matter (PM 10), Oxides of Sulphur (Sox), Oxides of Nitrogen (NOx), Carbon Monoxide (CO),	40,000	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	40,000x6= 2,40,000
2	Noise Quality	*Noise Level (dB) in selected busy areas at and around the* subproject road/bridge/khal site *(under Normal Condition and with Traffic)*	10,000	12 times / (Once at two locations for day and night time during pre-construction and semi-annually at two locations for day and night time during construction phase)	10,000x12= 1,20,000
3	Groundwater Quality	pH, Total suspended solids (TSS), Total dissolved solids (TDS), Dissolved oxygen (DO), Arsenic (As), Iron (Fe), Chloride (Cl), Electrical Conductivity (EC), nitrate-N (NO_3-N)	20,000	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	20,000x6= 1,20,000
4	Surface Water Quality	pH, Total suspended solids (TSS), Total dissolved solids (TDS), Turbidity, Dissolved oxygen (DO), Biological oxygen demand (BOD_{5days}), Chemical oxygen demand (COD), Arsenic (As), Iron (Fe), Chloride (Cl), Electrical Conductivity (EC), nitrate-N (NO_3-N, fecal and total coli-form	20,000	6 times / (Once at two locations during pre-construction and semi-annually at two locations during construction phase)	20,000x6= 1,20,000
	Total Cost:				**6,00,000**

IX. MONITORING AND REPORTING

152. The 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.

153. The contractor will submit monthly reports to the PIU with jurisdiction over the subprojectsites. 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-8. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

154. 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-9. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

155. The PMCU shall consolidate quarterly reports from the PIUs including Manikganj PIU and results of its independent monitoring or inspection activities. PMCU shall accomplish semi-annualenvironmental monitoring report (SEMRs), which shall be submitted to ADB for review and disclosure on ADB website. Submission of SEMR will continue until ADB issues a Project Completion Report. The template for the SEMR is attached as Appendix-10.

156. ADB will carry out the following monitoring actions to supervise the project implementation:

- On a need basis, conduct site visits for subproject with potential adverse environmental or social impact;
- 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;
- Review the SEMRs submitted by PMCU to ensure that adverse impacts and risks are mitigated as planned in the EMP;
- 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
- 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.

157. ADB's monitoring and supervision activities are carried out on an on-going basis until a Project Completion Report (PCR) is issued. ADB issues a PCR within 1-2 years after the projectis physically completed and in operation.

X. FINDINGS, RECOMMENDATION AND CONCLUSION

158. The Manikganj Khal drainage subproject is designed to improve the quality of life of Manikganj residents by rehabilitating and improving the Manikganj khal. This will in turn allow uninterrupted flow of stormwater run-off from the many parts of the Manikganj *pourashava*. Further, improvement of facilities such as footpaths on both sides of the khal embankment located at the town center will create an improved environment of the khal surrounding neighborhoods.

159. 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 environmentallysensitive areas.

160. 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.

161. 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.

162. Based on the above findings, the classification of the subproject under package no. CRDP-II/LGED/MANIKGANJ/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 updated 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. In the updating of the IEE, the following are considered:

- Final detailed design on the construction and rehabilitation of Manikganj Khal, including the provision of safety infrastructures such as railings along the footpaths on the embankment of the canal and areas adjacent to residential and commercial establishments;
- Final calculations of the volume of spoils and wastes that will be excavated from the Manikganj Khal; and
- Final footprint of the spoil disposal location within the disposal site identified and approved by Manikganj PIU.

163. The approved updated 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 Manikganj 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 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.

Appendix-1: Some Additional Photographs of Existing Khal Conditions

Appendix-2: SAMPLE SPOIL MANAGEMENT PLAN

Purpose and application: Spoil Management Plan (SMP) is to describe how the project 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; and
Manage the transportation of spoil with consideration of traffic impacts andtransport related emissions.

Structure of SMP:

Section 1: Introduction of SMP
Section 2: Legal and other requirementsSection 3: Roles and responsibilities
Section 4: Identification and assessment of spoil aspects and impacts Section 5: Spoil volumes, characteristics and minimization
Section 6: Spoil reuses opportunities, identification and assessment Section 7: On site spoil management approach
Section 8: Spoil transportation methodology
Section 9: Monitoring, Reporting, Review, and Improvements

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

Table A3. Key Aspects of Potential Impacts in Relation to Spoil Management Plan

Aspects	**Potential Impacts**
Air Quality	Potential for high winds generating airborne dust from the stock piles
Sedimentation	Potential for sediment laden site runoff from spoil stockpiles and potentialfor 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 forstorage/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 (sand stone, mud mix materials, reusable materials

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

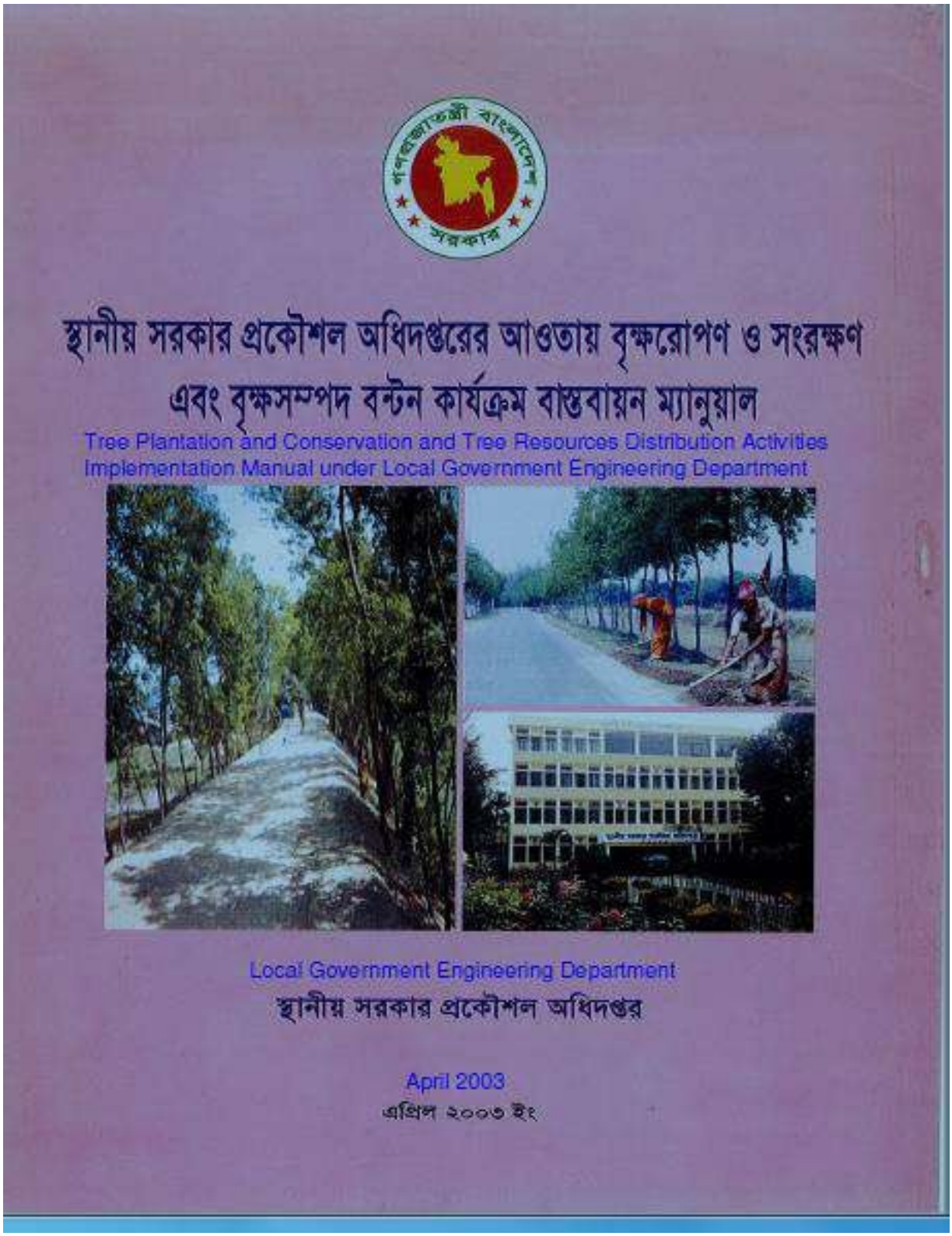
- Consideration of likely spoil characteristics
- Identification of possible reuse sites
- Screening of possible reuse opportunities

Identification of possible safe disposal sites for spoil: Those spoils which cannot be reuse shall be properly disposed in designated areas, such disposal areas should be identified in project locations. Such disposal areas should be safe from environmental aspects and there should be any legal and resettlement related issues. Such areas need to be identified and prior 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 stock piling Transportation and haulage route
Based on the above, the contractor will prepare a SMP as an integral part of EMP andsubmit it 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 timeframe

Appendix-3: LOCAL GOVERNMENT ENGINEERING DEPARTMENT TREE PLANTATION PROGRAM MANUAL



(Cover Page and Table of Contents)

Note: Copy of the full manual is available upon request at the PMCU Office.

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

Table of Contents

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

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

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

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

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

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

3.2 Implementation

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

3.4 Wages

3.5 Financing

3.6 Implementing Agency

3.7 Tree Resources Distribution

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

Annexures

A) Road

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

B) Embankment

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

Appendix-4: RECORDS OF PUBLIC CONSULTATIONS

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

Sl. No	Date of Consultation	Road and Place ofConsultation	Number and Type ofParticipants	Issues Discussed
1	11 December 2017	Starting point of thepropose khal	Total 18, 8 Female and 10 Male. (Councilors, Retired Government Officials, Local Elite, Businessperson, project beneficiaries etc.)	General perception about the project and the awareness about the proposed project are disseminated in the meeting. The following predefined 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 mechanismetc.
2	29 June 2018	In *pourashava*, hall room Manikganj	Total 12, 2 Female and 10 Male. (Councilors, Retired Government Officials, Local Elite, Businessperson, project beneficiaries etc.)	
3	29 June 2018	- Ending point of propose khal	Total16, 6 Female and 10 Male. (Councilors, Local Elites, Businessperson, Beneficiaries Service holders etc.)	
4	14 September 2021	In *pourashava*, hall room Manikganj	Total 45, 13 Female and 32 Male. (Councilors, Local Elites, Businessperson, Beneficiaries Service holders etc.)	

Findings 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 sufferinghuge traffic congestion due to movement of heavy container truck. They cannot easily move to the school, hospital, and their working place from their due to congestion. Peoples will be benefitted who are residing alongside the road of areaif the project will undertake.
The area is dominating business area about 70% are depends on business and the rest service and cultivations.
During construction period short term community activities will be affected.
No resettlement and land acquisition required for due to the project, only compensation need for the unauthorized shop and residence.
There is no protected area in and around the project area.
The project will never impact on natural water body and not contaminate the soil resources.

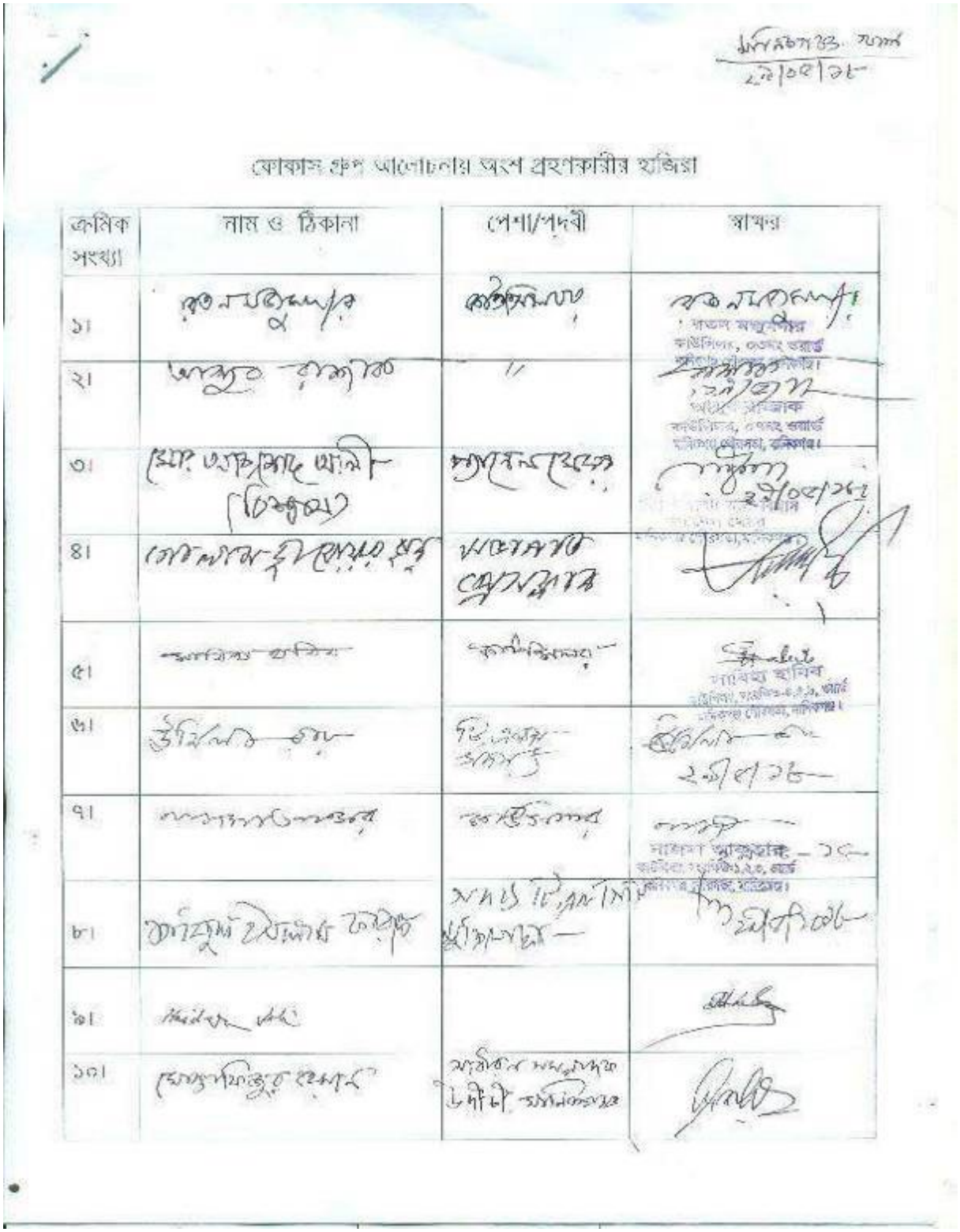
The NGOs within the areas are: ASA, BRAC, Grameen Bank, Karitas, MSS, ODC,UPPR, JIZ, Gonosasto, etc.
It assured by the participant, that they will welcome the project, and willsupport/cooperate in all stages of the project works.

Photographs of Community Consultations

	
FGD at place near the midsection of the khal	FGD at place near the midsection of the khal
	
FGD at place near the starting point of the khal	FGD at place near starting point of the khal
	
FGD at place near the ending point of the khal	FGD at place near the ending point of the khal

List of Participants in Consultations Meetings in Different Location of Manikganj Khal

Venue: *Pourashava* Hall RoomDate:



কোষাক্স গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
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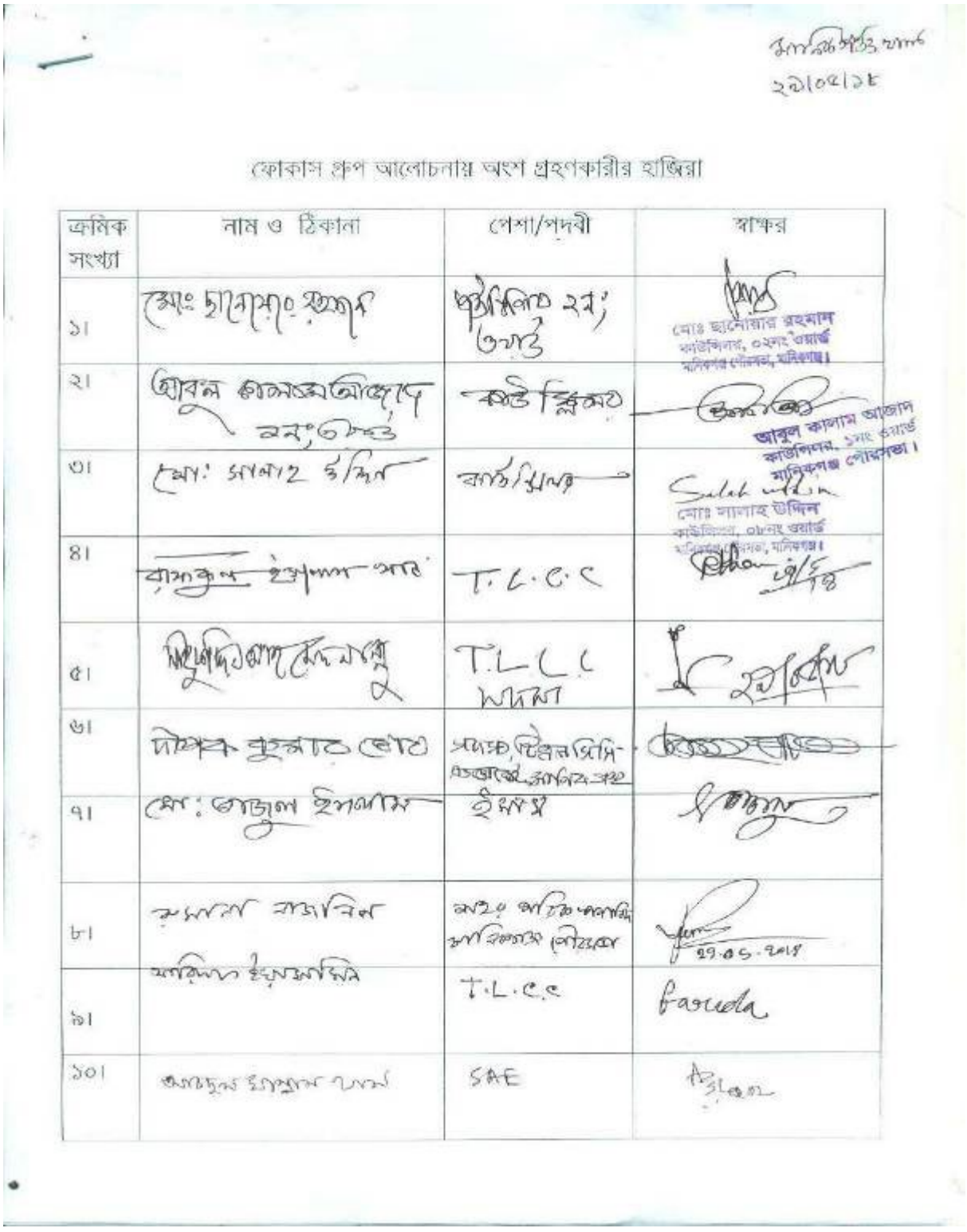
ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১১।	নুরুন্নাহার বেগম	সদস্য T.L.C.C	[signature]
১২।	মাসুমা আনজুম (রুবিন)	সদস্য T.L.C.C	মাসুমা
১৩।	বিলকিস বেগম সরকার	সদস্য T.L.C.C	[signature]
১৪।	হাফিজা বেগম	T.L.C.C	[signature]
১৫।	[illegible]	Town Planner Manikganj Pourashava	[signature] 20.05.2018
১৬।	[illegible] ইয়াসমিন	T.L.C.C	Bairola
১৭।	সৈয়দ সাইফুল ইসলাম মজুমদার	[signature] T.L.C.C	[signature]
১৮।	আ.ন.ম নিজাম উদ্দিন	সহঃ প্রকৌশলী মানিকগঞ্জ পৌরসভা	[signature]
৯।			
১০।			

Venue: at a Public meeting place near the midsection of Manikganj KhalDate:



ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	মোঃ ছানোয়ার হোসেন	কাউন্সিলর ২২; ওয়ার্ড	মোঃ ছানোয়ার রহমান কাউন্সিলর, ০২নং ওয়ার্ড মানিকগঞ্জ পৌরসভা, মানিকগঞ্জ।
২।	গোবল কালাম আজাদ	কাউন্সিলর	আবুল কালাম আজাদ কাউন্সিলর, ১নং ওয়ার্ড মানিকগঞ্জ পৌরসভা।
৩।	মোঃ সালাহ উদ্দিন	কাউন্সিলর	Salah uddin মোঃ সালাহ উদ্দিন কাউন্সিলর, ০৮নং ওয়ার্ড মানিকগঞ্জ পৌরসভা, মানিকগঞ্জ।
৪।	[illegible]	T.L.C.C	[illegible]
৫।	[illegible]	T.L.C.C WARD	[illegible]
৬।	[illegible]	সভাপতি, [illegible]	[illegible]
৭।	মোঃ আজাদুল ইসলাম	ইমাম	[illegible]
৮।	[illegible]	[illegible]	29.05.2018
৯।	[illegible]	T.L.C.C	Farida
১০।	[illegible]	SAE	[illegible]

ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	[illegible]	SAE	[illegible]
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Venue: At a Public meeting place near the end part of Manikganj KhalDate:

মানিকগঞ্জ খাল
২৯/০৫/২৮

ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	[illegible]	[illegible]	[illegible]
২।	ডঃ [illegible]	"	[illegible]
৩।	[illegible]	T.L.C.C	[illegible]
৪।	[illegible]	T.L.C.C	[illegible]
৫।	[illegible]	T.L.C.C	[illegible]
৬।	[illegible]	T.L.C.C	[illegible]
৭।	[illegible]	[illegible]	[illegible]
৮।	[illegible]	[illegible]	[illegible]
৯।	[illegible]	সদস্য) TLCC	[illegible]
১০।	[illegible]	সদস্য) TLCC	[illegible]

ফোকাস গ্রুপ আলোচনায় অংশ গ্রহণকারীর হাজিরা

ক্রমিক সংখ্যা	নাম ও ঠিকানা	পেশা/পদবী	স্বাক্ষর
১।	[illegible]	[illegible]	
২।	[illegible]	[illegible]	
৩।	Rajlakshmi Chowdhury.	TLCC. M.	27.5.18.
৪।	[illegible]	[illegible]	
৫।	[illegible]	[illegible]	
৬।	[illegible]	[illegible]	
৭।			
৮।			
৯।			
১০।			

Photographs from Public consultation Meeting held on 14/09/2021

List of Participants in Consultations Meeting held on 14/09/2021

Venue: Manikganj Pourashava Hall Rooom

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-কর্মঃ- মানিকগঞ্জ খাল পুনঃ খনন ও সুশোভিতকরণ মানিকগঞ্জ জেলা

Name of Sub-project: Re-excavation and beautification of Manikgonj Khal.

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা
Attendance of FGD participants

তারিখঃ- 14.09.2021
Date:

ক্রমিক নং Sl. no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
০১।	[illegible]	[illegible]	[illegible]	
০২।	[illegible]	[illegible]	[illegible]	
০৩।	[illegible]	01688600 4410	[illegible]	
০৪।	[illegible]	01712729678	[illegible]	
৫	[illegible]	01715413347	[illegible]	
৬	[illegible]	01711581[illegible]	[illegible]	
৭	[illegible]	01712-0540 40.	[illegible]	
৮	[illegible]	01721945[illegible]	[illegible]	
৯।	[illegible]	01713505[illegible]	[illegible]	
১০।	[illegible]	01711-154880	[illegible]	

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-নামঃ- মানিকগঞ্জ খাল পুনঃখনন ও সৌন্দর্যবর্ধন মানিকগঞ্জ জেলা

Name of Sub-project: Re-excavation and Beautification of Manikgonj Khal.

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা
Attendance of FGD participants

তারিখঃ-
Date: 14.09.21

ক্রমিক নং Sl. no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
১১।	Jasmine	01718-575465	কাউন্সিলর	[illegible]
১২।	মোঃ নুরুল ইসলাম	01719976402	"	[illegible]
১৩।	আবু মোঃ নাহিদ	0173115807	"	[illegible]
১৪।	নীনা রহমান	01819016981	গৃহিণী	[illegible]
১৫	[illegible]	01711943849	প্রধান শিক্ষক, নবগ্রাম [illegible] বিদ্যালয়	[illegible] ১৪।৯।২১
১৬।	[illegible] সিদ্দিকী	01716833661	সা: স: জেলা আদিবাসী [illegible]	[illegible] সিদ্দিকী ১৪।৯।২১
১৭।	প্রধান [illegible] মোঃ আনিসুর রহমান	01713-041211	উপজেলা [illegible] প্রাথমিক সরকারি বালিকা মানিকগঞ্জ	১৪।৯।২১
১৮	[illegible]	01816645995	[illegible]	[illegible] ১৪।৯।২১
১৯।	মোঃ হেলাল উদ্দিন	01711-120934	সাবেক [illegible] বীর মুক্তিযোদ্ধা	[illegible]
২০।	মোঃ মোকাদ্দেস আলী	01778182676	ব্যবসা	মোকাদ্দেস/ ১৪।৯।২১

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-নামঃ- মানিকগঞ্জ খাল পুনঃ খনন ও সৌন্দর্যবর্ধন মানিকগঞ্জ জেলা

Name of Sub-project: Re - excavation and Beautification of Manikgonj Khal.

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা
Attendance of FGD participants

তারিখঃ-
Date: 14.09.'21

ক্রমিক নং Sl. no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants	
২২/	মোঃ ইয়াহিয়া চৌধুরী (হেনু)	01711980133	ব্যবসা —	[signature] 14.9.21	
২২।	অমল চন্দ্র সরকার	01761810155	অবঃ সার্ভেয়ার [illegible]	অমল ১৪/০৯/২১	
২৩।	আখতার আলম	01711-325177	উপ-বিশেষজ্ঞ প্রকৌ: গনপূর্ত	[signature] ১৪/৯/২১	
২৪।	উত্তম কুমার তালুকদার	01720216522	প্রকৌশলী সমাজকর্মী	[signature] ১৪/০৯/২০২১	—
২৫।	সেলিনা আক্তার	01714534375	সাধারণ সম্পাদক [illegible] মানিকগঞ্জ	[signature] ১৪/৯/২০২১	—
২৬।	লিপি আক্তার	01836695[illegible]	শিক্ষিকা	Lipi Akter	—
২৭।	দি পালি	01633115351	গৃহিনী	দি পালি	✓
২৮।	রাবেয়া	01747450685	গৃহিনী	রাবেয়া	✓
২৯।	লতা আক্তার	01641184585	Mother foundation	Lata	✓
৩০।	কাজী সামছুল হক	01818390329	Retd. Govt. Servent	[signature]	

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-~~নামঃ-~~ মানিকগঞ্জ জেলা সদর পুনঃখনন ও সুন্দরীকরণ মানিকগঞ্জ জেলা

Name of Sub-project: Re-excavation and Beautification of Manikgonj Khal.

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা
Attendance of FGD participants

তারিখঃ-
Date: 14.09.21

ক্রমিক নং Sl. no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
৩১।	মোঃ [illegible]	[illegible]	ব্যবসা	
৩২।	মোঃ [illegible]	[illegible]	[illegible]	
৩৩।	[illegible]	[illegible]	[illegible]	
৩৪.	[illegible]	01712966333	[illegible]	
৩৫	[illegible]	[illegible]	[illegible]	
৩৬.	[illegible]	[illegible]	[illegible]	
৩৭.	[illegible]	[illegible]	[illegible]	
৩৮.	[illegible]	01720386514	[illegible]	
৩৯.	[illegible]	01823012233	[illegible]	
৪০	[illegible]	01729792627	[illegible]	

স্থানীয় সরকার প্রকৌশল অধিদপ্তর
দ্বিতীয় নগর অঞ্চল উন্নয়ন প্রকল্প
লেবেল-৪, আরডিইসি ভবন
আগারগাঁও শের-এ-বাংলানগর
ঢাকা-১২০৭

প্রকল্পের নামঃ-~~নামঃ~~- মানিকগঞ্জ খাল পুনঃখনন ও সৌন্দর্যবর্ধন মানিকগঞ্জ জেলা

Name of Sub-project: Re-excavation and Beautification of Manikganj khal

ফোকাস গ্রুপ আলোচনায় আংশগ্রহনকারীর হাজিরা
Attendance of FGD participants

তারিখঃ-
Date: 14.09.21

ক্রমিক নং Sl. no	নাম, মোবাইল নম্বর Name of participants	মোবাইল নম্বর Mobile no.	পেশা Profession	স্বাক্ষর Signature of participants
৪০	মোঃ আলাউদ্দিন [illegible]	01719458559	ব্যবসায়িক	[signature]
৪১	মোঃ আবুল কালাম আজাদ অতিরিক্ত ইঞ্জিনিয়ার (অবঃ)	01716941319	সমাজ সেবক	[signature]
42	মোঃ জসিম উদ্দিন ক্যাম্প অপারেটর CRDP	01732476601	চাকুরী	[signature]
৪৩	সুমাইয়াহ মামুন	01982600175	চাকুরী (কনসালটেন্ট)	[signature]
৪৪	মোঃ আজিজুল হক	0192929[illegible]	চাকুরী	[signature]
৪৫	মোঃ গোলাম মোস্তফা	0191284৮ 0112	চাকুরী	[signature]

Female - 13 29% apx
Male - 32
45

Appendix-5: 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 clarificationand 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) ofyour 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:	**YesNo**
Means of Disclosure:	

SUGGESTED TEMPLATE FOR RECORD-KEEPING OF GRIEVANCES

S. 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-6: TRAFFIC MANAGEMENT PLAN TEMPLATE

Principles

One of the prime objectives of this traffic management plan (TMP) is to ensure the safetyof 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.

Operating Policies for Traffic Management Plan

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.

Analyze the Impact Due to Street Closure

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

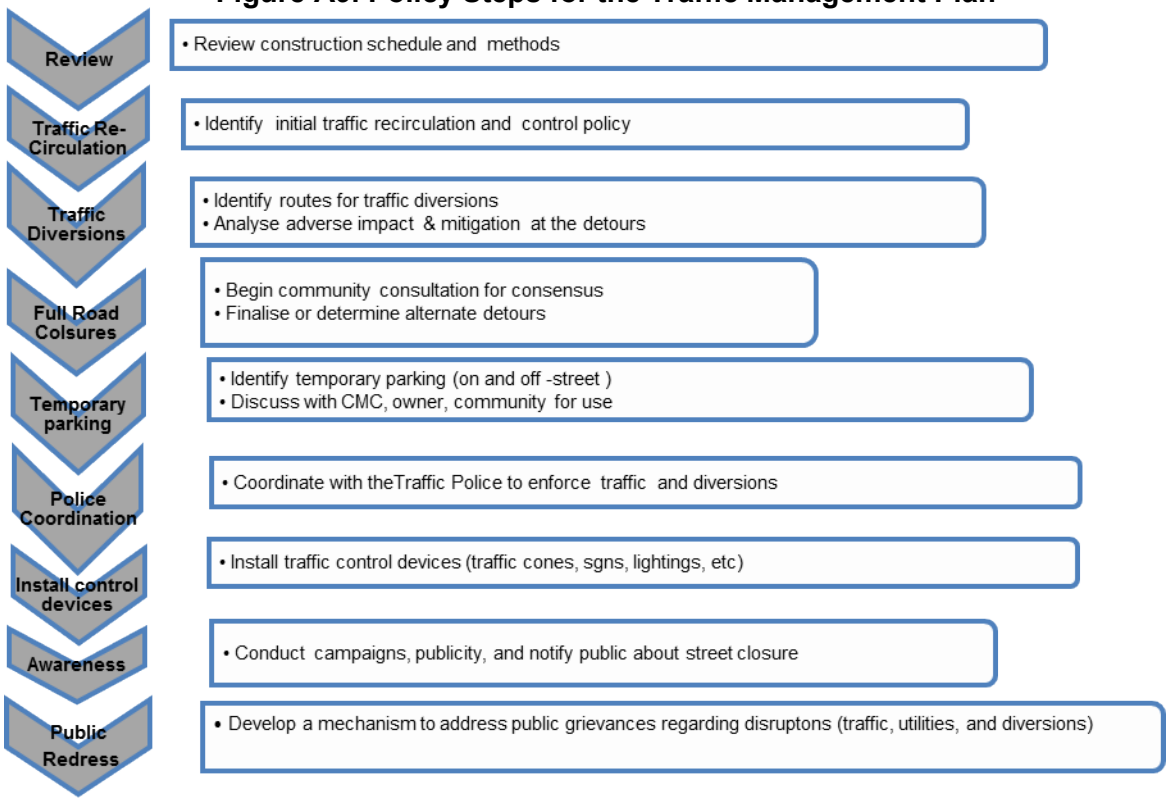
- approval from the local authorities to use the local streets as detours;
- consultation with businesses, community members, traffic police, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
- determining of the maximum number of days 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.

- 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 A9. Policy Steps for the Traffic Management Plan



Public awareness and notifications

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

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

The PMCU and PIU will also conduct an awareness campaign to educate the public aboutthe 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.

- It may be necessary to conduct the awareness programs/campaigns on road safety duringconstruction.

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. Thetext 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 atthe work zones (name, telephone, mobile number of the contact person; and
  Indicate the office hours of relevant offices.

Vehicle Maintenance and Safety

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 andit 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 governmentof 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.

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

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

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

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

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 temporarySTOP and GO signs should be provided. In addition, at least 60 cm is necessary to install the temporary traffic signs and cones.

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

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

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

Appendix-7: SAMPLE DAILY MONITORING SHEET FOR CONTRACTORS

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

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

Other Issues: _____

_____

_____

_____

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

Prepared by: _____ Name, Designation and Signature

Appendix-8: SAMPLE INSPECTION REPORT FOR PROJECT MANAGEMENT COORDINATION UNIT AND PROJECT IMPLEMENTATION UNITS

Second City Region Development ProjectSite 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 onsite?				
2.	The Facilities	Yes	No	NA	
	a. Are there a medical and first aid kits onsite?				
	b. Are emergency contactdetails available on-site?				
	c. Are there PPEs available? What arethey?				
	d. Are the PPEs in good condition?				
	e. Are there firefighting equipment onsite?				
	f. Are there separate sanitary facilities formale and female workers?				
	g. Is drinking water supply available forworkers?				
	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 withshores or protection from landslide?				
	c. Is breaktime for workers provided?				
	d. How many for each type of collectionvehicle 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 thesites?				
	c) Are temporary and safe walkways for pedestrians available near work sites?				
	d) Is there a record of treated wastewater quality testing/measurement?				
5.	Solid Waste Management	Yes	No	NA	
	a. Are excavated materials placed sufficiently away from water courses?				

Monitoring/Inspection Questions		Findings			Comments/ Clarifications
	b. Is solid waste segregation and management in place?				
	c. Is there a regular collection of solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	a) Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	b) Is any wastewater discharged to stormdrains?				
	c) Is any wastewater being treated prior to discharge?				
	d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				
7.	Dust Control	Yes	No	NA	
	a. Is the construction site watered to minimize generation of dust?				
	b. Are roads within and around the construction sites sprayed with water on regular intervals?				
	c. Is there a speed control for vehicles at construction sites?				
	d. Are stockpiles of sand, cement and other construction materials covered to avoid being airborne?				
	e. Are construction vehicles carrying soils and other spoils covered?				
	f. Are generators provided with airpollution 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 throttleddown?				
	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?				

Monitoring/Inspection Questions		Findings			Comments/Clarifications
	b) Are re-routing signages sufficient to guide motorists?				
	c) Are the excavation sites along roads provided with barricades with reflectors?				
	d) Are the excavation sites provided with sufficient lighting at night?				
10.	Recording System	Yes	No	NA	
	a) Do the contractors have recording system for SEMP implementation?				
	b) Are the daily monitoring sheets accomplished by the contractor EHS supervisor (or equivalent) properly compiled?				
	c) Are laboratory results of environmental sampling conducted since the commencement of construction activities properly compiled?				
	d) Are these records readily available at the site and to the inspection team?				

Other Issues: _____

_____

_____

_____

Prepared by: _____ Name, Designation and Signature

Appendix 9: 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 asscciated 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 10: Renewal of Environmental Clearance Certificate (ECC)

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

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

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

Ref: Your application dated 24/02/2021.

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

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

24.03.2021

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

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

Copy Forwarded to :

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

Appendix 11: A Draft Sample Standard Operating Plan (SOP) for Operation and Maintenance of the Public Toilet

Standard Operating Plan (SOP)
A. General Cleaning

The following SOP is for general cleaning of the Toilet Complex. These are principles of Cleaning that should be followed general, irrespective of the frequency of the cleaning as well as well as the type of cleaning.

a. Assess and Plan	• Set the Timetable to confirm what cleaning is scheduled. • Identify the surfaces to be cleaned and consumables to be replenished. • Identify any Special cleaning required (Specific spot cleans, Special stains) in addition to regular cleaning • Develop to Surface and Cleaning Agent Guide to identify equipment • Maintain Sequence of Cleaning and plan your approach. Cleaning sequence to be followed: a) clear and empty bins, b) sweep floor, c) clean toilet pans/bowls, d) clean shinks/urinals, e) clean shinks/vanity taps, f) clean windows/mirrors, g) spot clean any areas, h) clean fittings, i) wet mop the floor
b. Protect Yourself	• Check whether all safety equipment and clothing is functional • Follow the Cleaner's Health and Safety guideline if necessary
c. Assemble Equipment	• Based on Step 1 gather cleaning equipment on one trolley. • Follow the Cleaner's Health and Safety guideline
d. Inform Users	• Inform users with signage that limits access during cleaning
e. Clear Area to be Cleaned	• Clear the Bins and remove them from cleaning area • Remove any (non-faecal) litter. Refer to Local Municipal Solid Waste Guidelines if necessary • If any faecal litter is present, use a flexible pipe and a water jet to drain any faecal matter through the floor drain.
f. Raise Maintenance/Repair Issues	• Identify and raise issues with management that go beyond cleaning but are affecting the operations of a toilet and require specialized intervention in the form of repair or maintenance.
g. Apply and Wait / Scrub	• Apply the appropriate Surface and Cleaning Agent . • Wait if appropriate depending on surface / agent. Then Scrub if stains are resistant, consider special cleaning techniques.
h. Rinse	• Rinse the Surface with a damp cloth and / or by Pouring Water
i. Drain and Wipe	• Drain any excess water and wipe the surfaces using a dry Cloth.
j. Restock	• Replenish consumables such as soap, sanitiser, tissue paper and garbage bags.
k. Pack Away	• Make cleaning Materials suitable for next use and put away in designated space.
l. Sanitize Self	• Ensure that you take off the gloves and dispose them safely.

	• Wash hands using disinfectant and or waterless sanitiser.
m. Inspect and Update	• Carry out an Inspection and check for areas that were missed out • Check the customer-complaint book for any cleaning or repair issues

Standard Operating Plan (SOP)
B. Operation Standard

Frequency of Cleaning	• Toilets (Inside the Restroom Complex) should be cleaned • in every 1 hour. • In heavy footfall areas, toilets must be cleaned every 1 • hours. • Cleaning of all operation should be split into 5 groups: • Continually, Daily, Weekly, Monthly and Half Yearly. • Daily and Periodic cleaning should be scheduled and • timetabled as per requirements. • The Timetable for Cleaning Activities / Cleaning • Checklist should be placed in an area that is highly visible • to users • Cleaning of all surfaces should be split into 4 groups:Daily, Periodic, Special and Spot
Cleanliness	• The Access areas and the Access Signage must be Clean. • The Toilet, the cubicles and washing area must be clean and dry. • The Toilet cleaning equipment must be clean, odourless, and kept in one place. • Mirrors and Windows should be clean and not having water marks. • Accessories such as Bins and Sanitary disposal units must be clean, dry, sanitised, hands-free and odourless, as well as should have liners. • Fixtures such as wash basins, vanity tops, WC bowls and urinals must be clean and dry. • Fittings such as door handles, doors should be clean. • The floor should be dry. • Ventilation systems that are natural or mechanical should be clean & functioning. • The humidity levels indoors should not be higher than normal. • Adequate floor drainage should be clean and unclogged
Opening / Closing Times	• The toilet opening times must be determined by the area that it is serving. In areas with high public footfall, the toilet must be open for 16-18 hours a day. • The opening hours must be displayed right next to the main entrance of the toilet. • Opening times must also be displayed on GIS and other information based platforms in addition to being displayed on the access signage. • Cleaning should be carried out in a phased manner, allowing minimum restrictions on users. • Closure of the toilet should be for emergency cleaning rather than periodic cleaning.

Odour	• The Toilet should be fragrant / odourless • Natural ventilation should be given preference to air fresheners to reduce bad smells.
Safety Protocols	• Protocols should ensure that windows and ventilation are open during cleaning. • Cleaning in progress, wet floor' signs should be in place. • Cubicles that need special cleaning must be locked / blocked • All Safety Equipment issued to cleaners must be checked by the cleaners themselves before use and by the Site Manager / Chief Attendant on a weekly basis. Any faulty hardware must be immediately replaced. • Chemicals must be stored separately, in a unit that is locked and not accessible to users. • Flooring should be anti-slip and dry. • Disabled Assistance / Distress alarm must be working • Assistance Handlebars for the Disabled Toilets must be properly fitted and not damaged. • CCTV should be in place (where appropriate). The data recorded should be stored as per data protection laws
Monitoring	• Monitoring should be carried out by a designated person within the PIU on a scheduled but unannounced basis. • A cleaning checklist that is dated, timed and signed by the cleaning staff should be placed in a place that is highly visible to users. • There must be a visible, easily accessible suggestion mechanism in place
Electrical Fittings	• The electrical fittings shall be functional, not violating any safety norm and the toilet shall always be well lit • Any electrical fittings must be repaired within 24 hours of break down • Any damaged electrical fittings that are posing a safety risk for users / staff must be removed, or if not possible, then the area must be sealed • Further, any electrical malfunctioning that is rendering the use of the toilets difficult, such as complete or significant failure of the lighting system must be rectified within 4 hours.
Water Availability	• Water should always be available for washing and cleaning purposes • The water connection, if disrupted, should be restored in 1 hour • If the quality of water has degraded, the Water supply board must be informed immediately upon detection.
Information Boards / Signage	• Signage Boards must be clean, unobstructed and properly fitted • If not properly fitted, or obstructed, it must be moved immediately.
Consumables	• All consumables such as toilet roll, soap must be well stocked • Any consumable dispenser that is empty, must be replaced within one hour.

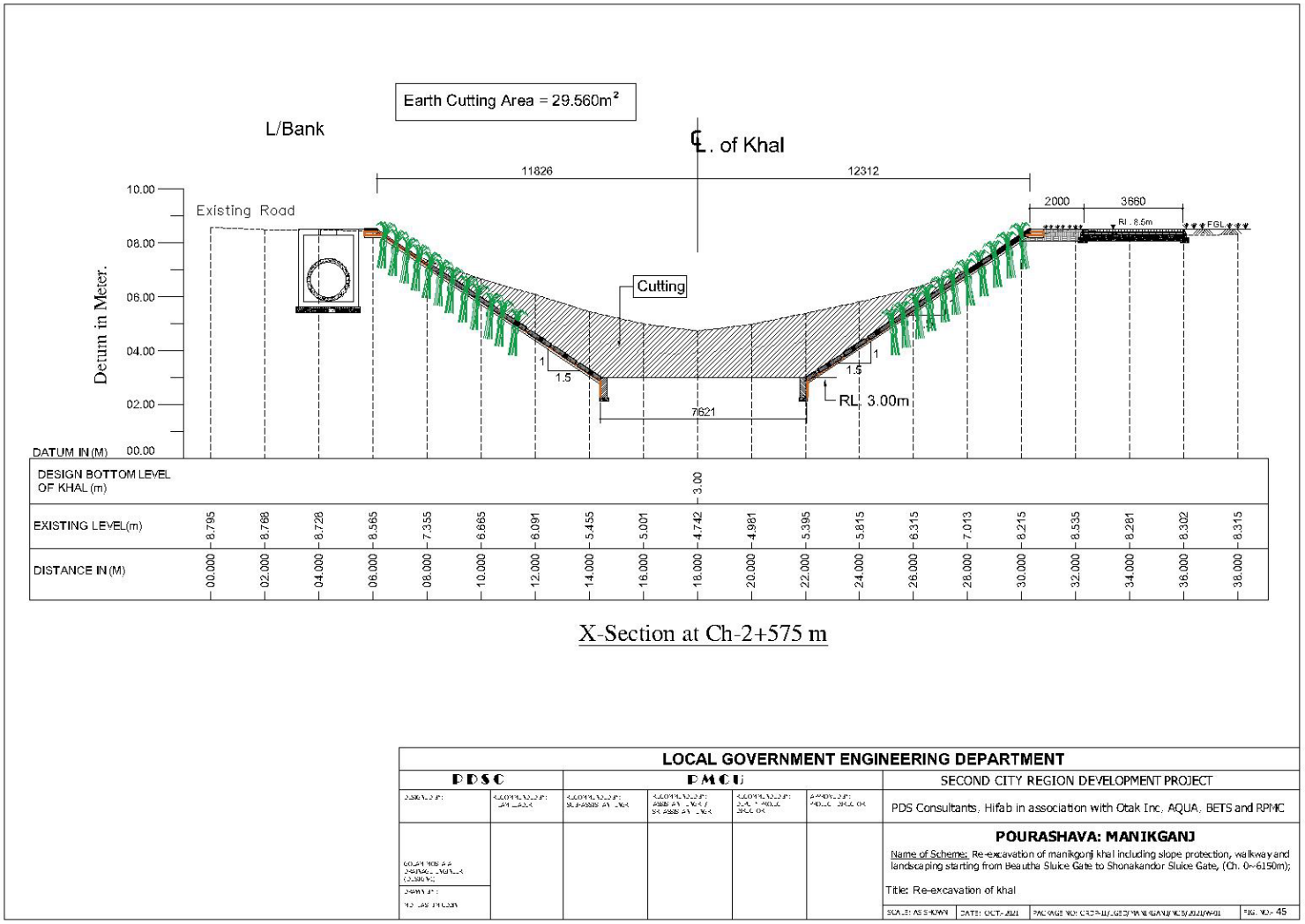
Appendix 12: Environmental Risk Assessment Matrix (without application of mitigation measures)

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)*

Appendix 2: Cross sections of the subproject interventions (khal, bridge cross drain and slope protection)

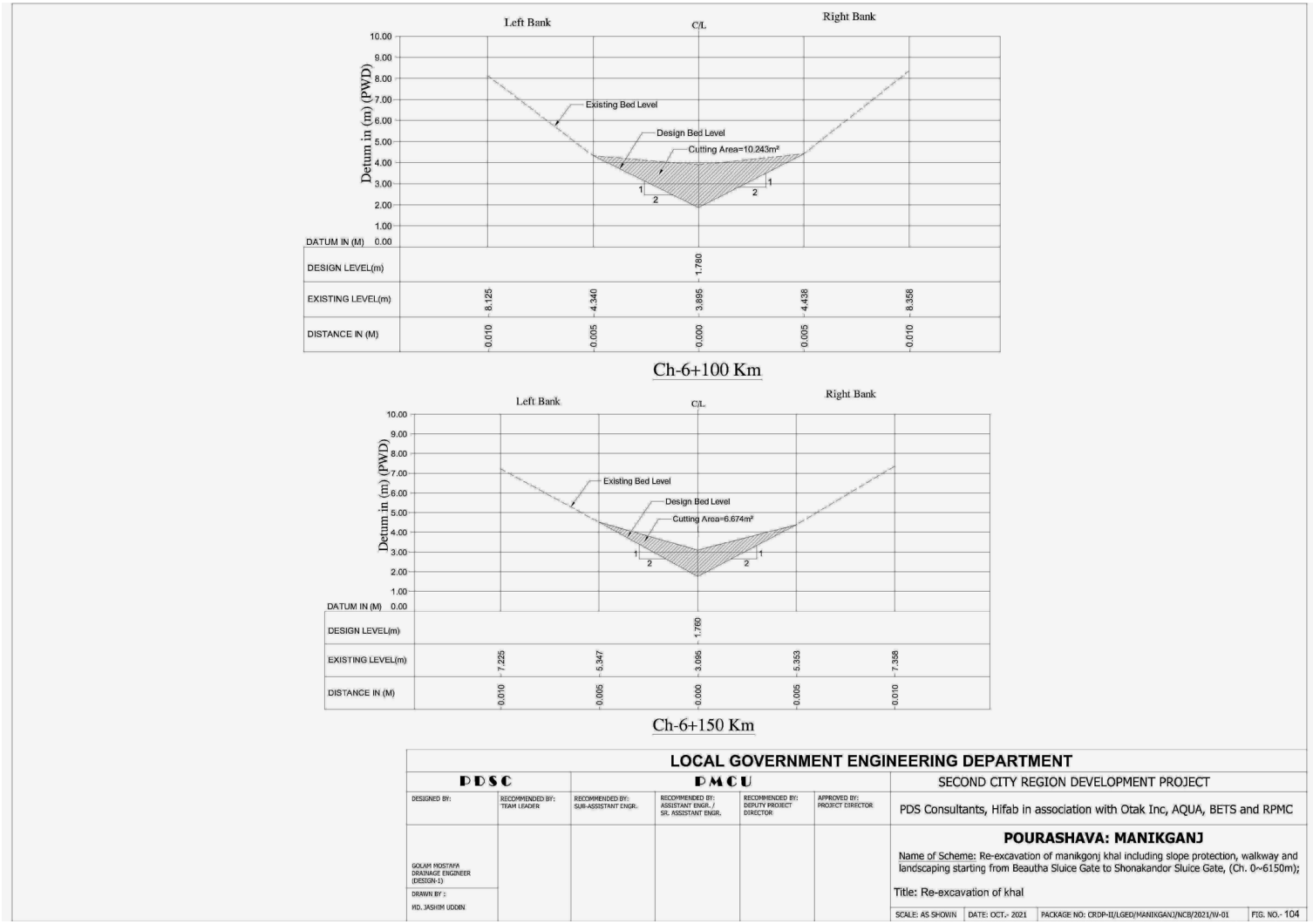
Cross section of Re-excavation of Manikganj Khal including slope protection, walkway and landscaping (Inside the Town Area)



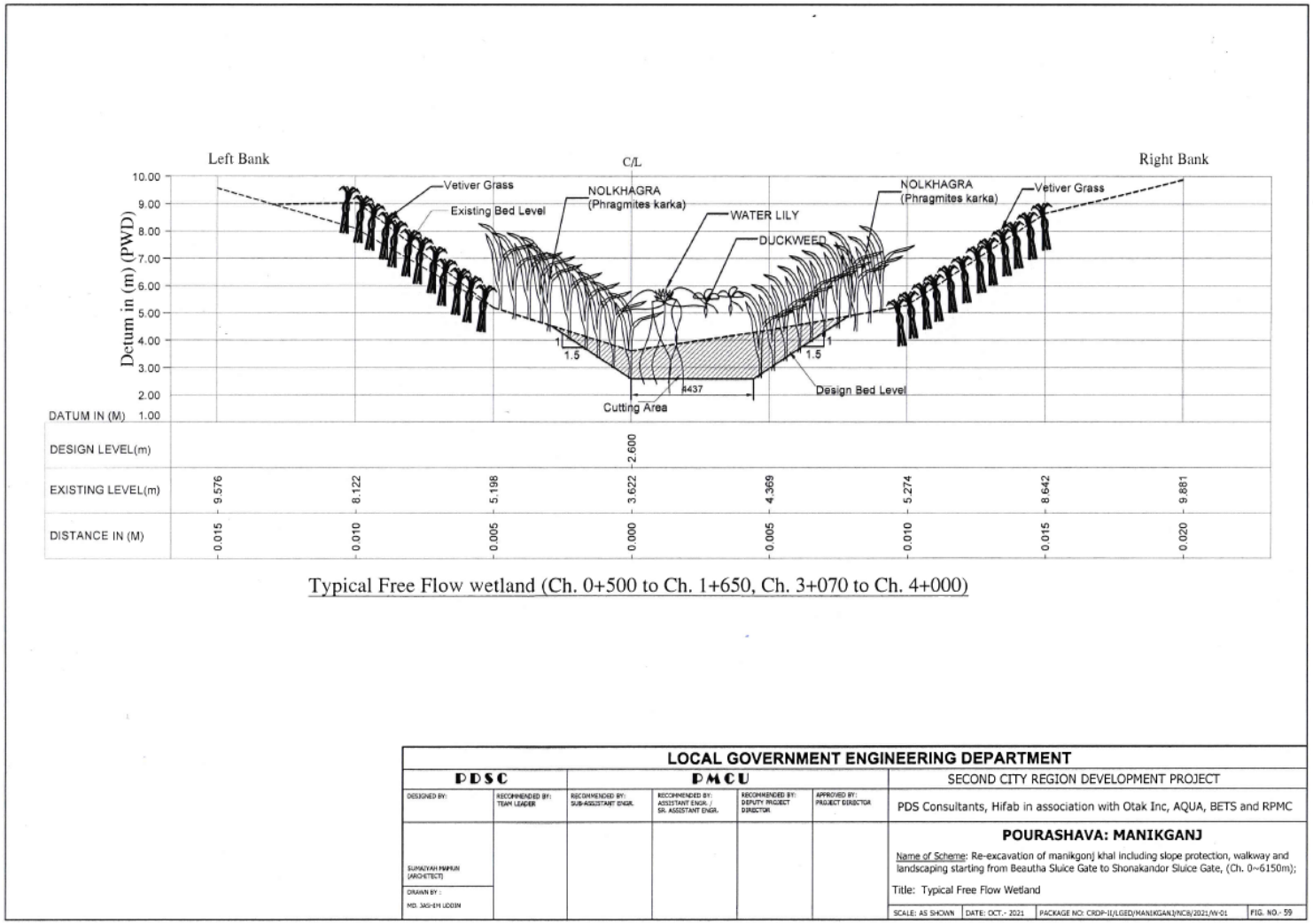
X-Section at Ch-2+575 m

LOCAL GOVERNMENT ENGINEERING DEPARTMENT					
PDSC		PMCU			SECOND CITY REGION DEVELOPMENT PROJECT
					PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
					POURASHAVA: MANIKGANJ Name of Scheme: Re-excavation of manikganj khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate, (Ch. 0+6150m); Title: Re-excavation of khal
					SCALE: AS SHOWN | DATE: OCT-2021 | PACKAGE NO: CRDA-III/GEC/MANIKGANJ/WORKS/2021/W-01 | FIG. NO.- 45

Cross Section of Re-excavation of Manikganj Khal including slope protection, walkway and landscaping (Outside the Town Area)



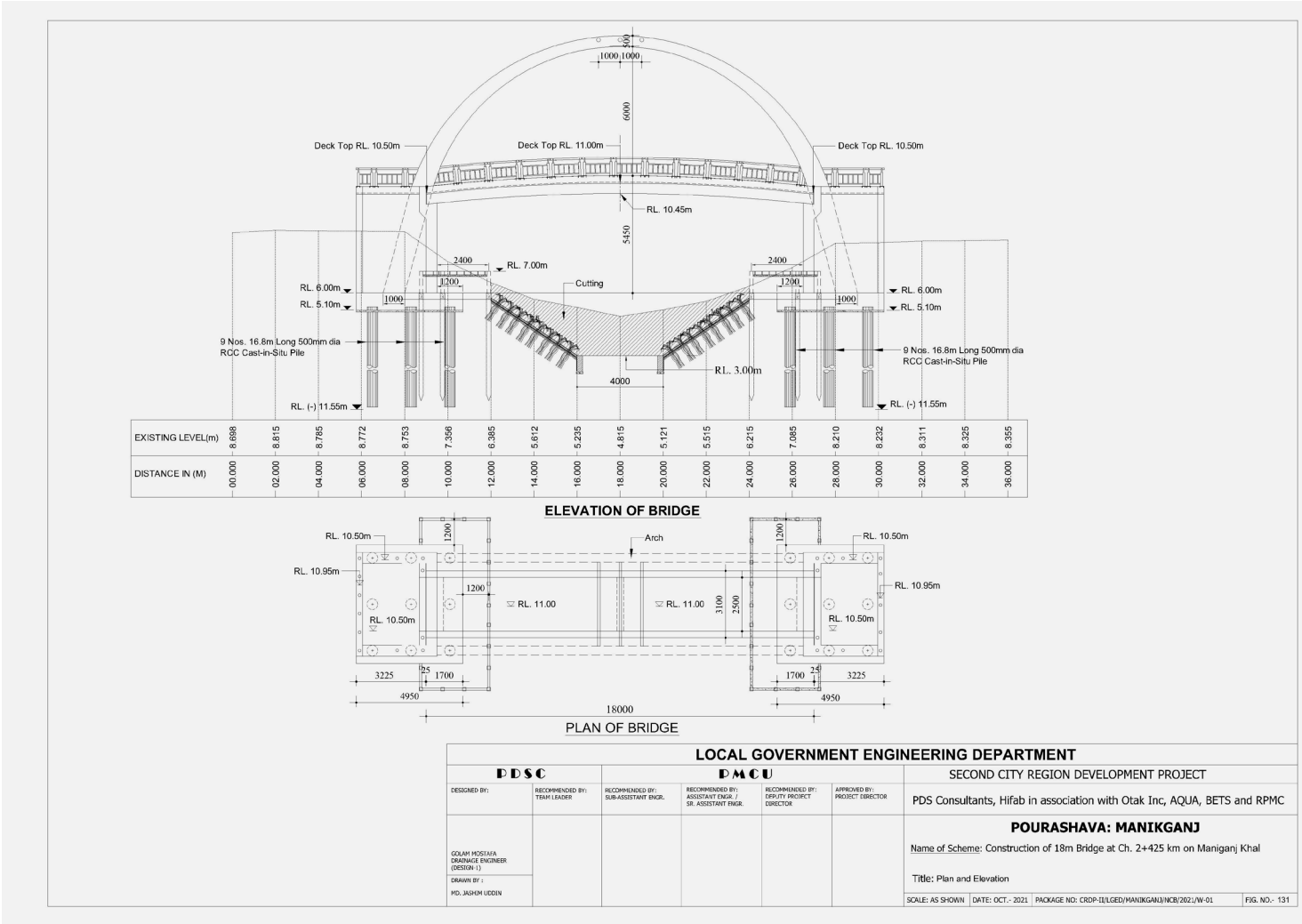
Typical Free Flow Wetland (Ch. 0+500 to Ch. 1+650, Ch 3+070 to Ch. 4+000)



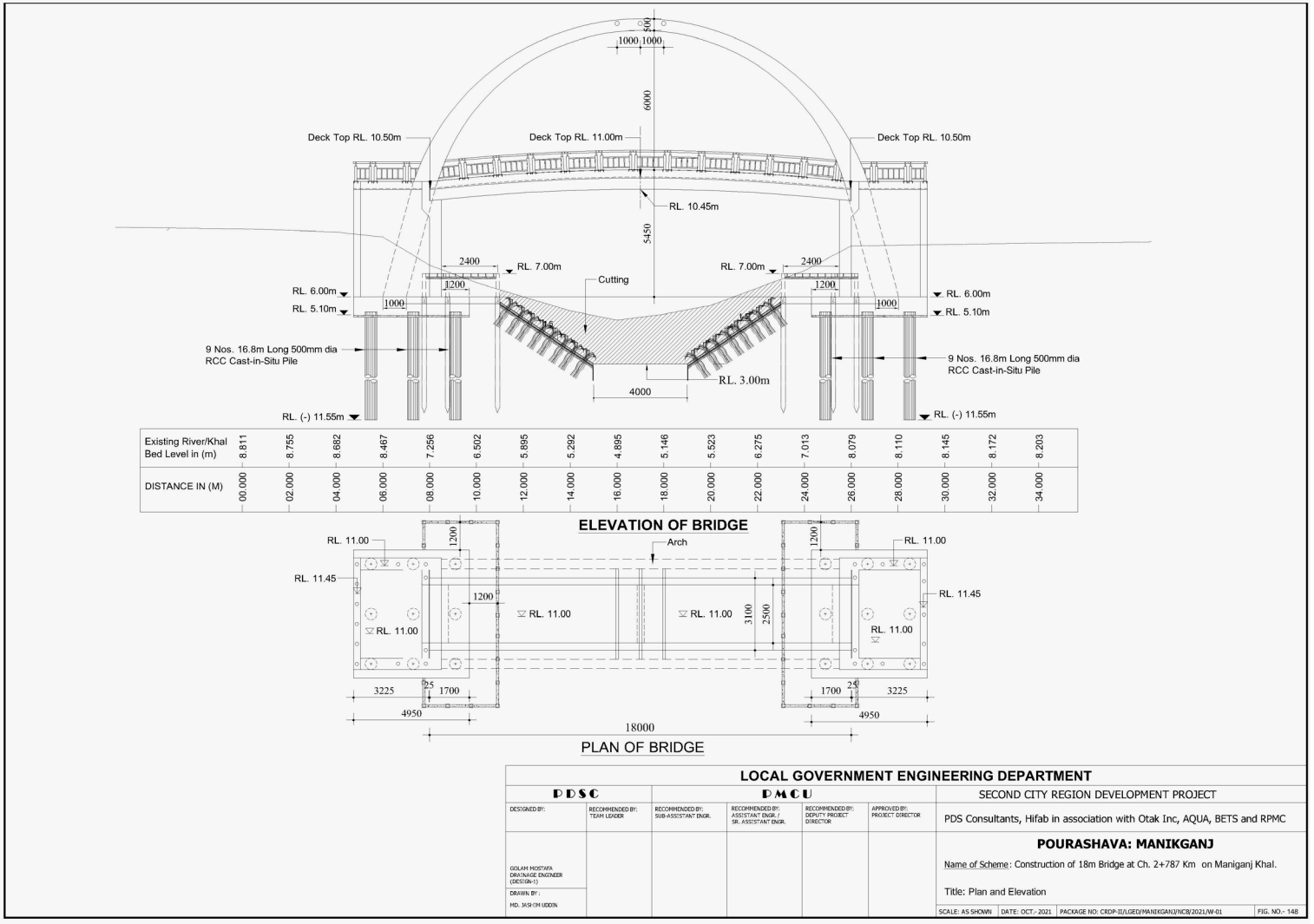
Typical Free Flow wetland (Ch. 0+500 to Ch. 1+650, Ch. 3+070 to Ch. 4+000)

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 Otak Inc, AQUA, BETS and RPMC
SUMAIYAH MAMUN (ARCHITECT)						**POURASHAVA: MANIKGANJ**
DRAWN BY : MD. JASHIM UDDIN						Name of Scheme: Re-excavation of manikgonj khal including slope protection, walkway and landscaping starting from Beautha Sluice Gate to Shonakandor Sluice Gate, (Ch. 0~6150m);
						Title: Typical Free Flow Wetland
						SCALE: AS SHOWN | DATE: OCT.- 2021 | PACKAGE NO: CRDP-II/LGED/MANIKGANJ/NCB/2021/W-01 | FIG. NO.- 59

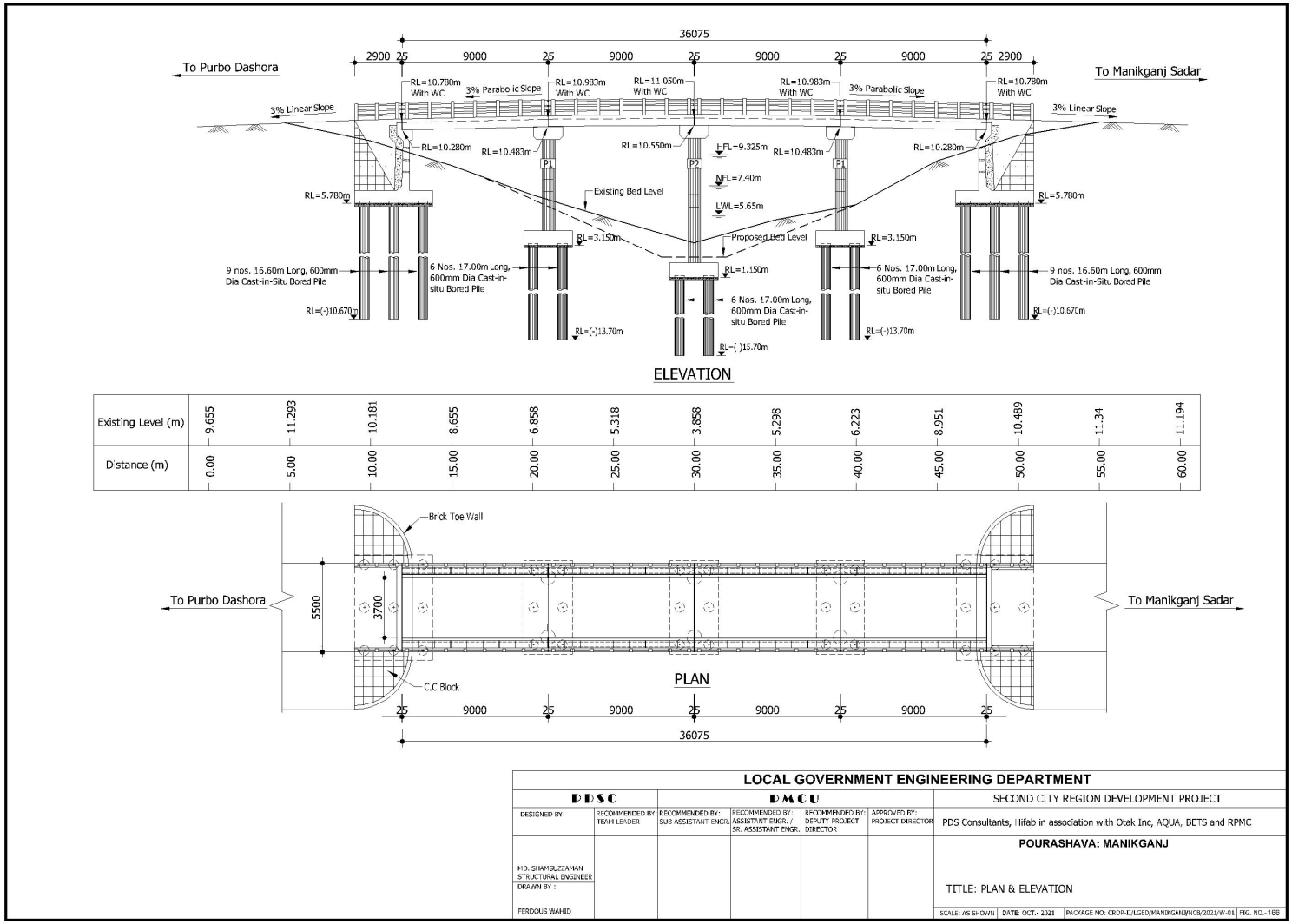
Cross Section of Scheme 2 (Bridge): Construction of 18m bridge at Ch.2425m on Manikganj Khal



Cross Section of Scheme 3 (Bridge): Construction of 18m bridge at Ch.2787m on Manikganj Khal

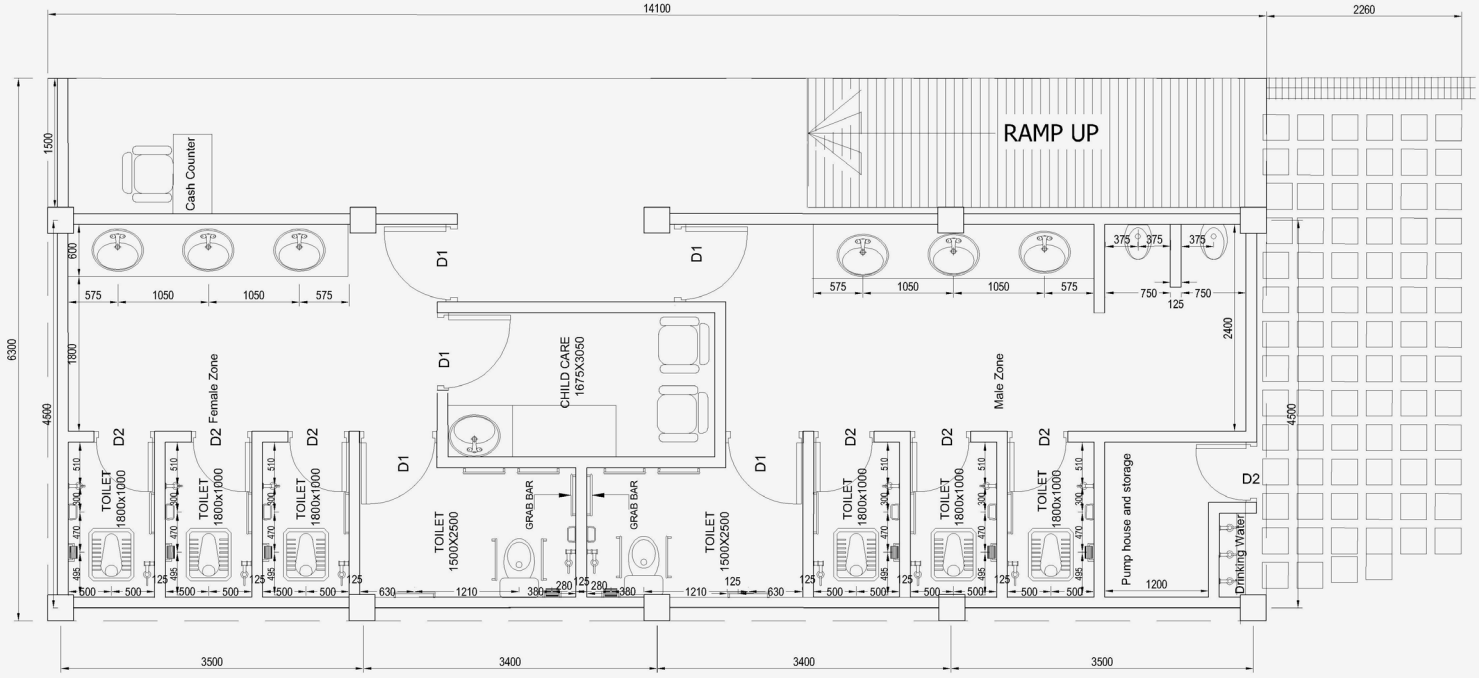


Cross Section of Scheme 4 (Bridge): Construction of 36m bridge at Ch.3023m on Manikganj Khal



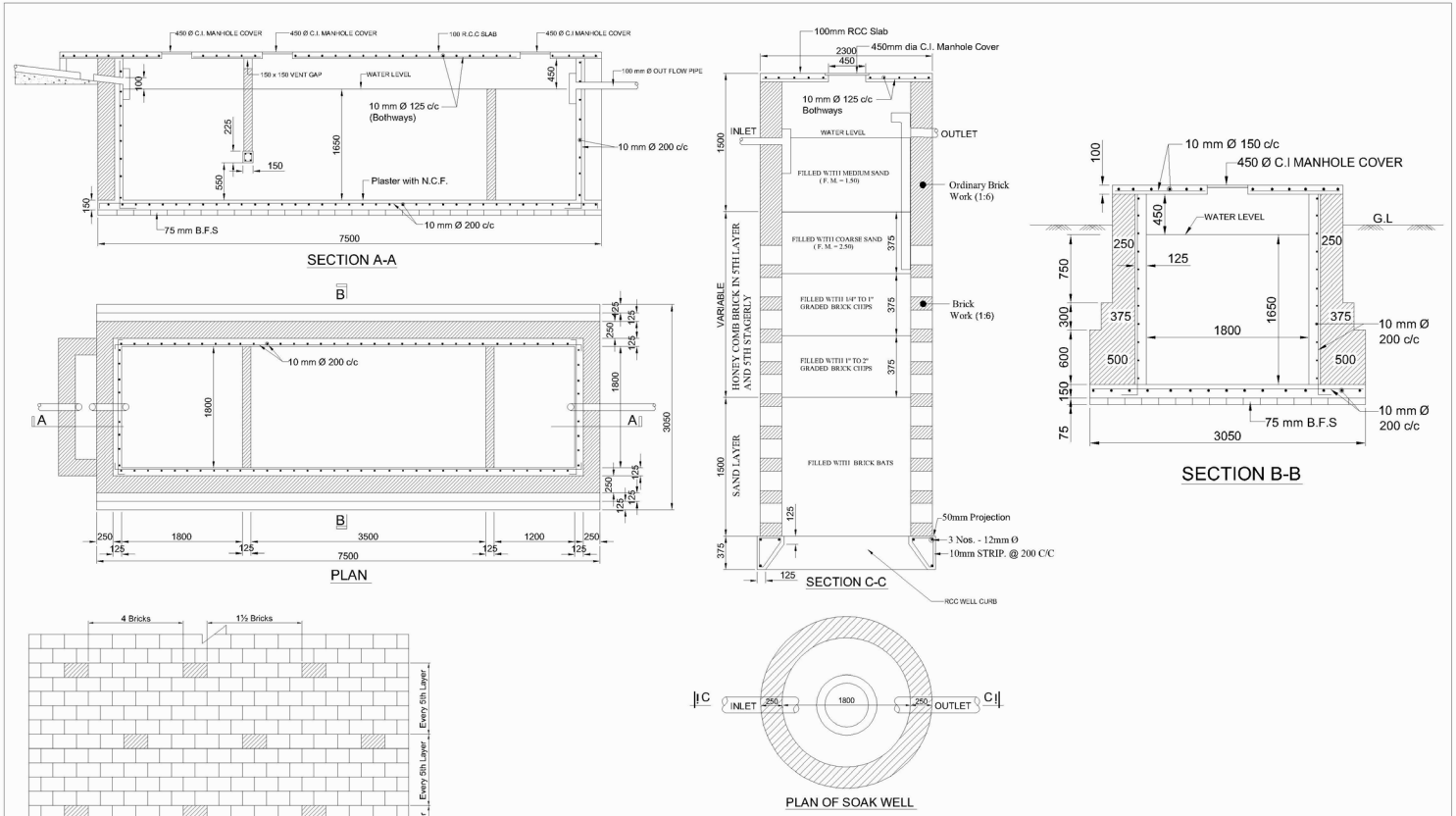
LOCAL GOVERNMENT ENGINEERING DEPARTMENT						
PDSC		DMCU				SECOND CITY REGION DEVELOPMENT PROJECT
DESIGNED BY:	RECOMMENDED BY: TEAM LEADER	RECOMMENDED BY: SUB-ASSISTANT ENGR.	RECOMMENDED BY: ASSISTANT ENGR. / SR. ASSISTANT ENGR.	RECOMMENDED BY: DEPUTY PROJECT DIRECTOR	APPROVED BY: PROJECT DIRECTOR	PDS Consultants, Hifab in association with Otak Inc, AQUA, BETS and RPMC
MD. SHAMSUZZAMAN STRUCTURAL ENGINEER						POURASHAVA: MANIKGANJ
DRAWN BY : FERDOUS WAHID						TITLE: PLAN & ELEVATION
SCALE: AS SHOWN	DATE: OCT.- 2021	PACKAGE NO: CRDP-II/LGED/MANIKGANJ/NCB/2021/W-01	FIG. NO.-166			

Plan Section of Scheme 5 (Public Toilet): Construction of 1 No. Public Toilet at Ch.2525m of Manikganj Khal



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 Otak Inc, AQUA, BETS and RPM
Sumaiyah Mamun (Architect)						**POURASHAVA: MANIKGANJ**
DRAWN BY : MD. JASHIM UDDIN						Name of Scheme: Re-excavation of manikgonj khal including slope protection, walkway and landscaping Ch. 0+000 Km to 6+150 Km.
						Title: Plan of Proposed WASH Facility
						SCALE: AS SHOWN | DATE: SEP.- 2021 | PACKAGE NO: CRDP-II/LGED/MANIKGANJ/NCB/2021/W-01 | FIG. NO.-

Plan and Section Detail of Septic Tank & Soak Well of Public Toilet at Ch.2525m of Manikganj Khal



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 Otak Inc, AQUA, BETS and RPMC
MD. SHAMSUZZAMAN STRUCTURAL ENGINEER						**POURASHAVA: MANIKGANJ**
DRAWN BY : MD. JASHIM UDDIN						Name of Scheme: Construction of 1 No. Public toilet at Ch:2515m of Manikganj Khal
						Title: PLAN AND SECTION DETAIL OF SEPTICK TANK & SOAK WELL (200 User)
SCALE: AS SHOWN	DATE:-OCT- 2021	PACKAGE NO: CRDP-II/LGED/MANIKGANJ/NCB/2021/W-01	FIG. NO.-201			