Initial Environmental Examination

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BAN: Second City Region Development Project – Comprehensive Solid Waste Management Planning and Small Works (Composting Plant) for Khulna City Corporation

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

CURRENCY EQUIVALENTS

(as of 20 February 2019)

Currency Unit	=	taka (Tk)
Tk1.00	=	$0.0119
$1.00	=	Tk83.83

ABBREVIATIONS

ADB	–	Asian Development Bank
CRDP	–	City Region Development Project
KCC	–	Khulna city corporation
DOE	–	Department of Environment
KWASA	–	Khulna Water Supply and Sewerage Authority
EARF	–	environmental assessment and review framework
ECR	–	Environmental Conservation Rules
EIA	–	environmental impact assessment
EMP	–	environmental management plan
GRC	–	grievance redress committee
GRM	–	grievance redress mechanism
IEE	–	initial environmental examination
LGED	–	Local Government Engineering Department
LGI	–	Local Government Institution
NGO	–	nongovernment organization
NOC	–	no objection certificate
O&M	–	operation and maintenance
PDSC	–	preparation, design and supervision consultant
PIU	–	project implementation unit
PMCU	–	project management and coordination unit
REA	–	rapid environmental assessment
ROW	–	right-of-way
SEMP	–	site-specific management plan
SPS	–	safeguard policy statement
SWM	–	solid waste management

WEIGHTS AND MEASURES

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

NOTE

In this report, "$" refers to United States dollar.

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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 the comprehensive solid waste management (SWM) planning and small works subproject for Khulna city corporation (KCC). In particular, this IEE covers the following components under the subproject: (i) comprehensive SWM planning for a long term integrated SWM infrastructure for the entire KCC; and (ii) construction of a composting plant to help reduce the environmental impact of the current yet inadequately managed SWM of KCC.

Categorization. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB Safeguard Policy Statement (SPS), 2009. Using ADB rapid environmental assessment checklist, the subproject is classified as Environmental Category B per ADB SPS, 2009 as no diverse, irreversible or unprecedented significant impacts are envisaged. ADB's Environment and Safeguards Division confirmed this categorization on 27 August 2018. Accordingly, this IEE has been undertaken, which assesses in more detail the likely environmental impacts of the subproject and provides an environmental management plan (EMP) specifying the required mitigation and monitoring measures to ensure that these impacts are managed to acceptable levels. This IEE also emphasizes the need to incorporate pollution prevention and control technologies during the design, construction, and operation of the subproject and adhere to internationally recognized standards such as ADB's Practical Guide on Integrated Solid Waste Management for Local Governments and the World Bank Group's Environment, Health and Safety Guidelines.

Environmental Management. The comprehensive SWM planning component will not involve construction of any infrastructures. Hence, this component will not pose any actual physical impact to the environment. However, this component under the subproject will have the beneficial and long-term environmental impact for KCC. The output of the comprehensive SWM plan will be a plan that will guide KCC in implementing a sustainable and integrated SWM for the city.

The small works component under the subproject will undertake the construction of a composting plant that will help manage the solid waste generation in KCC by reducing the volume of residual wastes for treatment and/or final disposal. While the design of the proposed composting plant is not yet developed, this IEE presents an EMP defining the common environmental impacts and mitigating measures associated with composting plants based on various actual experiences worldwide. The environmental impacts associated with construction of a composting plant are site-specific in nature that can be mitigated through simple measures known to contractors, while the environmental impacts associated with the operation and maintenance can be mitigated with implementation of a well-developed and designed operation and maintenance (O&M) manual. Overall, composting plant is considered as an environment-friendly SWM component.

The subproject components, particularly the proposed composting plant, will be located within

KCC, the third largest city in Bangladesh. KCC is not a host to any environmentally sensitive areas per definition of ADB SPS, 2009, and therefore does not require special or critical considerations in terms of locating the proposed composting plant under the subproject. The methods to be used for site preparation and construction of the proposed composting plant, 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 EMP (SEMP) based on the EMP of this IEE. Contractor will submit its SEMP for approval to KCC as the project implementation unit (PIU) of the subproject. The SEMP will cover the following areas of impact which are potentially significant but can be mitigated by the adoption of good practice: (i) impedance of traffic, (ii) noise pollution and vibration, (iii) waste generation, (iv) release of silt from excavations, (v) water pollution, (vi) air pollution due to dust and emissions, (vii) community health and safety risks, and (viii) occupational health and safety. The operation and maintenance phase of the proposed composting plant will be guided by an O&M manual that contains all procedures to follow in ensuring efficient functioning of the plant.

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 and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures. Affected people are to be informed about the mechanism through media and public outlets. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process.

Implementation Arrangement. The executing and implementing agency is the Local Government and Engineering Department (LGED) of the Government of Bangladesh. LGED will establish a project management and coordination unit (PMCU) comprising officials including an Environmental Safeguard Officer who is a permanent employee of LGED. The PMCU will be strengthened with external experts or consultants in environmental and social safeguards, including experts on finance, procurement, technical areas, and contract management. The PIU under the subproject will be KCC. The PMCU and KCC PIU will have responsibility for overseeing subproject management, including overseeing EMP implementation.

For the comprehensive SWM planning component, the PMCU will spearhead the formation of team of experts. Some experts will be hired and be part of the preparation, design and supervision consultant (PDSC) team under PMCU, while other experts will be hired separately under the project and/or other funding modalities from ADB (e.g., technical assistance). The formed team will conduct the planning based of the timeline that is yet to be agreed among ADB, PMCU, PDSC, and external experts. The updating of this IEE will include information on the final arrangement and budget for the comprehensive SWM planning component under the subproject.

For civil works under the composting plant component, 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 the updated version of this IEE, and submit to PIU for approval; (iv) carry out all of the monitoring and mitigation measures set forth in the approved SEMP; and (v) implement any corrective or preventative actions set out in safeguards monitoring reports that the PMCU will prepare from time to time to monitor implementation of the updated version of this IEE, EMP in the updated version of IEE, and SEMP. The Contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

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

Conclusion. The proposed subproject is not an environmentally critical undertaking. This IEE confirms that the proposed components of the subproject, particularly the composting plant, will be located in KCC– a city which is not located within or adjacent any environmentally sensitive areas. The overall finding of this IEE is that the subproject will result in otherwise significant environmental benefits. The subproject components will help improve the current but worsening SWM system in KCC. The subproject will not have significant adverse environmental impacts and the potential adverse impacts identified are associated with the construction phase, which can be managed through effective implementation of the EMP. No further environmental assessment is therefore required and the classification of Category B per ADB SPS, 2009 is confirmed.

This IEE has been prepared based on conceptual and preliminary information. The PMCU shall update this draft IEE based on (i) final arrangement and budget for the comprehensive SWM planning; and (ii) final detailed design of the composting plant. The updated IEE will be submitted to ADB for review and disclosure. The approved updated IEE by ADB 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) SEMP prepared by contractor is approved by KCC PIU. If circumstances would require, the IEE will be further updated for ADB's review during the implementation period. In the event of unanticipated impact and/or any design change and/or non-compliance during subproject implementation period, the IEE shall be updated to include (i) assessment of the unanticipated impact and corresponding mitigation measures, and/or (ii) information on the design change and assessment of associated environmental impacts, if any, and/or (iii) corrective actions, associated cost and schedule; respectively.

Recommendations for the Comprehensive Solid Waste Management Planning. In the comprehensive SWM planning activities, recommendations that may be considered in order to ensure compliance of future SWM infrastructures with ADB SPS, 2009 and international best practices on SWM are provided. For the detailed step-by-step activities and sample illustrations on how to proceed with the tasks, it is recommended that the comprehensive SWM planning utilize ADB's Practical Guide on Integrated Solid Waste Management for Local Governments.

Recommendations for the Composting Plant. This IEE shall be updated to include the detailed design of the composting plant consistent with the comprehensive SWM plan that will be developed for KCC under the subproject. In addition, it is recommended that the design consideration for the composting plant follow international best practices on SWM such as the relevant guidelines on composting in ADB's Practical Guide on Integrated Solid Waste Management for Local Governments.

I. INTRODUCTION

1. The Second City Region Development Project (the project) will support development in the city regions of Dhaka and Khulna building upon infrastructure and capacity building initiatives implemented during the first City Region Development Project (CRDP)[1] funded by the Asian Development Bank (ADB). The project will finance additional crucial infrastructure in urban and peri-urban areas needed to stimulate growth and improve livability in Dhaka and Khulna, two densely populated rapidly growing city regions of Bangladesh. The project will also continue strengthening capacity for project development, sustainable service delivery, and community awareness. The project will be implemented over a 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 (KCC) 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. The subprojects are largely built around 'integrated area planning' which seeks to enhance economic activity in the city regions and provides opportunities for investment, including (i) transport infrastructure upgrading; and (ii) 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 IEE report has been prepared for the comprehensive solid waste management plan and small works subproject for KCC. In particular, this IEE covers the following components under the subproject: (i) comprehensive solid waste management (SWM) planning for a long term integrated SWM infrastructure for the entire KCC; and (ii) construction of a composting plant to help reduce the environmental impact of the current yet inadequately managed SWM in KCC.

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

[2] ADB's Environment and Safeguards Division confirmed the Category B classification of the project on 27 August 2018. A project's category is determined by the category of its most environmentally sensitive component, including direct, indirect, cumulative, and induced impacts in the project's area of influence. Each proposed project is scrutinized as to its type, location, scale, and sensitivity and the magnitude of its potential environmental impacts. Projects are assigned to one of the following four categories: (i) **Category A**. A proposed project is classified as category A if it is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment is required. (ii) **Category B**. A proposed project is classified as category B if its potential adverse environmental impacts are less adverse than those of category A projects. These impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination is required. (iii) **Category C**. A proposed project is classified as category C if it is likely to have minimal or no adverse environmental impacts. No environmental assessment is required although environmental implications need to be reviewed. (iv) **Category FI**. A proposed project is classified as category FI if it involves investment of ADB funds to or through a financial intermediary.

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

A. 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 components based on the preliminary information available from the project. In particular, this IEE discusses the bases of (i) developing a comprehensive SWM plan for KCC; and (ii) constructing a composting plant as a selected sample SWM small work under the subproject. This IEE also provides recommendations that may be followed in the development of the comprehensive SWM plan and in the establishment of a composting plant.

6. However, this IEE emphasizes that the detailed design of the composting plant shall be based on the comprehensive SWM plan that will be developed. Thus, finalization of detailed design and construction of the composting plant shall commence only after undertaking the comprehensive SWM planning activity of the subproject, Nevertheless, this IEE provides a cursory assessment of common environmental impacts and mitigation measures associated with establishing a composting plant from design stage to operation and maintenance (O&M) stage. This IEE also includes an environmental management plan (EMP) outlining mitigation measures for the potential environmental impacts of a composting plant, and describes the monitoring and reporting requirements per ADB SPS, 2009 and applicable Government of Bangladesh (government) laws and regulations. The information used in this IEE is based on field visits, and secondary data gathered to characterize the environment within and around KCC.

7. This IEE and the EMP herein shall be updated based on the final detailed design of the proposed composting plant. The updated IEE, with the updated EMP therein, will form part of the civil works contract documents of the composting plant component of the subproject. In addition, the updating of this IEE shall include the output of the comprehensive SWM planning component of the subproject (i.e., the comprehensive SWM plan for KCC).

8. Screening using ADB's rapid environmental assessment checklist for the proposed composting plant was conducted using preliminary information from the project and KCC as its general location. Results of the rapid assessment show that the project is unlikely to cause any significant adverse impacts, and therefore classified under Category B per ADB SPS. 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. KCC as the general location of the subproject is described in Section III. The updating of this IEE as described in paragraph 7 hereof shall include an updated accomplished REA checklist that will show the result of a rapid assessment on the final and specific location of the proposed composting plant.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

9. 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 policies exist, ADB's 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.

A. ADB Safeguard Policy Statement

10. 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]

11. **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.

12. **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 subprojects related to SWM.

13. **Environmental Planning and Management.** The PMCU shall prepare 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.

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

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

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

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

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

16. **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 detail in Section VI below.

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

18. **Unanticipated Environmental Impacts.** Where unanticipated environmental impacts become apparent during subproject implementation, the 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.

19. **Pollution Prevention and Control Technologies**. During the design, construction, and operation of the subproject the PMCU and PIU shall apply pollution prevention and control technologies and practices consistent with international good practice, as reflected in internationally recognized standards such as the World Bank Group's Environmental, Health and Safety (EHS) Guidelines, more particularly the EHS Guidelines for Waste Management Facilities.[7] These standards contain performance levels and measures that are normally acceptable and applicable to the subproject. 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.

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

[7] The guidelines can be found here:https://www.ifc.org/wps/wcm/connect/1cd72a00488557cfbdf4ff6a6515bb18/Final+-+Waste+Management+Facilities.pdf?MOD=AJPERES.

20. **Occupational Health and Safety.** The PMCU[8] shall ensure that workers[9] 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.

21. The 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.[10]

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.** The updated IEE, with the updated EMP, as described in paragraph 7 herein will be included in bidding and contract documents and verified by PIU. The PMCU and PIU shall also ensure that bidding and contract documents include specific provisions requiring contractors to (i) comply with all other conditions required by ADB,[11] and (ii) to submit to PIU, for review and approval, a site-specific environmental management plan

[8] 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.

[9] Including nonemployee workers engaged by Local Government Engineering Department (LGED) through contractors or other intermediaries to work on project sites or perform work directly related to the project's core functions.

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

[11] 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.

(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 updated IEE and EMP as described in paragraph 7 hereof are incorporated into the works contract; (ii) this IEE is updated as described in paragraph 7 hereof and PMCU has obtained ADB's clearance of such updated IEE; and (iii) IEE (i.e., IEE in compliance with Environmental Conservation Rules [ECR], 1997) approved by the Department of Environment (DOE) and other necessary permits from relevant government agencies have been obtained. For "design, build, and operate" type contracts, PMCU shall ensure no works under the subproject which involves environmental impacts shall commence until (i) relevant provisions from the updated IEE and updated EMP as described in paragraph 7 hereof are incorporated into the Works contract; and (ii) this IEE is updated as described in paragraph 7 hereof to reflect the proposed composting plant's detailed design, and PMCU has obtained ADB's clearance for such updated IEE.

B. 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.

Table 1: Summary Environmental Clearance Application Requirements Per Category

Category	Requirements
Green	(i) Completed Application for Environmental Clearance Certificate (ECC); (ii) Payment of the appropriate fee based on Schedule 3 of ECR, 1997; (iii) General information about the project; (iv) Exact description of the raw materials to be used and the product to be manufactured (where relevant); and (v) No objection certificate from the local authority.

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

DOE = Department of Environment, ECC = Environmental Clearance Certificate, ECR = Environmental Conservation Rules, EIA = environmental impact assessment, EMP = environmental management plan, ETP = Effluent Treatment Plant, IEE = initial environmental examination, LCC = location clearance certificate, TOR = term of reference.
Source: A Guide to Environmental Clearance Procedure, DOE, Bangladesh Ministry of Environment and Forests, August 2010.

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 its likely classifications based on this schedule.

Table 2: Government of Bangladesh Classification of the Subproject

No.	Subproject	Component	Equivalent in Schedule I of Environmental Conservation Rules, 1997	Department of Environment Classification
1.	Solid waste management (SWM)	Comprehensive SWM Planning	Not covered	None (no infrastructure/ facility to be constructed and no equipment will be procured)
		Composting Plant and associated facilities	No similar facility	Orange – B[a]

[a] Although there is no similar facility in Schedule I of ECR, Orange – B classification is taken from previously issued ECCs for composting plants in the country.

C. 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,[12] which is revised from time to time. See **Error! Reference source not found.** for template being used of this date. The accomplished application form 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.

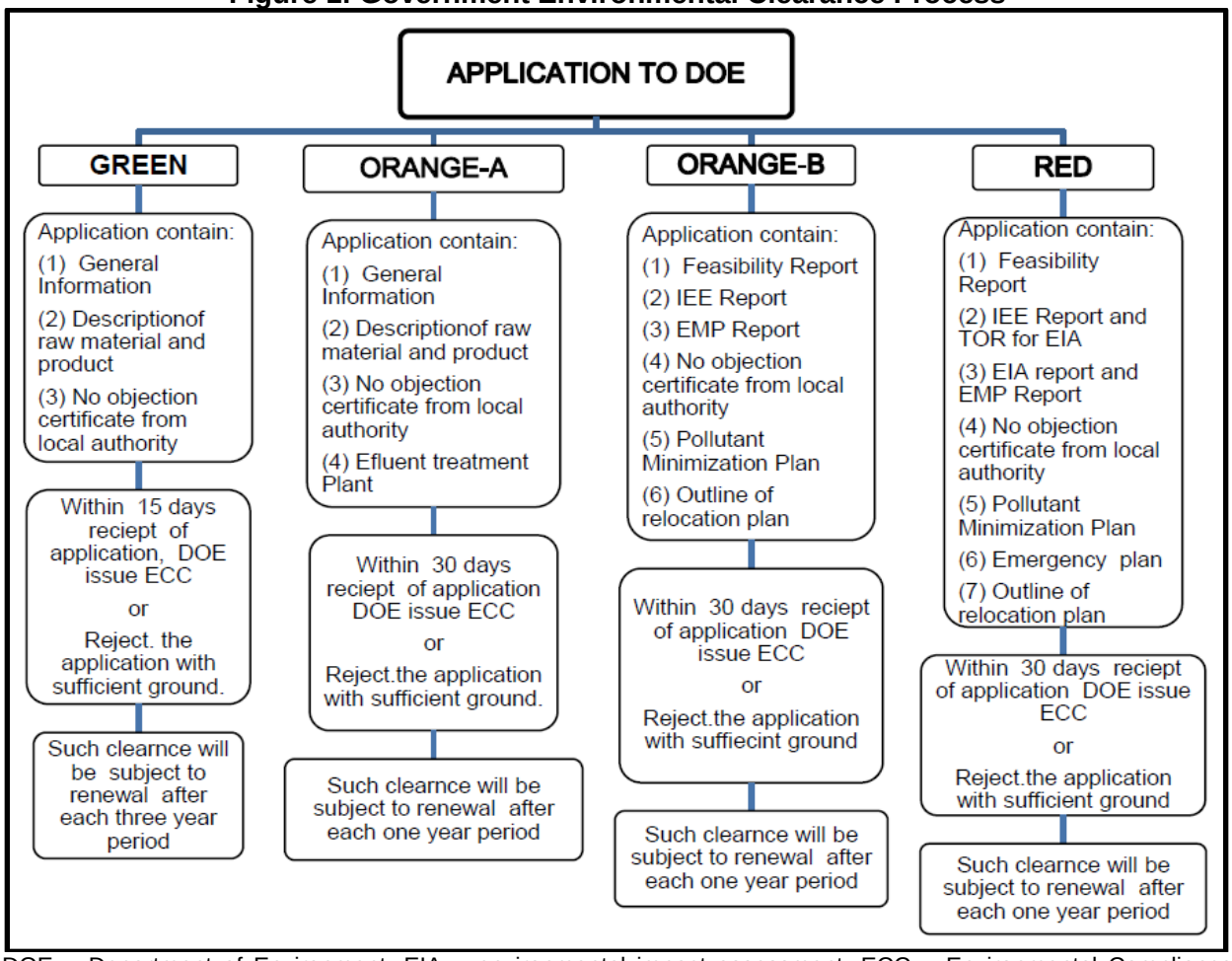
31. The ECC is issued within 30 days from receipt of the application by DOE. Such ECC is required to be renewed every year from the date of its effectivity. For the project, PMCU is responsible for application for ECC. This ECC will cover all subprojects identified under the project. Application for said ECC is ongoing.[13]

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

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

[13] Per information from project management and coordination unit (PMCU), the required fee for Environmental Clearance Certificate (ECC) application and other necessary documents have been submitted to Department of Environment (DOE) as of July 2018. Once approved for ADB project processing, this IEE will be used in the ECC application with DOE.

Figure 1: Government Environmental Clearance Process



DOE = Department of Environment, EIA = environmental impact assessment, ECC = Environmental Compliance Certificate, EMP = environmental management plan, IEE = initial environmental examination, TOR = term of reference.

D. Applicable Environmental Standards

33. 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 of the 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 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. In view of this, Table 3 and Table 4 show the ambient air quality standards and noise level standards to be followed by the subproject.

Table 3: Ambient Air Quality Standards

Parameter	Location	Bangladesh Ambient Air Quality Standard (µg/m^3)[a]	WHO Air Quality Guidelines (µg/m^3)		Applicable to Subproject Per ADB Safeguard Policy Statement[d] (µg/m^3)
			Global Update[b] 2005	Second Edition[c] 2000	
TSP	Industrial and Mixed	500	-	-	500
	Commercial and Mixed	400			400
	Residential and Rural	200			200
	Sensitive	100	-	-	100
PM_{10}	Industrial and Mixed	-	50 (24-h)	-	50 (24-h)
	Commercial and Mixed	-	50 (24-h)		50 (24-h)
	Residential and Rural	-	50 (24-h)		50 (24-h)
	Sensitive	-	50 (24-h)	-	50 (24-h)
PM_{25}	Industrial and Mixed	-	25 (24-h)	-	25 (24-h)
	Commercial and Mixed	-	25 (24-h)		25 (24-h)
	Residential and Rural	-	25 (24-h)		25 (24-h)
	Sensitive	-	25 (24-h)	-	25 (24-h)
SO_2	Industrial and Mixed	120	20 (24-h)	-	20 (24-h)
	Commercial and Mixed	100	20 (24-h)	-	20 (24-h)
	Residential and Rural	80	20 (24-h)		20 (24-h)
	Sensitive	30	20 (24-h)	-	20 (24-h)
NO_2	Industrial and Mixed	100	200 (1-h)	-	100
	Commercial and Mixed	100	200 (1-h)	-	100
	Residential and Rural	80	200 (1-h)		80
	Sensitive	30	200 (1-h)	-	30
CO	Industrial and Mixed	5,000	-	10,000 (8-h) 100,000 (15-min)	5,000
	Commercial and Mixed	5,000	-	10,000 (8-h) 100,000 (15-min)	5,000
	Residential and Rural	2,000	-	10,000 (8-h) 100,000 (15-min)	2,000
	Sensitive	1,000	-	10,000 (8-h) 100,000 (15-min)	1,000

CO = carbon oxide, h = hour, µg/m^3 = microgram per cubic meter, min = minute, NO_2 = nitrogen dioxide, SO_2 = sulfur dioxide, TSP = total suspended particulate.

[a] Schedule 2 of ECR, 1997.

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

[c] WHO Regional Office for Europe. 2000. *Air Quality Guidelines for Europe, Second Edition*. Copenhagen.

[d] If less stringent levels or measures are appropriate in view of specific project circumstances, PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

Table 4: Ambient Noise Quality Standards

Receptor/ Source	National Noise Standard Guidelines, 1997[a] (dB)		WHO Guidelines Value For Noise Levels Measured Out of Doors[b] (One Hour LA_q in dBA)		Applicable to Subproject Per ADB Safeguard Policy Statement[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	50	40	55	45	50	40
Silent Zone	45	35	55	45	45	35

[a] Schedule 4 of ECR, 1997.
[b] Guidelines for Community Noise, WHO, 1999 (WB Environmental, Health and Safety General Guidelines, 2007).
[c] If less stringent levels or measures are appropriate in view of specific project circumstances, PMCU will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS, 2009.

E. Other Relevant National Laws

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

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

Laws, Regulations, and Standards	Details	Relevance to Subproject
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.	Environmental court has been established in Khulna where the subproject is located. This court has jurisdiction over any subproject-related environmental cases or litigations or complaints elevated to it.
The Pourashava (Municipality) Ordinance of 1977, the City Corporation Ordinances of 1983 and the recently revised unified ordinance for all city corporations of 14 May 2008 (Local Government Ordinances 16, and 17 of 2008); City Corporation Act 2009, 15 Oct 2009, and; Pourashava Act 2009, 6 Oct 2009.	These ordinances have clearly assigned responsibilities to the LGIs to ensure the provision of a wide range of primary and public health services including primary health care, sanitation, water supply, drainage, food and drink, birth and death registration, vector and infectious disease control, etc. for the residents. LGIs have the authority to address all related issues within their legal and administrative mandate.	The subproject aims to help KCC (as the LGI) achieve or fulfill these mandates.

Laws, Regulations, and Standards	Details	Relevance to Subproject
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 programs 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.	The exact location of the composting plant component of the subproject is not yet known. Hence, there is always a possibility that the final site will have to be cleared and will have potential tree cutting activities. However, it is expected that this will be minimal considering that the footprint for a composting plant is small and there are ways in designing the composting plant so as to avoid cutting of any tree in the area. As a precautionary measure, however, the subproject will implement the mitigation measures as indicated in this IEE.
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.	Provides for security and safety of work force during construction period. Compliance with this law is included in the responsibility of the Contractor of the proposed composting plant.

IEE = initial environmental examination, KCC = Khulna city corporation, LGI = local government institution.

F. International Environmental Agreements

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

Table 6: International Environmental Agreements Relevant to Second City Region Development Project

International Environmental Agreement	Year Ratified	Details	Relevance to Subproject
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. The development of a comprehensive solid waste management (SWM) plan and the engineering design of the composting plant component should consider climate change impacts, such as temperature rise, flooding and river water level rise. A climate change vulnerability assessment has been conducted for the geographic coverage of the entire Second City Region Development Project, 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	While Khulna city corporation is not a host to historically significant sites and monuments, the composting plant component of the subproject may have the potential of damaging or encroaching undiscovered historically and culturally significant relics underground the site (final site is yet to be identified). As a precautionary measure, the environmental management plan provides measures for any chance finds.

SWM = solid waste management, UNFCCC = United Nations Framework Convention on Climate Change.

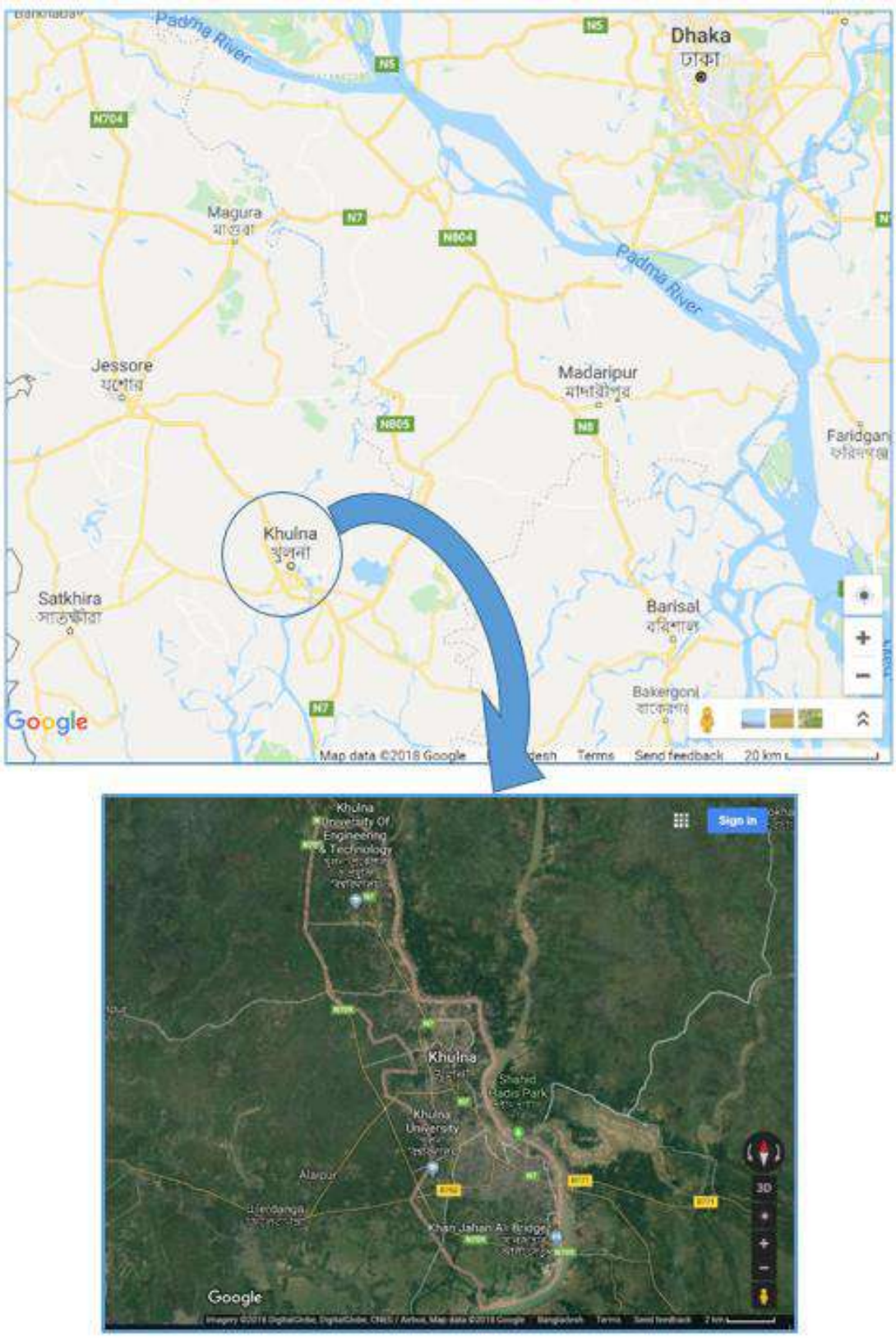
III. DESCRIPTION OF THE SUBPROJECT

A. The Subproject Area and Location

36. The location for the subproject is within KCC (the third-largest city in Bangladesh), which is about 333 kilometer (km) by road south-southwest from Dhaka. KCC lies at 22°49′0″N 89°33′0″E, and on the banks of the Rupsha and Bhairab river. It covers a total area of 59.57 square kilometer (km²) and is composed of 31 wards. KCC is the second port entry in Bangladesh and connected by road to Jessore in the north, Gopalganj in the East, Bagerhat in the south and Satkhira in the west. The location of KCC is shown in Figure 2. The proposed comprehensive solid waste management planning and small works subproject will cover KCC. The subproject will study and take into consideration the existing solid waste management practices in the city to come out with the comprehensive SWM plan — that will ensure compliance of future SWM undertakings with ADB SPS, 2009 and government laws, rules, and regulations.

37. The subproject will consist of two components, namely: (i) comprehensive SWM planning for a long term integrated SWM infrastructure for the entire KCC; and (ii) construction of a composting plant to help reduce the environmental impact of the current yet inadequately managed SWM in KCC.

Figure 2: Location of Khulna city corporation



source: google map.

38. The comprehensive planning component will involve preliminary non-infrastructure-related activities, while the composting plant component will involve small infrastructure works.

39. There are existing SWM activities in KCC which are discussed below in this section. However, these activities are regarded as crude in nature and cover a limited number of households and areas in the city. Therefore, a comprehensive SWM will ensure that the system in place is long term, inclusive, and cover all areas and communities of the city.

40. Based on the result of the comprehensive SWM planning, the subproject will establish a composting plant that will help manage in the interim the existing solid waste generation in the city. In view of the environmental benefits of compositing, the composting plant will nevertheless play a big role in any future integrated solid waste management system that may be established as a result of the comprehensive SWM planning under the subproject. As such, the comprehensive planning will ensure to incorporate the relevance and role of this composting initiative in any SWM infrastructure plans that will be developed under the subproject.

B. Existing Solid Waste Management in Khulna city corporation

1. Solid Waste Generation and Characteristic

41. Khulna city corporation's population is currently at 799,113[14] and projected to be 1,588,094 inhabitants by 2035.[15] It is estimated that the average quantity of waste generated per capita in KCC is 0.3 kg/person/day,[16] which corresponds to 476 tons waste being generated daily.

42. The composition of the municipal solid waste can be found in Table 7.[17] It can be noted that food and vegetable waste make up 78.9% of the waste stream, or almost four fifths of all the generated waste. Lesser components are paper and paper products with 9.5% and plastics with 3.1%; indicating that packaging materials are not prevalent in KCC. Dust and ashes constitute 3.7% of the waste by weight and this could mostly come from the sweeping of streets, yards and houses.

Table 7: Physical Composition of Municipal Solid Waste
(Wet Weight %)

Municipal Solid Waste Component	Residential	Commercial	Institutional	Whole City
Food and Vegetables	86.0	40.1	16.0	**78.9**
Paper and Paper products	6.0	27.2	48.0	**9.5**
Polythene and Plastics	2.0	9.1	14.0	**3.1**
Textile and Woods	1.0	3.3	3.0	**1.3**
Rubber and Leather	0.5	0.8	0.0	**0.5**
Metal and tins	1.0	1.6	2.0	**1.1**
Glass and ceramics	0.5	0.6	0.0	**0.5**

[14] Government of People's Republic of Bangladesh. 2011. *Bangladesh Bureau of Statistics*.
[15] Population in 2035 is based on projection using the average household size reported on Bangladesh Bureau of Statistics 2011.
[16] The EU Asia Pro Eco Programme through the Waste Safe Project with the Khulna University of Engineering and Technology (KUET) has produced data of waste generation and waste characterization in 2007. Data was taken from five wards (Wards no. 1, 17, 18, 21, and 23) for different socioeconomic groups.
[17] Hifab (2016), Pre-feasibility study report for Khulna City Corporation, Consulting Services through Cities Development Initiative for Asia (CDIA) for TA-8556 REG-BAN: The Pre-Feasibility Studies and Preliminary Engineering in the Gazipur & Khulna City Corporations, Bangladesh, Hifab International AB, Sweden, in association with Otak, Inc., USA, BETS Consulting Services Ltd., Bangladesh, AQUA Consultant & Associates Ltd. Bangladesh.

Municipal Solid Waste Component	Residential	Commercial	Institutional	Whole City
Brick, concrete and stone	1.0	1.6	2.0	**1.1**
Dust, ash and soil	2.0	13.9	14.0	**3.7**
Other (e.g., bone and jute)	0.5	2.4	2.0	**1.2**
Total	100.0	100.0	100.0	**100.0**

43. The above waste composition suggests that around 80% is organic in nature that can be converted into usable and marketable compost material. If properly segregated, collected and processed into organic compost, this amount of waste can significantly reduce the volume of residual waste that need to be disposed and treated in the end. Hence, composting is a necessary component for a successful SWM in the city. This option will be further studied in the comprehensive SWM planning under the subproject.

44. There are more than 129 hospitals, private clinics and pathological laboratories in the city. Of these, 5 are government hospitals, 59 are private clinics with more than 2,000 beds, and 65 are other types of pathological laboratories and diagnostic centers. It is estimated that the generation rate for medical waste is 0.25 kg/bed/day and the total generated amount is about 500 kilograms per day.

45. Two slaughterhouses that currently operate in KCC generate about 2 to 3 tons of waste per day.

2. Waste Collection

46. The following are two types of solid waste collection systems that are presently utilized in KCC:

(i) **Conventional System**. The households carry their wastes to the nearest roadside bins or similar facilities provided by KCC. KCC then collects the deposited wastes and transfer them to the final disposal site at regular intervals.

(ii) **Community Based Door-to-Door Collection System.** Waste collector collects wastes from houses every day by utilizing a rickshaw van, and then takes the collected wastes to a nearby transfer point. The collector gets a monthly fee from every household. The wastes are then transported from the transfer point to the final disposal site by KCC trucks.

47. Door-to-door collection is carried out by local NGOs and CBOs and transport the collected waste to the nearest secondary transfer station (STS) or collection point. About 65 tricycle rickshaw vans are operated by these local NGOs and CBOs for this purpose. However, this scheme covers only approximately 10% of the total domestic waste sources in the city. There is no collection system for majority of households and most residents take their wastes to the nearest STS or collection point. The situation is aggravated by the prevalent practice of mixing all types of wastes at the household level, wherein these wastes are stored in a single bin and collected mixed as they are by trucks. At worst, more than 50% of the generated domestic wastes is not collected and transported to the dumpsite. Most of this uncollected garbage often end up at roadsides and eventually carried down the drains and canals. This scenario presents a serious threat to people's health and pollution to the surrounding environment. Table 8 shows the NGOs and CBOs engaged in solid waste collection in the Khulna city corporation.

Table 8: Nongovernment Organizations and Community-based Organizations Involved in Solid Waste Collection in Khulna city corporation Area

No.	Name of NGOs/ CBOs	Working area Ward No.	No. of Households covered	Manpower Involved	No. of Vans	Revenue Earned (Tk/month)	Expenditure (Tk/month)
1.	Nabarun Shanshad	24, 27 (P)	1,500	12	7	26,000	16,000
2.	Muktir Alo	21, 23	1,400	10	6	12,000	11,600
3.	Goti	20 (P)	420	2	1	4,200	3,500
4.	CHD	16 (P)	500	7	3	5,000	4,200
5.	AOSED	25 (P), 26 (P)	1,485	11	5	20,000	16,000
6.	Proshanti	30	1,200	9	4	14,000	10,000
7.	Rustic	17, 18 (P)	4,200	24	11	84,000	70,900
8.	SIAM	25 (P), 26 (P)	1,200	9	4	12,000	15,200
9.	Rupayon	19, 20 (P)	2,000	12	5	20,000	15,900
10	SPS	9, 14, 15 (P)	1,550	10	6	15,000	14,200
11	Commitment	11 (P)	450	3	1	4,500	3,000
12	Clanship	16 (P), 17 (P)	750	4	2	7,500	5,000
13	Shamadhan	13, 15 (P)	1,200	9	4	15,000	13,200
14	Protisruti	22	1,900	5	2	9,000	7,000
15	BRIC	4, 7	1,377	9	4	13,000	11,300
16	Environmental Development Group	6, 12, 24, 27, 28					
	Total		**21,132**	**136**	**65**		

CBO = community-based organization, NGO = nongovernment organization, Tk/month = taka per month.
Source: Conservancy Department, KCC 2016.

3. Present Waste Storage and Transfer System

48. Four STS have been built under the ADB-funded Urban Public and Environmental Health Sector Development Project[18] and currently being used. However, these secondary transfer stations are underutilized due to lack of coordinated and efficient solid waste collection and hauling in the city. Photos of the actual situation at some of these STS are in Figure 3 below.

Figure 3: Actual photos of an existing secondary transfer station in Khulna city corporation

[18] ADB. *Bangladesh: Urban Public and Environmental Health Sector Development Program (Program Loan)*.

49. Presently, open spaces on roadsides are used to store solid waste, either directly on the pavement or using concrete bins or metal skips. Sustaining schedules for waste collection and transport has been a challenge due to insufficient number of road-worthy or functioning vehicles. The functioning vehicles may be able to transport some wastes from these locations to the secondary transfer stations, and eventually to the dumpsites. However, significant amount of solid wastes still remains unhauled from various collection points. This situation results to accumulation of wastes on the roadsides and causes nuisance to the neighborhoods due to odor from decaying wastes and proliferation of disease vectors in the area. Rains during monsoon season and occasional rains during other seasons also wash down leachate and solid wastes to nearby canals. These canals eventually drain out and pollute the receiving bodies of water in the city such as the Rupsha river. Table 9 shows the inventory of existing fleet of equipment being used by KCC.

Table 9: Equipment Used for Waste Collection and Transport by Khulna city corporation

Vehicle Types	**No. of Vehicles**	**Pay-load** (tons)
Dump truck (L)	9	7
Dump truck (M)	8	5
Covered truck	3	5
Container carrier (L)	5	5
Container carrier (M)	8	3
Container carrier (L, Double container)	5	5
Open truck	16	3
Front end loader	4	
Excavator	1	
Skips	65	
Tri-cycle rickshaw vans	144	
Hand carts	76	

Source: Conservancy Department, Khulna city corporation.

4. Waste Recycling and Treatment

50. About 8% of the total generated waste in the city is recycled by the informal sector.[19] It is estimated that 40 tons solid waste is recycled and recovered by the primary level of stakeholders such as households and scavengers. The livelihood of 10,000-15,000 people depends on this recycling value chain. A separate study[20] found that there are 450 dealers of recyclables in KCC, and that these dealers all together handle about 41.23 tons of recyclable materials daily. These dealers process mainly paper, plastic, iron, animal bone, tire or rubber, glass and aluminum.

51. Based on a characterization of the solid wastes in the city (footnote 17), nearly about 80% of the waste are organic materials, and therefore the initiative to undertake composting will obviously help in the reduction of wastes being disposed at final disposal sites. Several groups such as NGOs have been doing the composting initiative for several years now. However, the coverage and scale of these composting activities are too small and may need substantial support.

[19] Salequzzaman M, M.A. Salam, M.A. Kashem, M.U. Rahman, S.M.T. Islam, S. Jahan& M. Wahiduzzaman. 2009. Domestic Solid Waste Management towards the Sustainable Resource Recovery Option in Khulna City Corporation of Bangladesh.

[20] Bari QH, Mahbub Hassan K, Haque R. Scenario of solid waste reuse in Khulna city of Bangladesh. Proceedings of the Waste Safe.

5. Hospital Waste Management

52. It is estimated that only around 1% of the total solid waste generation in KCC is from medical facilities like hospitals. Only 10%-25% of the hospital waste is infectious or hazardous. Therefore, the amount of medical waste is quite small. However, even with this small amount of medical wastes, the handling process still poses potential hazard to the people and environment. The lack of effective segregation tends to mix medical wastes with domestic wastes at any one point from collection to disposal. This gives rise to the risk of infections among solid waste management personnel, including the spread of diseases due to improper handling of the medical wastes (footnote 17).

6. Slaughterhouse Waste Management

53. Another added burden to the solid waste problem in KCC is generation of slaughterhouse wastes. At present, about 150 animals are slaughtered daily at two slaughterhouses in KCC. The generated waste is transported by trucks on irregular basis and disposed of in the existing dumpsites. Not only does the slaughterhouses produce solid waste but also generate high strength wastewater that is discharged indiscriminately causing pollution to the nearby water bodies.

7. Final Waste Disposal in Khulna city corporation

54. Khulna city corporation has two existing dumpsites that are being operated by KCC. The bigger dumpsite is located at Rajbandh-1, which is around 7 km from the city center and along the Khulna-Satkhira road. The Rajbandh-1 dumpsite has an area of approximately 8.1 hectares (ha). The other dumpsite is also located near Rajbandh-1 dumpsite and tagged as Rajbandh-2 dumpsite. Rajbandh-2 dumpsite has an area of around 2 ha. Rajbandh-2 dumpsite is where medical wastes are disposed. See Figure 4 for the actual photos taken from Rajbandh dumpsites.

Figure 4: Photos showing Existing Condition at Rajbandh Dumpsite

55. At present, KCC has identified a new location which was proposed as the future SWM site. This new location is tagged as “Scholua” site, which has an area of approximately 6.9 ha. However, site visit reveals that some portions of the site have already been used as dumping area for solid wastes.

Figure ***5*** shows the photos taken from the site. Accordingly, if the land area is enough, this site will be utilized by KCC to implement the comprehensive SWM plan that is yet to be developed under the subproject.

Figure 5: Photos showing Existing Condition at the Scholua Site

56. It is also observed that one section of the main road in Mathavanga area (outside the city center) is also utilized as dumping site. Figure 6 shows the vicinity of this dumping area. Accordingly, the land adjacent this section of the road is owned by KCC. This land is also a potential area for any future SWM facilities as may be recommended by the comprehensive SWM plan to be developed under the subproject.

Figure 6: Photos showing a Dumping Area along the Main Road in Mathavanga

57. The situations of solid waste management as described above justify the need for KCC to develop a realistic and comprehensive SWM plan that will ensure a long term, inclusive and environmentally sustainable solution to the exacerbating SWM condition in KCC.

IV. DESCRIPTION OF THE ENVIRONMENT

A. Location

58. The location of the subproject is the jurisdictional area of KCC, the third largest city in Bangladesh, which is about 333 km by road south-southwest from Dhaka, at 22°49′0″N 89°33′0″E, on the banks of the Rupsha and Bhairab river. It is the second port entry in Bangladesh. It covers a total area of 59.57 km² and composed of 31 wards. The proposed subproject will cover the entire city corporation boundaries, which comprise mostly of urban landscapes, and some peri-urban and semi-rural environments.

B. Physical Resources

1. Climate

59. Bangladesh is located at the central part within the Asiatic monsoon region where the climate is tropical. Relatively small size of the country and generally low-lying area cause moderate variation in terms of temperature, precipitation, relative humidity and wind speeds.

60. The region has a tropical climate. There are two marked seasons: (i) the rainy seasons from May to October, during which more than 85% of the total annual rainfall occurs; and (ii) the dry season from November to April. The beginning of the rainy season varies from year to year, heavy rains may commence anywhere between mid-April and early June and may end anywhere between the end of September and mid-November.

2. Precipitation and Humidity

61. The general pattern of precipitation (which consists entirely of rain) follows the monsoon pattern with the cooler, drier months of November to March, increasing rains in April and May and highest rainfall in the summer months of June to September when the prevailing wind direction from the southwest brings moisture laden air from Bay of Bengal. Average monthly rainfall and humidity values for the study area are given in Table 10.

62. Khulna is humid during summer and pleasant in winter. Khulna has an annual average temperature of 26.3 °C (79.3 °F) and monthly means varying between 12.4 °C (54.3 °F) in January and 34.3°C (93.7°F) in May. Annual average rainfall of Khulna is 1,809.4 millimeters (71.24 in). Approximately 87% of the annual average rainfall occurs between May and October. Annual averages of temperature are presented in Figure 7 and Figure 8, while annual averages of precipitation and humidity are presented in

Figure ***9*** and

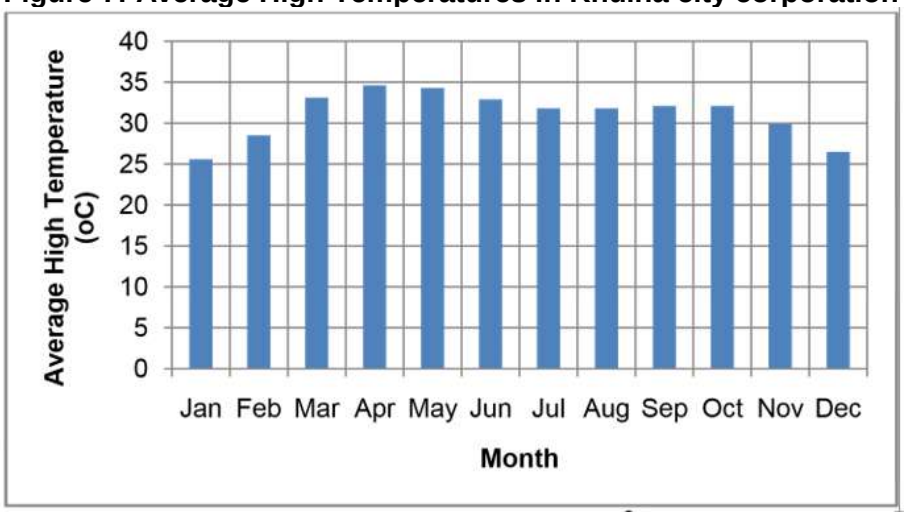
Figure ***10***, respectively.

Table 10: Rainfall and humidity characteristics of the study area

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average precipitation (mm)	13	44	52	88	200	336	330	324	255	130	32	6.6
Average relative humidity (%)	78	74	73	76	79	85	87	86	87	84	80	79

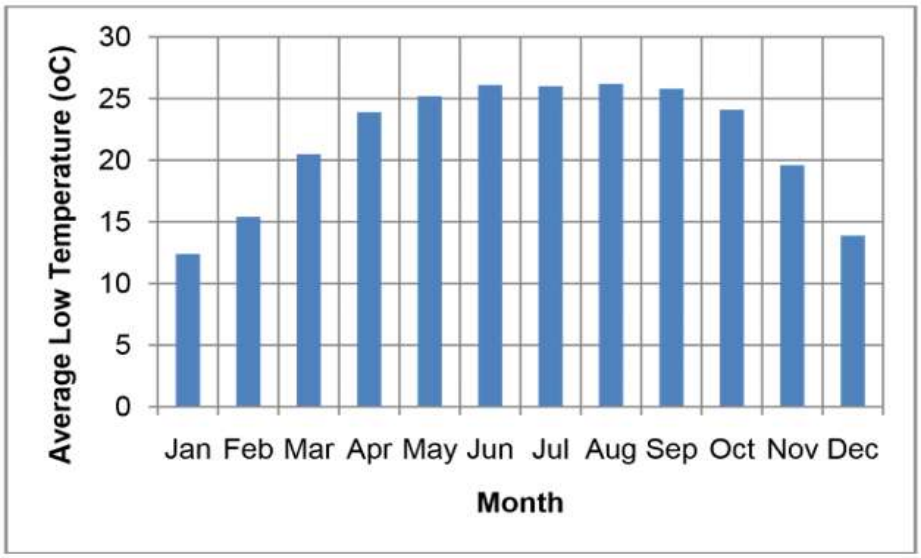
Source: *Bangladesh Meteorological Department*.

Figure 7: Average High Temperatures in Khulna city corporation



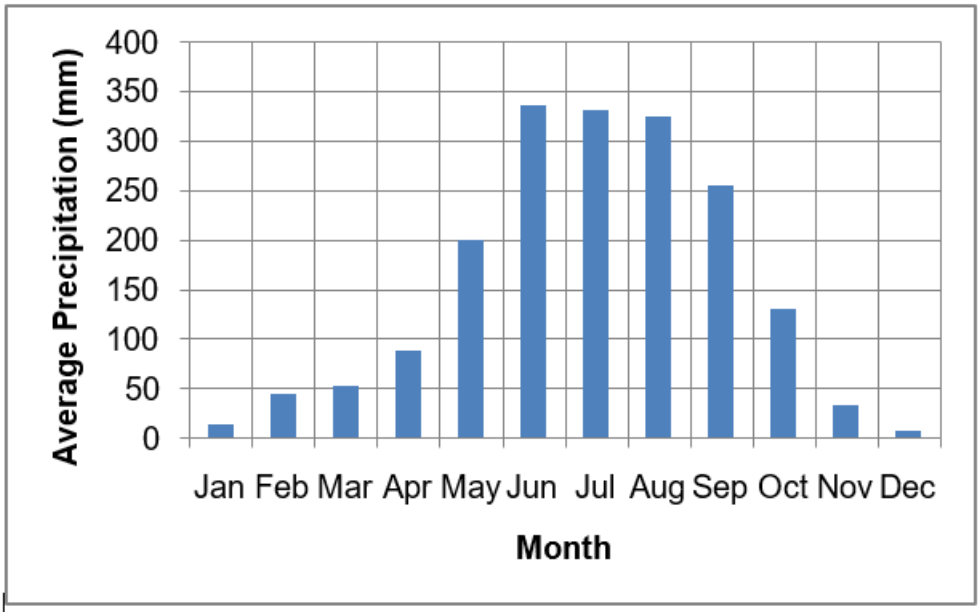
Source: *Bangladesh Meteorological Department*.

Figure 8: Average Low Temperature in Khulna
(°C)



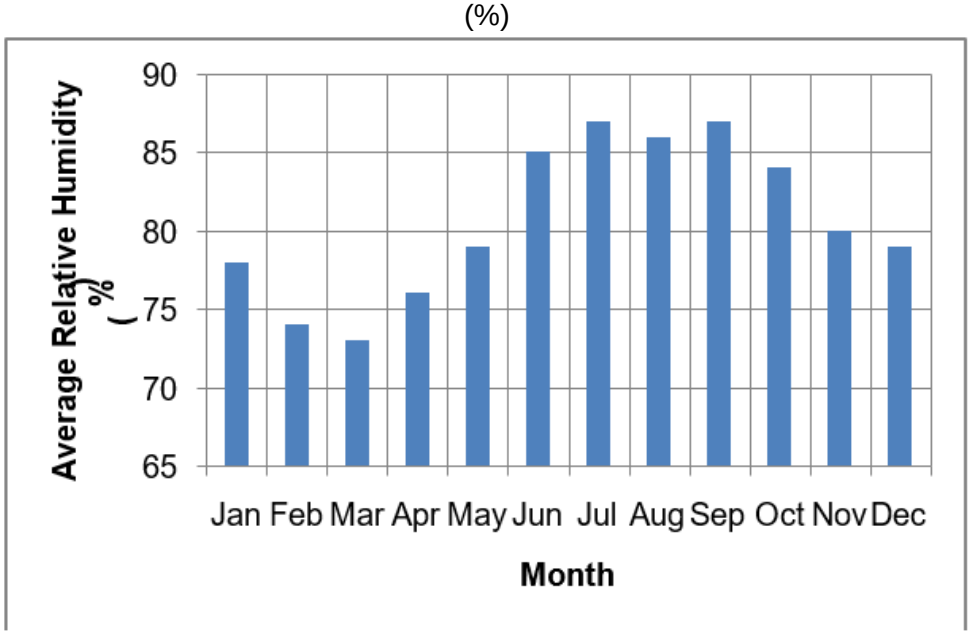
Source: *Bangladesh Meteorological Department*.

Figure 9: Average Precipitation in Khulna city corporation



Source: *Bangladesh Meteorological Department*.

Figure 10: Average Relative Humidity in Khulna



Source: *Bangladesh Meteorological Department*.

3. Topography, Soil and Geology

63. Khulna city corporation is a part of the lower Ganges-Brahmaputra River floodplain as per the national classification. In this region, the soil is predominantly silty with silty loams on ridges and silty clay loams in depressions. The area is generally flat and poorly drained. Soils are somewhat porous allowing for some seepage of surface water into the soil. Channelized drainage covers most of the land, in which slowly draining streams transport surface runoff to the Bhairab and Rupsha Rivers.

64. Because of this low elevation in KCC, any infrastructure developments related to SWM such the proposed composting plant should be elevated, and earth filling may be required. This will be a standard parameter in designing the infrastructure.

4. Earthquakes

65. Khulna is located in a seismic zone III,[21] referred to as the low risk zone for earthquake in the country. Seismic events in Bangladesh are relatively infrequent, but there have been severe earthquakes recorded in history, such as the earthquakes of 1930, 1950 and 2004. To address any potential impacts due to seismic activities, provisions of the Bangladesh National Building Code (BNBC) 1993 and 2006 shall be strictly followed in the detailed designs of project components, apart from consideration of seismic vulnerability in the specifications for the design and construction of the works.

[21] The National Seismic Zoning Map produced by the Geological Survey of Bangladesh (GSB) divides the country into 3 regions: (i) a high-risk zone between Mymensingh and Sylhet in the north and northeast; (ii) a medium-risk zone stretching diagonally from Rajshahi in the northwest through Dhaka and Comilla to Chittagong and Cox's Bazar in the southeast; and (iii) a low-risk zone in the south and southwest, around Khulna and Barisal.

5. Surface Water Resources

66. The main rivers that interact with the project are Rupsha, Bhairob and Moyur. The river system in the Khulna watershed includes Rupsha, Bhairob, Moyur, Kabodak and Pashur Rivers. Khulna city region is in the natural floodplain of the various rivers in the area and functioned as an important breeding ground for many aquatic species in the past. This function is still evident in the seasonal flooding that affects large parts of the area. The floodplain function has been further degraded by the construction of embankments to protect the city from flooding.

67. Due to encroachment and disposal of solid and liquid wastes into canals, several areas of the city have become vulnerable to water logging. All the rivers receive untreated sewage and industrial liquid wastes, and municipal waste through the major canal systems, as well as from direct disposal from various sources.

68. Baseline information on river water quality will be gathered once the location of the proposed composting plant under the subproject is determined. Sampling will be conducted at the upstream and downstream of river water or receiving bodies of water that will be likely impacted by the subproject. This IEE will be updated to include this baseline information.

69. Available secondary data gathered for some canals in KCC reveal heavy water pollution.

70. Table 11 below shows the results of analyses on samples taken from these canals.

Table 11: Results of Analyses on Surface Water Samples from Selected Canals/Khals in Khulna city corporation

SL No	Water Quality Parameters	Unit	Mayur Khal (22°48′ 1.9″ N 89°32′ 24.2″E)	Sholuya River* (22°52′7.9″ N 89°28′42.4″E)	A Khal near Mathavanga* (22°45′ 52.7″N 89°34′34.5″E)	A Khal near Kaya Bazar* (22°47′ 23.7″ N 89°28′57.4″E)	National Standards
1	pH	--	8.25	8.77	8.15	8.43	6.5-8.5
2	Biochemical Oxygen Demand (BOD_5) at 20°C	mg/L	45	32	18	22	3 or less
3	Dissolved Oxygen (DO)	mg/L	0.56	1.56	5.58	0.68	5 or above
4	Fecal Coliform (FC)	CFU /100ml	TNTC	TNTC	TNTC	TNTC	200 or less

CFU = colony-forming unit, mg/L = milligram per liter, ml = milliliter, TNTC = too numerous to count.
Source: Waste Water Management Master Plan. Khuna Water Supply and Sewerage Authority (KWASA).

6. Groundwater Resources

71. Water aquifers are present beneath the vast majority of Bangladesh, which are being recharged by the major river systems and by infiltration of rainwater. Most ground water is available within 5 m of the surface. This level fluctuates seasonally, approaching the ground surface over most of the country during the months July to September.

72. Local ground water represents a stable source of water for various activities including irrigation (both shallow and deep tube wells), domestic purposes (hand pumps) and industrial applications (deep tube wells).

73. The local groundwater level is lowered to approximately 3-5 m below ground level during the dry seasons, with levels returning to their normal position before the end of the monsoon. This

fall in ground levels is an entirely natural process that arises because of the hydrological link with the river.

74. Baseline information on groundwater quality will be gathered once the location of the proposed composting plant is determined. Sampling will be conducted at the upstream and downstream relative to the groundwater flow profile at the proposed composting plant site. This IEE will be updated to include this baseline information.

7. Air Quality

75. While the location of the proposed composting plant has not been identified as yet, no information is available on site-specific ambient air quality. Baseline information on ambient air quality will be gathered once the location of the proposed composting plant is determined. This IEE will be updated to include this baseline information.

76. Secondary data on air quality monitoring activities conducted at various locations in KCC reveal mixed results in terms of compliance with the standards prescribed by the ECR. Table 12 below shows the results of ambient air quality sampling in 2016 which were reported in the Khulna Water and Sewerage Authority (KWASA) masterplan. All parameters are in compliance with the standards, except for one location in Mathavanga area where SO_2 value is extremely high.

Table 12: Results of Ambient Air Quality Monitoring at Various Locations in Khulna city corporation

S. No.	Air Quality Parameters	Unit	MathaVanga, (22°45′52.7″N 89°34′34.5″E)	CastomGhat, (22°48′44.5″N 89°34′37.9″E)	RupshaBridge (22°46′40.4″ N 89°34′53.9″E)	NiralaGate, (22°48′10.5″N 89°33′21.4″E)	ShibbariMor, (22°49′19.9″N 89°33′11.3″E)	Standard Values Per ECR
1.	CO	µg/m^3	0	0	0	0	0	2,000
2.	NO_2	µg/m^3	0	0	0	0	0	80
3.	SO_2	µg/m^3	400	0	0	0	0	80
4.	SPM (PM_{10})	µg/m^3	100	90	115	95	110	200

CO = carbon oxide, µg/m^3 = microgram per cubic meter, NO_2 = Nitrogen Dioxide, SO_2 = sulfur dioxide, SPM = suspended particulate matter.
Source: Waste Water Management Master Plan KWASA.

77. Analysis of this set of data from the KWASA masterplan explains that the elevated SO_2 value in Mathavanga could be due to various brick kilns operating in the area. Therefore, should the proposed location of the composting plant is located in any of these areas, the baseline monitoring will validate the figures and will be included in the updating of this IEE.

8. Noise Level

78. Similarly, while the location of the proposed composting plant has not been identified as yet, no information is available on site-specific ambient noise level. Baseline information on ambient noise level will be gathered once the location of the proposed composting plant is determined. This IEE will likewise be updated to include this baseline information.

79. In the same KWASA masterplan, noise level was measured in the same locations where the ambient air quality measurements were gathered as indicated in Table 12. Table 13 shows the results, which reveal compliance with the ambient noise standard per ECR for mixed area category.

Table 13: Ambient Noise Level Measurements at Various Locations in Khulna city corporation

Sl. No.	Location	Measured Sound Level dB(A) for day time	Standard per Environmental Conservation Rules (Mixed Area Category) db(A) for day time	Standards per WHO guidelines for day time in mixed areas, dB(A)
1.	MathaVanga (22°45' 52.7" N, 89° 34' 34.5" E)	48±2	60	55
2.	CastomGhat (22° 48" 44.5" N, 89° 34'37.9" E)	47±2	60	55
3.	Rupsha Bridge (22º 46' 40.4" N, 89° 34' 53.9" E)	59±2	60	55
4.	NiralaGate (22° 48' 10.5" N, 89° 33' 21.4" E)	57±2	60	55
5.	ShibbariMor (22° 49' 19.9" N, 89° 33' 11.3" E)	53±2	60	55

C. Biological and Ecological Resources

80. There are no endangered species or critical habitats in Khulna city corporation. The ecological environment is characterized by a human-managed landscape. In the study area, terrestrial floras are present mainly in the homestead regions, roadsides, village groves, picnic spots, and upland or high cultivated lands. Homesteads and orchards have the following: betel nut, kadam, coconut, date palm, sofeda, mango, jackfruit, pomegranate, guava, grapefruit, lemon, blackberries, plum, toddy palm, koroi, shisoo, shirish, rain tree, evcaiytta, bamboo, babla, jeol, neem, tamarind, banana, ipil-ipil, papaya, mehgani, debdaru, shimul, akashmoni, khai babla, jamrul, chalta, bel, amra, amloki, segun, etc. Roadside plantations include: datepalm, road chambol, koroi, krishnachura, rain tree, banyan, shisoo, babla, akashmoni, eucalyptus, mango, blackberries, raj koroi, etc. Fish species include rui, katla, thai puti, minar carp, silver carp and shrimp. None of these species are listed as Threatened, Nearly Threatened or Rare in the IUCN Red List. Table 14 shows the summary of the various species found in the city.

Table 14: Terrestrial and Aquatic Flora and Fauna Resources In Khulna city corporation (the Project Area)

SL No.	Local Name	Scientific Name	Status
Terrestrial Flora			
1.	Betel nut	Areca catechu	Fairly Common
2.	Mashkalai (type of pulse)	Phaseolus mungo roxb	Fairly Common
3.	Potato	Solanum tuberosum	Fairly Common
4.	Ground Nut	Arachis hypogea	Fairly Common
5.	Ginger	Zingiber officinale	Fairly Common
6.	Wheat	Triticum aestivum	Fairly Common
7.	Til	Sesamum indicum	Fairly Common
8.	Kumra	Cucurbita maxima	Fairly Common
Terrestrial Fauna (Reptiles			
1.	Anjila	Mabuya carinata	Common
2.	Dhura Shap	Amphiesma stolata	Common
3.	Matia Shap	Atretium schistosum	Common
4.	Tiktiki	Hemidactylus brooke	Common
5.	Daraish Shap	Ptyas mucosus	Fairly Common
6.	Gui Shap	Varanus nubulosus	Fairly Common
Terrestrial Fauna (Mammals)			
1.	Babur	Pteropus giganteus	Common

SL No.	Local Name	Scientific Name	Status
2.	Idur	Mus musculus	Common
3.	Shial	Vulpes bengalensis	Common
4.	Chika	Pipistrellus. Sp	Common
5.	Beji	Herpestes	Fairly Common
Avifauna (Birds)			
1.	Choroi	Passer domesticus	Common
2	Doyel	Opsychus sularis	Common
3.	Kak	Carvus splendens	Common
4.	Ghugho	Streptapelia Orientalis	Common
5.	Shalik	Stuma contra	Common
6.	Tuntuni	Orthotomus sutorius	Common
7.	Machranga	Helcyon smyrrensis	Fairly Common
8.	Haludpakhi	Oriolus xanthornus	Fairly Common
Insects			
1.	Dragon fly nymph	Odonata	Fairly Common
2	Damsel fly nymph	Odonata	Fairly Common
3.	Water strider	Hemiptera	Fairly Common
4.	Midge	Diptera	Fairly Common
5.	Flies	Diptera	Fairly Common
6.	Ant	Hymenoptera	Common
7.	Caddisfly	Trichoptera	Fairly Common
Fish (Small fishes)			
1.	Pabda	Ompoc pabda	Fairly common
2	Golsha	Mystus cavasius	Fairly common
3.	Bele	Glossogobius giuris	Fairly common
4.	Tengra	Mystus vittatus	Common
5.	Puti	Puntius conchonius	Common
6.	Fali	Notopterus notopterus	Fairly common
7.	Kachki	Corica suborna	Fairly common
8	Mola	Amblypharyngodon mola	Common
9	Kakila	Xenentodon cancila	Fairly common
10	Chapila	Gudusia chapra	Fairly common
11	Kholisha	Colisha fasciatus	Common
12	Chingri	Macrobrachium eqidense	Common
13	Shol	Channa striates	Common
14	Taki	Channa punctatus	Common
15	Shing	Heteropneustes fossilis	Fairly common
16	Koi	Anabas testudineus	Fairly common
17	Gozar	Channa marulius	Fairly common
18	Chela	Chela cachius	Fairly common
Fish (Big fishes)			
1	Rui	Labeo rohita	Common
2	Katla	Catla catla	Common
3	Kalibaush	Labeo calbasu	Common
4	Boal	Wallago attu	Common
5	Ayre	Sperata aor	Fairly Common
6	Bain	Mastacembelus armatus	Common
7	Chital	Chitala chitala	Fairly Common
8	Fasha	Setipinna phasa	Fairly Common
9	Bata	Liza Persia	Fairly Common
10	Magur	Clarius batrachus	Fairly Common
11	Dari	Scistura scaturigina	Fairly Common

D. Socioeconomic Resources

1. Demography and Population[22]

81. As of 2011, KCC has a population of around 799,113 based on the census made by the Bangladesh Bureau of Statistics (footnote 14). Based on this population, projections have been made for the populations expected in future years. Table 15 below shows the results of calculations to estimate population for years 2016, 2021, 2026, and 2036. These projections may be used by the subproject in achieving an effective comprehensive SWM plan for KCC. In particular, these projections will be used in designing the proposed composting plant under the subproject.

Table 15: Population Projections for Khulna city corporation Area

Administrative Unit	Population			
	2016	2021	2026	2036
KCC Area	**1,100,658**	**1,213,708**	**1,340,579**	**1,616,689**
Daulatpur Thana	161,136	177,687	196,261	236,683
Khalishpur Thana	328,877	362,656	400,565	483,067
Khulna Sadar Thana	358,154	394,941	436,225	526,070
Sonandanga Thana	252,491	278,425	307,529	370,868

Source: Projections gathered from the Final Pre-Feasibility Report for Khulna city corporation under ADB TA-8556 REG-BAN: The Pre-Feasibility Studies and Preliminary Engineering in the Gazipur and Khulna city corporations, Bangladesh.

82. Density of population is about 19,000 per km^2. The literacy rate among the urban people of Khulna is 59.1%, which is higher than the national average of 56.5%. Most of the people in Khulna are the Bengali people, as is the case in most of Bangladesh. The long-standing inhabitants of the city are known as Khulnaiya. Apart from them, the city population is composed of people from the neighboring districts and from the greater Barisal and Faridpur regions of Bangladesh. Many people from greater Noakhali region also reside in the city. Khulna also has a significant number of Bihari population (footnote 22).

83. Most residents of Khulna speak Bengali, the national language. Many distinctive Bengali dialects and regional languages are also spoken. English is understood by a large segment of the population, especially for business purposes. There is a minority Urdu-speaking population, who are descendants of displaced Muslims from eastern India during 1947 and sought refuge in East Pakistan. Islam is the major religion in Khulna, approximately 80.12% people are Muslim, and the proportion of other religions are: Hindu 19.11%, Christian 0.67%, Buddhist 0.04%, and Others 0.06% (footnote 22).

2. Economic Activities

84. Khulna is the third largest economic center in Bangladesh. It is situated north of the Port of Mongla and has various heavy and light industries. The major sectors are jute, chemicals, fish and seafood packaging, food processing, sugar mills, power generation and shipbuilding. The region has an Export Processing Zone, which has attracted substantial foreign investments. The city is home to the corporate branch offices of numerous national companies, including among others, M. M. Ispahani Limited, Beximco, James Finlay Bangladesh, Summit Power and the Abul Khair Group. Some of the largest companies based in the city include Khulna Shipyards, Bangladesh Oxygen, Platinum Jubilee Mills, Star Jute Mills and the Khulna Oxygen Company.

[22] Wikipedia, The Free Encyclopedia. *Khulna – Demographics*.

85. Main sources of income are: (i) agriculture - 31.18%, (ii) non-agricultural labor - 5.55%, (iii) industry - 1.66%, (iv) commerce - 29.34%, (v) transport and communication - 6.99%, (vi) construction - 3.11%, (vii) religious service - 0.21%, (viii) rent and remittance - 1.84%, and (ix) others - 20.12%. Ownership of agricultural land is: (i) landowner - 46.45%, and (ii) landless 53.55%.

86. Main crops in the city are paddy, wheat, sesame, mustard, onion, garlic. Extinct or nearly extinct crops is jute. Main exports of the city are prawn, crab, ready-made cloths.

3. Physical Cultural Resources

87. KCC is not a host to any archaeological sites or protected historical heritage sites. The city has numerous religious institutions such as Town Jami Mosque, Tutpara Puratan Bara Jami Mosque, Baitul Aman Jami Mosque, Dolkhola Tabligh Mosque, Bazar Kalibari Mandir, Ayra Dharmasabha Mandir, and Shitalabari Mandir. However, none of these structures is listed as critical historical or religious sites protected by the Bangladesh Department of Archaeology.

V. ASSESSMENT OF ENVIRONMENTAL IMPACT OF THE SUBPROJECT

A. Methodology

88. **Assessment of compliance with subproject selection criteria**. Based on the EARF, any infrastructure components under the subproject will comply with the subproject selection criteria in

Table ***16***. Specifically, assessment of compliance of the components will be done during the final detailed design and included in the updating of this IEE.

Table 16: Compliance Matrix with Subproject Selection Criteria

Components	Criteria
Comprehensive Solid Waste Management (SWM) Planning	Ensures that the conduct of comprehensive SWM planning itself does not trigger environmental category A per ADB Safeguard Policy Statement (SPS), 2009.
	Introduces elements of 3Rs (reducing, reusing, and recycling wastes), including composting in the overall SWM planning. This includes waste characterization, waste categorization, waste collection, waste processing and diversion.
	Ensures sufficient capacity for collection, transfer and disposal, perform site selection for proposed disposal sites and assure there is a practical operations and maintenance plan in place for sustaining the system over the period until all infrastructures for an integrated SWM are in place in the future.
	Provides for capacity building of project implementation unit (PIU) staff on waste management practices.
	Ensures detailed designs and environmental safeguards conditions are included in the planning.
Composting Plant	Complies with all requirements of relevant national, state and local laws, rules and regulations.
	Complies with all requirements of ADB SPS, 2009, and follow procedures set down in the environmental assessment and review framework.
	Does not trigger environmental category A per ADB SPS. In particular, the composting plant shall not include any components or activities that 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.
	Does not include and/or involve any activities listed in ADB's Prohibited Investment Activities List (Appendix 5 of ADB SPS). These activities do not qualify for ADB's financing.
	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.
	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.
	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.
	Reflects inputs from public consultation and disclosure for site selection.
	Provides for appropriate protection/mitigation measures to address noise impacts on adjoining communities, especially sensitive receptors as schools/hospitals along the roads. Locate composting plant away from houses, sensitive buildings like schools, hospitals, religious places etc., with distance enough that odor nuisance and disease vectors will not impact these receptors.
	For subproject components that may affect natural streams or rivers, all comments and advice received from project management and coordination unit (PMCU), PIU, design engineers, and appropriate departments are incorporated into the planning, design and construction of the subprojects as far as practicable.
	The design of small works such as a composting plant shall be finalized in accordance with the specific recommendations of the comprehensive SWM plan. Therefore, the design, construction and operation and maintenance (O&M) of a composting plant or any other small SWM infrastructures shall commence only after the comprehensive SWM planning is done, unless a separate SWM expert is hired for the composting plant component. The engagement of a separate SWM expert shall ensure that the composting plant is designed and constructed in accordance with the comprehensive SWM plan that is yet to be developed. As such, the SWM expert shall be closely coordinating with the comprehensive SWM planning team.
	Provides for (i) capacity building of PIU staff on composting plant operation and maintenance, and (ii) market study on the users of compost to assess sustainability of the demand for such compost.
	Ensures detailed designs and environmental safeguard conditions are included in the planning.

O&M = operation and maintenance, PIU = project implementation unit, PMCU = project management and coordination unit, SPS = Safeguard Policy Statement, SWM = Solid Waste Management.

89. **Comprehensive Solid Waste Management Planning.** The comprehensive planning activity for an integrated SWM system for KCC will be an interdisciplinary exercise involving various sector and sub-sector specializations, including environmental safeguards, environmental

engineering, climate change, social safeguards, finance, economics, human resources, and many others. However, this IEE will focus primarily on the environmental safeguard issues that may be relevant in the comprehensive SWM planning for the city. Research has been made on internationally accepted and best practices in SWM. Based on this research work, recommendations are provided in this IEE to ensure that the planning will follow the step-by-step process of developing a comprehensive SWM and come out with a plan consistent with these best practices.

90. **Composting.** The small works component of the subproject will be the construction of a composting plant in KCC. The details of this composting plant are not yet known and considerably at conceptual stage. However, since composting is not a new scheme but rather one of the basic components of fulfilling an environmentally sound SWM, this IEE will rely on the rudiments of composting found in literature, as well as reports on successful practices around the world. As such, the impacts presented in this section are related to the commonly encountered issues of implementing a composting scheme in developing countries like Bangladesh.

91. **Construction Method.** The construction of any common composting plant will not require extensive civil works that could heavily impact the environment. Civil works are not expected to have deep excavation activities. Similar to other normal light construction works for composting plants, trenches will be dug by backhoe digger, supplemented by manual digging where necessary. Expectedly, the infrastructures will be constructed using human manual labor. Any disturbed landscape within the vicinity of the site will be restored to original or better condition after the construction works.

B. Screening Out Areas of No Significant Impact

92. From the results of the rapid environmental assessment, it is clear that the composting infrastructure component will not have major negative impacts because the component itself is an environmentally beneficial undertaking. There may be small construction works that have impacts, but these are regarded as localized and/or site-specific and short in duration. Because of these, there are several aspects of the environment that are not expected to be affected by the subproject and thus can be screened out of the assessment at this stage but will be assessed again during detailed design stage and before implementation. Table 17 shows the summary of areas with no significant impacts.

Table 17: Fields in Which the Subproject Is not expected to have Significant Impacts

Field	Rationale
A. Physical Characteristics	
Topography, landforms, geology and soils	Required amount of materials will not cause alteration of topography, landforms, geology and soils. Erosion hazard is insignificant as trenching and excavation works will be conducted only during construction stage (short-term) and specific to sites in KCC-owned lands.
Climatic conditions	Short-term production of dust is the only effect on atmosphere. However, impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
B. Biological Characteristics	
Biodiversity	Activities being located in the built-up area of Khulna city corporation area will not cause direct impact on biodiversity values. The construction activities do not anticipate any cutting of trees.
C. Socioeconomic Characteristics	
Land use	No alteration on land use. Rehabilitation of existing Solid Waste Management is prioritized over new construction, using vacant government land and ROW.
Type of community spread	No alteration on type of community spread.
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will be located on KCC-owned lands and impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
Socioeconomic status	Subproject components will be located in KCC-owned land and existing ROWs thus there is no requirement for land acquisition or any resettlements. Manpower will be required during the 18-month construction stage. This can result in generation of contractual employment and increase in local revenue. Thus, potential impact is positive and long-term.
Other existing amenities for community welfare	Although construction of subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of KCC area where there are a variety of human activities, will result in impacts to the sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration. During operations stage, all impacts associated with the composting plant will be mitigated through the implementation of a well-prepared O&M manual following international best practices such as the EHS guidelines for Waste Management Facilities.
D. Historical, Cultural, and Archaeological Characteristics	
Physical and cultural heritage	There are no scheduled or unscheduled historical, archaeological, pale-ontological, or architectural sites of heritage significance listed by local and/or national authority and/or internationally (UNESCO) within or adjacent to subproject sites.

EHS = environmental, health and safety; KCC = Khulna city corporation; O&M = operation and maintenance; ROW = right-of-way; UNESCO = United Nations Educational, Scientific and Cultural Organization.

C. Anticipated Impacts and Mitigation Measures for Comprehensive SWM Planning – Planning and Design Phase

93. The planning and design phase for the KCC comprehensive SWM shall follow the basic steps suggested in international best practices documents such as ADB's Practical Guide on Integrated Solid Waste Management for Local Governments.[23] This IEE provides in Section IX hereof recommendations that can be considered in the planning stage of this component activity under the subproject.

[23] ADB. 2017. *Integrated Solid Waste Management for Local Governments. A Practical Guide*. Manila.

D. Common Anticipated Impacts and Mitigation Measures for Composting Plants – Planning and Design Phase

94. The small works component under the subproject such as the construction of composting plant will require proper planning and design as well. During the planning and design stage, some environmental issues may need to be addressed prior to conducting any civil works. Consistent with the subproject selection criteria in the environmental assessment and review framework for the project, Table 18 below summarizes some of the common planning and design issues in composting projects that should be taken into account to mitigate any potential environmental impacts. In view of the lack of specific technical information on the proposed composting plant under the subproject at this stage, this IEE will be updated based on the final detailed design of the composting plant and Table 18 will be revised accordingly.

Table 18: Common Anticipated Environmental Issues and Mitigation Measures for Composting Plant – Design Phase

S. No.	Environmental Issues for Consideration During Design Phase	Mitigation/Action During Design Phase
1.	Non-compliance with all requirements of relevant national and local laws, rules, and guidelines.	Require LCC and ECC to be obtained prior to commencement of works
2.	Composting plant may impact historical or cultural heritage sites	Ensure to have at least 500 meters distance between the proposed location of composting plant and any historical and/or cultural heritage sites. Use of “chance find” procedures in the EMP that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.
3.	Composting plant may require cutting of trees in proposed areas	Avoid locating the composting plant in area where cutting of trees is required. If all potential areas have trees that may be cut, choose the site with the least trees affected. Ensure to implement the replacement ratio of 1:10 as indicated in the environmental assessment and review framework.
4.	Composting plant may impact residents due to odor and other forms of nuisance.	If proposed locations are near residential areas, ensure to choose the location that has the farthest distance from residential houses with at least 500 m. However, the distance should not be too far to cause cost implication in the hauling of materials during operation phase. Ensure all planning and design interventions and decisions are made in consultation with local communities and include women. Reflect inputs from public consultation and disclosure for site selection.
5.	Composting plant location may require access roads that will potentially encroach private properties	The composting plant should be located in areas with access road that has a ROW. Preferably, locate the composting plant in areas with direct access from any of the existing roads.

ECC = environmental compliance certificate, EMP = environmental management plan, LCC = locational clearance certificate, ROW = right of way.

E. Common Activities and Anticipated Impacts of Composting Plants – Construction Phase

95. Table 19 shows the commonly anticipated impacts during construction phase of composting plant projects. During the detailed design of the proposed composting plant under the subproject, the specific impacts and corresponding mitigation measures will be defined in the updating of this IEE or in the drafting of a new IEE for the proposed composting plant, whichever may be appropriate.

Table 19: Common Construction Impacts of Composting Plant Projects

General Receptors		Construction Phase Activities and Impacts
Land and Soil Resources	landscape	**Excavations and earthworks** • creation of undesirable terrains or landforms **Source of materials** • potential quarrying resulting to destruction of natural landscapes
	soils	**Use of vehicles and machinery** • compaction of soil in staging or parking areas **Earthworks** • soil erosion • removal or alteration of soils on site
	geology	**Excavations** • removal of rocks in the areas of construction works **Source of materials** • potential quarrying resulting to destruction of natural geological formations
Flora and Fauna Resources	aquatic resources	**Drainage works and use of vehicles** • pollution to receiving water bodies due to siltation **Materials management** • pollution to receiving water bodies due to spills of oil, fuel, cement or other raw materials and substances used during construction **Source of materials** • potential quarrying resulting to destruction of natural aquatic habitats
	terrestrial resources	**Earthworks and excavations** • removal of habitat • disturbance to, or loss of, species **Source of materials** • potential quarrying resulting to destruction or loss of biodiversity
Air / Atmosphere	local air quality	**Use of vehicles and machinery** • emissions of pollutants from construction vehicles and machineries that degrade ambient air quality • dust generation that degrade ambient air quality
	regional / global air quality	**Use of vehicles and machinery** • emissions of pollutants from construction vehicles and machineries that contribute to the increase of greenhouse gas in the atmosphere
Water Resources	surface water hydrology and channel morphology	**Use of vehicles and machinery** • increase in surface runoff due to soil compaction at staging and parking areas of construction vehicles and machineries (i.e. rainwater could not percolate due to compacted soil) • change in flow velocities due to increased runoff or siltation • increased erosion and subsequent changes in bed and bank stability • increased flood risk

General Receptors		Construction Phase Activities and Impacts
		Earthworks • increased sedimentation of watercourses
	surface water quality	**Earthworks** • pollution from suspended material • disturbance of contaminated soil and subsequent pollution of watercourses **Materials management** • pollution from spills or leaks of fuel, oil and construction materials
	groundwater hydrology	**Earthworks and site drainage** • reduction in water table • changes to groundwater distribution and flow
	groundwater quality	**Earthworks** • disturbance of contaminated soil and subsequent groundwater pollution **Materials management** • pollution from spills or leaks of fuel, oil and building materials
Socioeconomic Resources	socio-economic	**Earthworks and excavations** • disruption of services such as electricity, gas, water, or telecommunications due to the presence of underground cables and pipes • disruption of traffic movements • construction-related employment (positive impact) **Negative publicity** • migration of people away from proposed composting plant site
	community and occupational health and safety	**Earthworks and excavations** • risk of injuries or accidents to both community people and workers at construction site **Negative publicity** • adverse reaction to perceived health issues from waste feedstock and the perceived problems associated with the attraction of disease vectors to the composting process and expected piles of decaying matter
	local noise level and other nuisance	**Use of vehicles and machinery** • noise from movements and operation of construction vehicles and machineries • mud on roads due to heavy equipment and vehicles from the construction site
	physical cultural resources	• damage to known or unknown features of archaeological or cultural importance
	land valuation	**Physical presence of the compost piles and plant** • potential decrease of land value near the proposed composting plant site

F. Common Activities and Anticipated Impacts of Composting Plants – Operation and Maintenance Phase

96. Similarly, Table 20 shows the commonly anticipated impacts during operation and maintenance of composting plant projects. During the detailed design of the proposed composting plant, the specific impacts and corresponding mitigation measures will be defined in the updating of this IEE or in the drafting of a new IEE for the proposed composting plant, whichever may be appropriate.

Table 20: Common Operation and Maintenance Impacts of Composting Plants

General Receptors		Operation and Maintenance Activities and Impacts
Land and Soil Resources	landscape	**Physical presence of composting plant** • creation of undesirable terrains or landforms
	soils	**Mixed raw solid wastes** • potential contamination of soil from leachate • generation of methane gasses and its possible migration to soils beyond site boundary **Use of vehicles and machinery** • compaction of soil in staging or parking areas • soil erosion due to activities at composting plant • soil contamination from runoff
	geology	**Excavations** • potential removal of geological resource such as rocks following any site expansion **Source of materials** • potential quarrying due to any site expansion resulting to destruction of natural geological formations
Flora and Fauna Resources	aquatic resources	**Residual waste disposal** • pollution of receiving water bodies due to leachate **Site drainage** • pollution of receiving water bodies due to drainage water or stormwater contaminated with composting plant materials or runoff or leachate **Materials management** • pollution to receiving water bodies due to spills of oil, fuel, or other substances used during composting plant operations or maintenance
	terrestrial resources	**Physical presence of compost plant** • alteration or loss of terrestrial habitats **Physical presence of waste feedstock and compost piles** • attraction of insects, birds and mammals to the plant **Gas generation** • harm to terrestrial plants or animals due to releases of gases associated with the mismanagement of the compost process **Mechanical turning activities** • disturbance to, or loss of, species near the composting plant
Air / Atmosphere	local air quality	**Use of vehicles and machinery** • emissions of pollutants from plant vehicles and machineries (e.g. windrow turners, grinding machines) that degrade ambient air quality • dust generation and noise due to movement of vehicles at the plant that degrade ambient air quality and noise level, respectively. **Gas generation** • release of dangerous gases such as VOCs and bioaerosols due to mismanagement of raw solid wastes and composts at the plant. • offensive odors during the active composting stage

General Receptors		Operation and Maintenance Activities and Impacts
		Dust generation • Dust generated due to various processes (e.g. screening, windrow turners, packing of composts) resulting to degradation of ambient air quality
	regional / global air quality	**Greenhouse gas generation** • emissions of pollutants from plant vehicles and machineries that contribute to the increase of greenhouse gas in the atmosphere
Water Resources	surface water hydrology and channel morphology	**Use of vehicles and machinery** • increase in surface runoff due to soil compaction at staging and parking areas of construction vehicles and machineries (i.e. rainwater could not percolate due to compacted soil) • change in flow velocities due to increased runoff or siltation • increased erosion and subsequent changes in bed and bank stability • increased flood risk **Site drainage** • increased flow velocity of stormwater to receiving water bodies, which changes the flow regimes on the downstream relative to the location of the composting plant. • increased siltation on receiving water bodies, which increases risks of overflows or flooding.
	surface water quality	**Leachate management** • degraded river water quality due to seepage or leachate • eutrophication in receiving water bodies due to leaching of nutrients from composting plant **Materials management** • pollution from spills or leaks of fuel, oil and composting plant materials
	groundwater hydrology	**Physical presence of composting plant and paved areas** • potential alteration of groundwater flow
	groundwater quality	**Leachate management** • contamination of groundwater due to seepage of leachate **Materials management** • pollution from spills or leaks of fuel, oil and composting plant materials
Socioeconomic Resources	socio-economic	**Waste disposal operations** • continued migration of people away from the composting plant
	community and occupational health and safety	**Waste treatment operations** • risk of harm from contaminated drinking water **Gas generation** • release of dangerous gases such as VOCs and bioaerosols due to mismanagement of raw solid wastes and composts at the plant. • potential risk fires from mismanaged compost piles **Mismanagement of waste piles** • attraction of disease vectors • proliferation of diseases in the community and composting plant workers
	local noise level and other nuisance	**Use of vehicles and machinery** • noise from movements and operation of composting plant vehicles and machineries • mud on roads due to heavy equipment and vehicles from the composting plant

General Receptors		Operation and Maintenance Activities and Impacts
		Site management • odors from the composting process • dispersal of litters within the vicinity of the plant and along the routes of delivery vehicles of raw solid wastes • attraction of vectors of diseases
	physical cultural resources	• further damage to archaeological features resulting from expansion of the site
	land valuation	**Physical presence of the composting plant** • potential further decrease of land value near the composting plant site

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Consultation

97. Stakeholder consultation and participation is 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.

98. **Preliminary Consultation.** Public consultations were conduct on 5 June 2017 and 7 June 2017, which were attended by various stakeholders. The objective of the meetings was to appraise the stakeholders about the proposed project and the proposed subprojects for KCC. Since there were still no detailed design available for any of the infrastructure subprojects, the discussions focused on the overall impacts of a new solid waste management that may be implemented under the project for Khulna city corporation. Issues discussed and feedback received along with details of date, time, location, and list of participants are in Appendix 3. The environmental concerns and suggestions made by the participants were listed, discussed, and will be incorporated in the comprehensive SWM planning. All applicable suggestions will be considered in the EMP for the proposed construction of a composting plant, together with the recommendations from the outcome of the SWM planning activity that is yet to be undertaken. The following are some of the concerns discussed:

(i) The consultees will support the project activities;
(ii) The consultees believe that community activities will be affected during the construction activities in the future. However, the PIU explained that the project will ensure measures shall be put in place to avoid any negative impact to the community;
(iii) 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;
(iv) It was confirmed with the local stakeholders that there is no protected area in and around the project areas; and
(v) 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.

99. **Future consultations during final detailed design stage of the composting plant**. The stakeholder consultations during the final detailed design stage will continue to discuss about the composting plant component under the subproject, including the implementation of the EMP and SEMP that will be developed. PMCU, KCC PIU and PDSC will ensure that consultations will be conducted as meaningful per definition of ADB SPS (footnote 6). The KCC PIU, PDSC and contractors will ensure that public consultations will include representatives from all residential, commercial, industrial and institutional establishments found around the proposed site for the composting plant. Once detailed design and location of the composting plant are determined, this IEE will be updated to include the results of these public consultations.

B. Information Disclosure

100. Information shall be disclosed through public consultation and more formally by making documents and other materials available in a form and at a location in which they can be easily accessed by stakeholders. This normally involves making draft reports available for the public in the subproject locations and providing a mechanism for the receipt of comments, and making documents available more widely by lodging them on ADB and LGED websites. LGED through the PMCU will submit to ADB the following documents for disclosure on ADB's website:[24]

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

101. 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.

102. For the benefit of the community, the summary of the IEE will be translated in Bangla and made available at: (i) office of PMCU; and (ii) office of KCC 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 seeking information 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 approval of the documents by Government and clearance from ADB. PMCU will issue notification on the disclosure mechanism in local newspapers, ahead of the initiation of implementation of the project, providing information on the project, as well as the start dates, etc. The notice will be issued by the PMCU and PIUs in local newspapers one month ahead of the implementation works. This will create awareness of the project implementation among the public. PMCU and KCC will consider other additional means of information

[24] 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."

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

103. The project will adopt the grievance redress mechanism (GRM) outline of the first CRDP. The GRM shall be set up to register grievances of the people regarding technical, social and environmental aspects. Also, the GRM welcomes all kinds of technical and safeguards-related queries, comments, suggestions and complaints from anyone. The process will be designed to be transparent, gender responsive, culturally appropriate and commensurate to the risks and adverse impacts of the project, as well as readily accessible to all segments of the affected people. The project GRM will not supersede any legal government grievance procedures.

104. 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 local dialects) through the project website, installation of Grievance Intake Box at the project area and other mode of filing that the affected people have access to. For those affected people who cannot read and write, a community leader/volunteer will be identified in every project area. The community leader/volunteer will serve as the focal person who will assist the affected people in filing the complaints. This participatory process shall ensure that all views of the people are adequately reviewed and suitably incorporated in the design and implementation process. The GRM will be implemented in three levels. See Figure 11 for the outline.

105. **First Level**. The first level and most accessible and immediate venue for the fastest resolve of grievances is the PIU, chiefly through the environment and/or social safeguard officers and project manager (or equivalent), with assistance from the environmental and social safeguard specialists of the 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 4. The suggested format for record-keeping of grievance is in Appendix 5.

106. **Second Level**. Should the grievance remain unresolved, the PIU project manager (or equivalent), will activate the second level of the GRM by referring the issue (with written documentation) to the local grievance redress committee (GRC) of the *pourashava* or city corporation, who will, based on review of the grievances, address them in consultation with the safeguards officers of the PIU and PMCU, and affected persons. A hearing will be called, if necessary, where the affected person can present his/her concern/issues. The process will promote conflict resolution through mediation. The PIU project manager will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, providing feedback to complainants and taking follow

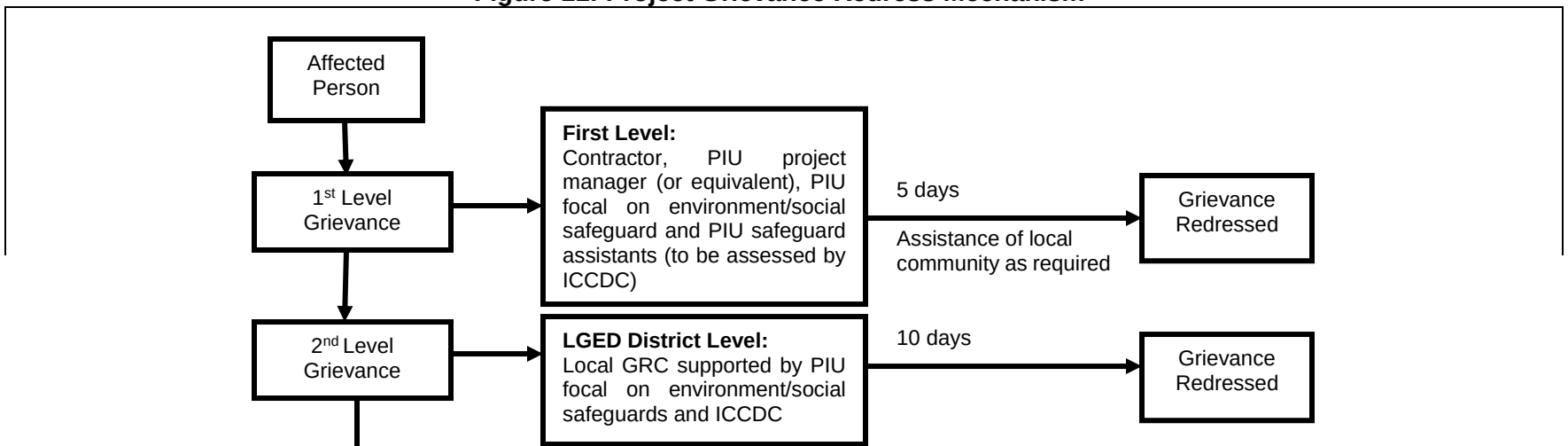
up actions so that formal orders are issued, and decisions are carried out. The local GRC will consist of the following persons: (i) chief executive officer or secretary of the *pourashava* or city corporation (GRC Chair); (ii) representative of the mayor of the *pourashava* or city corporation; (iii) representative of the affected persons; (iv) official of the land registry department; (v) official of the DOE divisional office; (vi) town planner of the *pourashava* or city corporation; and (vii) environmental and/or social safeguards officers of the PIU. The local GRC shall meet weekly, unless the Head of the PIU informs that there are no grievances to address, or they shall meet as needed as per the severity of the grievance. The local GRC will suggest corrective measures at the field level and assign responsibilities for implementing its decisions.

107. 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.

108. **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 director will sign off on all grievances received by the PMCU.

109. The GRC at the PMCU level shall meet based on the receipt of grievances, and the meeting shall be convened, and grievance redressed within 15 days of receipt of the grievance by the PMCU. The environmental and/or social safeguards officer of the PMCU will be responsible for processing and placing all papers before the PMCU GRC, recording decisions, issuing minutes of the meetings and taking follow up action to see that formal orders are issued, and the decisions carried out, and final decision conveyed to the complainant.

Figure 11: Project Grievance Redress Mechanism[a]



	Not Redressed
	Not Redressed

GRC = Grievance Redress Committee; ICCDC = Institutional Capacity and Community Development Consultants; PDSC = preparation, design and supervision consultant; PIU = project implementation unit; PMCU = project management coordination unit.

[a] Outline adopted from GRM of CRDP, and revised to conform with new arrangements and nomenclatures of the project.

110. 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.

111. 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.

VII. ENVIRONMENTAL MANAGEMENT PLAN

A. Institutional Arrangements

112. **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[25] 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

[25] Project management coordination unit (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 Urban Management Support unit.

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 will be assigned at PMCU. The environmental safeguards officer will primarily be responsible for the compliance to the statutory and legal requirements, including overall supervision of the implementation of the environmental management provisions in the IEEs/EMPs for the subprojects. The PDSC will assist the PMCU in this regard.

113. **Project Implementation Unit**. The KCC 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. KCC 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 KCC PIU will prepare quarterly progress reports on all aspects concerning environmental assessment, management, monitoring, and report to the PMCU.

114. **Preparation, Design and Supervision Consultants**. The preparation, design and supervision consultants (PDSC) team shall include the following environmental safeguards expertise to effectively implement the EARF and relevant provisions of the IEE reports of the subprojects: (i) an international environmental safeguards specialist (to be hired only on “as needed” basis); and (ii) national environmental specialists (for duration of implementation). These personnel will provide technical support to the PMCU and KCC PIU including implementation of the environmental requirements, according to ADB SPS, 2009, 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 KCC PIU. The terms of reference for project environmental personnel is provided in Appendix 6.

115. **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. KCC PIU will monitor contractors’ environmental performance.

116. Table 21 summarizes the overall roles and responsibilities of PMCU, KCC PIU, and ADB.

Table 21: Institutional Roles and Responsibilities

Project Management and Coordination Unit	Project Implementation Unit	ADB
Pre-construction stage		
Environmental officer of the PMCU, with assistance from the environmental specialist(s) of the 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 SPS. Submit all categorization forms to ADB.	PDSC will assist the PIU and conduct IEE (or update existing IEE) for all Category B subprojects, which will include an EMP. PIU with assistance from the environmental officer of the PMCU and the environmental specialist of the 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.

Project Management and Coordination Unit	Project Implementation Unit	ADB
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, 2009. 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 ECC under the ECR and other necessary clearances such as for example tree cutting permits from the Ministry of Environment and Forests, submission of application forms, and liaising with agencies towards obtaining ECC, tree-cutting permits, and other clearances from relevant government agencies. Environmental officer of PMCU shall notify the ADB on obtaining of these clearances, including the conditions specified if any in the clearances, and integration of these into the contracts/EMP.	ECR stipulates that for (i) green, (ii) orange-A, (iii) orange–B, and (iv) red category projects, obtaining of environmental clearance certificate from DOE is a prerequisite. The environmental support staff of the PIU with assistance from 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 clearance certificate from DOE, the environmental support staff will interact with the DOE on a regular basis and provide necessary documentation/clarifications as required.	ADB to ensure that the clearance requirements are included in the contract provisions/EMP.
Environmental officer of PMCU to ensure that the IEE containing the EMP of each subproject is included in the bid and contract documents. At the same time, the environmental officer of PMCU to ensure that the total budget for implementing the EMP is included in the bid and contract documents.	The environmental support staff of PIU to ensure that: (i) each contractor prepares its SEMP based on the EMP in the subproject IEE, and (ii) budget is included in the SEMP.	
Construction stage		
PMCU to review the PIU monthly monitoring reports to ensure that all 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.	ADB to review the reports and provide necessary advice/guidance needed to the PMCU.
Operation Stage		
LGED and PIUs to conduct monitoring, as specified in the environmental monitoring plan of EMP. The DOE to monitor the performance, if required and as specified in monitoring plan of EMP.	ADB to review semi-annual environmental monitoring report and disclose on its website.	

Project Management and Coordination Unit	Project Implementation Unit	ADB
PMCU to continue submission of semi-annual environmental monitoring report to ADB until ADB issues a project completion report.		ADB to prepare 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, LGED = Local Government Engineering Department, PDSC = preparation, design, and supervision consultant, NOC = no objection certificate, PIU = project implementation unit, PMCU = project management coordination unit, REA = rapid environmental assessment, SPS = safeguards policy statement.

B. Environmental Management Plan

117. An environmental management plan (EMP) for the composting plant will be developed to provide mitigation measures to reduce all negative impacts to acceptable levels.

118. Table 22 presents the common potential impacts and suggested mitigation measures associated with the design of a composting plant. During the detailed design stage, Table 22 shall be updated to include all other potential impacts and corresponding mitigation measures based on the outcome of the comprehensive SWM planning under the subproject.

119. Table 23 and

Table ***24*** present the common potential environmental impacts during the construction and O&M phases of a composting plant, respectively. Likewise, during the detailed design stage, Table 23 and

Table ***24*** shall be updated to include other more specific potential impacts and appropriate mitigation measures based on the outcome of the comprehensive SWM planning under the subproject.

120. 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.

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

Table 22: Common Potential Impacts and Suggested Mitigation Measures for Composting Plant Projects During Design Phase

(to be updated to reflect a more comprehensive matrix based on location, detailed design and outcome of comprehensive SWM planning)

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
1. Design and Pre-Construction Phase					
Consents, permits, environmental clearances, etc.	- Failure to obtain necessary consents, permits, etc. can result to design revisions and work stoppage	- Obtain all of the necessary consents, permits, environmental clearances, etc. before the start of civil works. - Include in detailed design drawings and documents all conditions and provisions if necessary.	PMCU, KCC PIU, and PDSC	- Incorporated in final design and communicated to contractors.	Before award of contract
Existing utilities such as electric poles, water supply lines, sewerage lines, telephone cables, etc.	- Disruption of services	- Identify and include locations and operators of these utilities in the detailed design documents to prevent unnecessary disruption of services during construction. - Require construction contractors to prepare a contingency and spoil management plan.	PMCU, KCC 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)
Location of composting plant	- Damage to historical or cultural heritage sites	- Ensure to have at least 500 meters (m) distance between the proposed location of composting plant and any historical and/or cultural heritage sites. - Use of “chance find” procedures in the EMP that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.	PMCU, KCC PIU, and PDSC	- On-site inspection	As soon as location is identified.
	- Cutting of trees in proposed areas	- Avoid locating the composting plant in area where cutting of trees is required. - If all potential areas have trees that may be cut, choose the site with the least trees affected. Ensure to implement the replacement ratio of 1:10 as indicated in	PMCU, KCC PIU, and PDSC	- On-site inspection	As soon as location is identified.

Field	Impacts	Mitigations Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		the environmental assessment and review framework.			
	- Odor and other forms of nuisance.	- If proposed locations are near residential areas, ensure to choose the location that has the farthest distance from residential houses with at least 500 m. However, the distance should not be too far to cause cost implication in the hauling of materials during operation phase. - Ensure all planning and design interventions and decisions are made in consultation with local communities and include women. Reflect inputs from public consultation and disclosure for site selection.	PMCU, KCC PIU, and PDSC	- On-site inspection and visit to nearby residential areas	As soon as location is identified.
	- Requirement of access roads that will potentially encroach private properties	- The composting plant should be located in areas with access road that has a ROW. Preferably, locate the composting plant in areas with direct access from any of the existing roads.	PMCU, KCC PIU, and PDSC	- On-site inspection	As soon as location is identified.
Construction work camps, stockpile areas, storage areas, and disposal areas	- Disruption to traffic flow and sensitive receptors	- Determine locations before award of construction contracts.	KCC 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
Sources of raw materials	- Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in	- Prepare list of quarry sites and approved sources of materials.	KCC 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 KCC 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
	natural drainage patterns, resulting water logging, and water pollution				
EMP Implementation Training	- Impact to the environment, workers, and community	- Project manager and contractors should be trained on EMP implementation, including spoils management, traffic management, community and occupational health and safety, Bangladesh Labor Act, and other standard operating procedures.	PMCU, KCC 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

EHS = environmental, health and safety, EMP = environmental management plan, KCC = Khulna city corporation, m = meter, PIU = project implementation unit, PDSC = preparation, design and supervision consultant, PMCU = project management and coordination unit, ROW = right of way.

Table 23: Template of Potential Impacts of Composting Plant Projects During Construction Phase

(to be updated to reflect a more comprehensive matrix based on location, detailed design and outcome of comprehensive solid waste management planning)

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Landscape	- creation of undesirable terrains or landforms - potential quarrying resulting to destruction of natural landscapes	- Dispose all excess spoils immediately to authorized disposal sites, following spoil management plan that will be developed for the subproject. - 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	Contractor		
soils	- compaction of soil in staging or parking areas - soil erosion - removal or alteration of soils on site			-	
geology	- removal of rocks in the areas of construction works - potential quarrying resulting to destruction of natural geological formations			-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		of implementing agency. Document all sources of materials and include in the monthly reporting to the PIU.			
aquatic resources	- pollution to receiving water bodies due to siltation - pollution to receiving water bodies due to spills of oil, fuel, cement or other raw materials and substances used during construction - potential quarrying resulting to destruction of natural aquatic habitats	- 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	-	
terrestrial resources	- potential cutting of trees - removal of habitat - disturbance to, or loss of, species - potential quarrying resulting to destruction or loss of biodiversity	- while effort to avoid cutting of trees is the paramount consideration under the subproject, cutting of some trees may not be avoided at some instances. However, any unavoidable cutting should be minimized to greatest extent possible. - for any tree cut, conduct replacement planting consistent with the approved EARF for the project and social forestry program of LGED - 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	Contractor	-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		firewood at the subproject sites or their vicinities.			
local air quality	- emissions of pollutants from construction vehicles and machineries that degrade ambient air quality - dust generation that degrade ambient air quality	- consult with PIU on the designated areas for stockpiling of sand, gravel, and other construction materials. - bring construction materials (aggregates, sand, etc.) to the construction site as and when required to avoid heavy stockpiling at the sites. - damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. - 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.	Contractor	-	
regional / global air quality	- emissions of pollutants from construction vehicles and machineries that contribute to the increase of greenhouse gas in the atmosphere			-	
surface water hydrology and channel morphology	- increase in surface runoff due to soil compaction at staging and parking areas of construction vehicles and machineries (i.e.	- dispose excess spoils per the spoil management plan to be developed for the composting plant - locate temporary storage	Contractor	-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	rainwater could not percolate due to compacted soil) - change in flow velocities due to increased runoff or siltation - increased erosion and subsequent changes in bed and bank stability - increased flood risk - increased sedimentation of watercourses	areas on flat grounds and away from any surface drainage routes. - 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. - conduct construction works during dry season.			
surface water quality	- pollution from suspended material - disturbance of contaminated soil and subsequent pollution of watercourses - pollution from spills or leaks of fuel, oil and construction materials -			-	
groundwater hydrology	- reduction in water table - changes to groundwater distribution and flow	- Contractors to 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 to 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		-	
groundwater quality	- disturbance of contaminated soil and subsequent groundwater pollution - pollution from spills or leaks of fuel, oil and building materials			-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		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.			
socio-economic	- disruption of services such as electricity, gas, water, or telecommunications due to the presence of underground cables and pipes - disruption of traffic movements - construction-related employment (positive impact) - migration of people away from proposed composting plant site	- prior to construction activities, ensure to pinpoint all locations of utilities on-ground or underground as identified during the pre-construction or design phase (Table 22) - provide list of utilities on-ground and underground at the proposed composting plant site - relocate the affected power supply poles, and advise the concerned authority during accidental damage to utilities. - prepare and implement a traffic management plan that will be developed for the composting plant component; - where traffic congestion will likely occur, place traffic flagmen during working hours; - provide compensation to affected people; - manage stockpile; - erect and maintain barricades if required - inform through display board about nature, duration of construction and contact for complaints - complete the work quickly nearby institution, place of worship, business, hospitals, and schools. - consult with business and institutions for work schedules. - restore damaged properties	Contractor, KCC PIU, PDSC	-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		and utilities			
community and occupational health and safety	- risk of injuries or accidents to both community people and workers at construction site - adverse reaction to perceived health issues from waste feedstock and the perceived problems associated with the attraction of disease vectors to the composting process and expected piles of decaying matter	- implement the community and occupational health and safety plan which follows international best practices on occupational health and safety such as those in Sections 4.2 and 4.3 of World Bank EHS Guidelines on Construction and Decommissioning Activities - restrict work force in designated areas. - Exclude public from worksites - identify staging, parking and stockyard areas in consultation with PIU - prefer small equipment or machines for excavation works - construct gender friendly toilets for workers - prohibit alcohol and drugs on site - prevent excessive noise; - implement code of conduct for workers, which includes restricting workers in designated areas, no open defecation, no littering, no firewood collection, no fire except designated places, no trespassing, no residence at construction sites, and no obligation to potentially dangerous work - maintain a complaint logbook in workers camp - take prompt action on complaints - Comply Labor Act 2006 - Train all site personnel on environmental health and	Contractor	-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		safety - 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 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.			
local noise level and other nuisance	- noise from movements and operation of	- Provide prior information to the local public, including institutions such as schools	Contractor	-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	construction vehicles and machineries - mud on roads due to heavy equipment and vehicles from the construction site	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.			
physical cultural resources	- damage to known or unknown features of archaeological or cultural importance	Although Khulna city corporation is not a host to any protected archaeological sites, precautionary measures shall be implements. the contractor will be required to: - strictly follow the protocol by coordinating immediately with KCC 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	Contractor, PMCU, KCC PIU, PDSC	-	

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
		observe when excavation resumes for the identification of the potential chance find, and comply with further instructions. .			
land valuation	- potential decrease of land value near the proposed composting plant site	- Public consultations to ensure inclusion of topics on business opportunities related to the operations of a proposed composting plant.	PMCU, KCC PIU, PDSC	-	
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 KCC 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 turnover of completed works to KCC PIU.
Environmental legislation compliance	- Lack of awareness in KCC PIU about legislations and IEE requirements	- Strengthen capacity of KCC PIU staffs;	PMCU, KCC PIU, PDSC	- Monitoring reports and checking operations against O&M manuals and permits/clearances	LGED - After completion of the composting plant works

CRDP = City Region Development Project, EARF = environmental assessment and review framework, EHS = environmental, health and safety, IEE = initial environmental examination, LGED = Local Government Engineering Department, PDSC = preparation, design and supervision consultant, PMCU = project management and coordination unit, O&M = operation and maintenance.

Table 24: Template of Potential Impacts of Composting Plant Projects During Operation and Maintenance Phase
(to be updated to reflect a more comprehensive matrix based on location, detailed design and outcome of comprehensive solid management waste planning)

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
Land and soil resources					
landscape	creation of undesirable terrains or landforms	Dispose all excess spoils immediately to authorized disposal sites, following spoil management plan that will be developed for the composting plant component.	KCC PIU as operator		
soils	potential contamination of soil from leachate generation of methane gasses and its possible migration to soils beyond site boundary compaction of soil in staging or parking areas soil erosion due to activities at composting plant soil contamination from runoff	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.	KCC PIU as operator		
geology	potential removal of geological resource such as rocks following any site expansion potential quarrying due to any site expansion resulting to destruction of natural geological formations	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. Document all sources of materials and include in the monthly reporting to the PIU.	KCC PIU as operator		
Flora and Fauna Resources					
aquatic resources	pollution of receiving water bodies due to leachate	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and	KCC PIU as operator		

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	pollution of receiving water bodies due to drainage water or stormwater contaminated with composting plant materials or runoff or leachate pollution to receiving water bodies due to spills of oil, fuel, or other substances used during composting plant operations or maintenance	outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.			
terrestrial resources	alteration or loss of terrestrial habitats attraction of insects, birds and mammals to the plant harm to terrestrial plants or animals due to releases of gases associated with the mismanagement of the compost process disturbance to, or loss of, species near the composting plant	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.	KCC PIU as operator		
Air and Atmosphere					
local air quality	emissions of pollutants from plant vehicles and machineries (e.g. windrow turners, grinding machines) that degrade ambient air quality dust generation due to movement of vehicles at the plant that degrade ambient air quality	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.	KCC PIU as operator		

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	release of dangerous gases such as volatile organic compounds (VOCs) due to mismanagement of raw solid wastes and composts at the plant. offensive odors during the active composting stage Dust generated due to various processes (e.g. screening, windrow turners, packing of composts) resulting to degradation of ambient air quality	Damp down with water dry exposed surfaces and stockpiles of aggregates at least twice daily, or as necessary. Require trucks delivering feedstocks and compost products to have tarpaulin cover. Limit speed of vehicles on access roads and composting plant to a maximum of 30 km/h. Use vehicles that have government-issued permits and registrations. Prohibit open burning of solid waste.			
regional / global air quality	emissions of pollutants from plant vehicles and machineries that contribute to the increase of greenhouse gas in the atmosphere		KCC PIU as operator		
Water resources					
surface water hydrology and channel morphology	increase in surface runoff due to soil compaction at staging and parking areas of construction vehicles and machineries (i.e. rainwater could not percolate due to compacted soil) change in flow velocities due to increased runoff or siltation increased erosion and subsequent changes in bed and bank stability increased flood risk increased flow velocity of stormwater to receiving	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.	KCC PIU as operator		

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	water bodies, which changes the flow regimes on the downstream relative to the location of the composting plant. increased siltation on receiving water bodies, which increases risks of overflows or flooding.				
surface water quality	degraded river water quality due to seepage or leachate eutrophication in receiving water bodies due to leaching of nutrients from composting plant pollution from spills or leaks of fuel, oil and composting plant materials	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.	KCC PIU as operator		
groundwater hydrology	potential alteration of groundwater flow		KCC PIU as operator		
groundwater quality	contamination of groundwater due to seepage of leachate pollution from spills or leaks of fuel, oil and composting plant materials		KCC PIU as operator		
Socio-economic resources					
socio-economic	continued migration of people away from the composting plant	Ensure to conduct continuous public consultations during the O&M phase and include topics on the relevance of and business opportunities related to the operations of a proposed composting plant.	KCC PIU as operator		
community and occupational health and safety	risk of harm from contaminated drinking water	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and	KCC PIU as operator		

Field	Impact	Mitigation Measures	Responsible for Implementation	Monitoring Indicator	Frequency of Monitoring
	potential risk fires from mismanaged compost piles attraction of disease vectors proliferation of diseases in the community and composting plant workers	outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.			
local noise level and other nuisance	noise from movements and operation of composting plant vehicles and machineries mud on roads due to heavy equipment and vehicles from the composting plant odors from the composting process dispersal of litters within the vicinity of the plant and along the routes of delivery vehicles of raw solid wastes attraction of vectors of diseases	Ensure to follow good housekeeping practices and O&M manual for the entire composting plant, which will be developed based on the detailed design and outcome of the comprehensive SWM planning under the subproject. The development of the O&M manual shall also refer to the World Bank EHS guidelines on Waste Management Facilities.	KCC PIU as operator		
land valuation	potential further decrease of land value near the composting plant site	Ensure to conduct continuous public consultations during the O&M phase and include topics on the relevance of and business opportunities related to the operations of a proposed composting plant.	KCC PIU as operator		

EHS = environmental, health and safety, KCC = Khulna city corporation, PIU = project implementation unit, O&M = operation and maintenance, SWM = solid waste management.

C. Environmental Monitoring Program

122. Monitoring of mitigation measures during construction is the responsibility of the PIU supported by the PMCU Environment Officer and PDSC Environmental Specialist. Table 25 shows the suggested environmental monitoring program for the composting component under the subproject. This program shall be updated during the detailed design phase when the EMPs during the construction and O&M phases are finalized in accordance with the outcome of the comprehensive SWM planning activity under the subproject. The monitoring program shall include the specific monitoring activities, indicating location, frequency of monitoring and responsibility.

Table 25: Suggested Environmental Monitoring Program for Composting Plant

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
PRE-CONSTRUCTION					
Secure Environmental Compliance Certificate from Department of Environment (DOE)	PMCU office	PMCU, PDSC	Copy of approved ECC	Before construction activities	PMCU, PDSC
IEEs and EMPs are included in bid and contract documents	PMCU office	PMCU, PDSC	Copies of bid and contract documents	Before approval tender document	PMCU, PDSC
Site-specific EMP (SEMP) submitted by Contractor for approval by KCC PIU	KCC PIU office	Contractor, KCC	Copy of approved SEMP	Before construction activities commence	PMCU, PDSC
Spoil Management Plan (SMP) submitted by Contractor for approval by KCC PIU	KCC PIU office	Contractor, KCC	Copy of approved SMP	Before construction activities commence	PMCU, PDSC
Traffic Management Plan (TMP) submitted by Contractor for approval by KCC PIU	KCC PIU office	Contractor	Copy of approved TMP	Before construction activities commence	PMCU, PDSC
Baseline environmental data gathering	All subproject sites	Contractor	Ambient air quality sampling River and ground water quality sampling Noise level measurements	Once before construction activities commence	PMCU, KCC PIU, PDSC
Secure all other necessary permits and licenses from relevant government agencies	KCC PIU office, Contractor office or site	Contractor	Copies of permits and licenses	Before construction activities commence	PMCU, KCC PIU, PDSC
CONSTRUCTION					
Implementation of SEMP, which includes 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.	Proposed site of composting plant	Contractor	Site visits, Contractor records,	Weekly or as needed	KCC PIU, PDSC
Implementation of SMP, which include disposal of spoil material at a location approved to by KCC PIU, use of tarpaulin or similar cover to trucks during transport, quick removal of spoils stocked at construction site, etc.	Proposed site of composting plant	Contractor	Site visits, Contractor records	Weekly or as needed	KCC PIU, PDSC
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.	Proposed site of composting plant	Contractor	Site visits, Contractor records	Weekly or as needed	KCC PIU, PDSC
Conduct of ambient air quality sampling, river and ground water quality sampling and noise level	Proposed site of composting	Contractor	Contractor records, Results of laboratory analyses	At least semi-annual or as needed	PMCU, KCC PIU, PDSC

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
measurements	plant				
Develop and apply archaeological protocol to protect chance finds	Office of Contractor or KCC PIU Proposed site of composting plant	Contractor, PMCU, KCC PIU, PDSC	Contractor records	Once until protocol is approved	PMCU, KCC PIU, PDSC
Provide EHS training for all personnel	Proposed site of composting plant	Contractor	Contractor records; Interviews to workers	Monthly	KCC PIU, PDSC
Keep accident reports and records	Proposed site of composting plant	Contractor	Contractor records; Interviews to workers and community people	Monthly	KCC PIU, PDSC
Employ workforce from communities near sites	Proposed site of composting plant	Contractor	Contractor records	Monthly	KCC PIU, PDSC
Implementation of EHS measures at construction camps	Construction camp sites	Contractor	Site visits; Interviews to workers at camps	Monthly	KCC PIU, PDSC
Operation and Maintenance					
Maintenance of integrity and efficient functioning of all structures, machineries, working areas, storage areas, and workers' amenities at composting plant	Proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations	Monthly	LGED
Operation of the compost plant within capacity limit only	Proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations, Records of volume of feedstocks and finished compost products	Monthly	LGED
Implementation of provisions of O&M manual developed for the composting plant, including implementation of good housekeeping practices	Proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations	Monthly	LGED
Implementation of the World Bank EHS Guidelines on Waste Management Facilities	Proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations	Monthly	LGED
Monitoring of the quality of river or surface water and groundwater in pre-identified sampling points	Vicinity of proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations, Results of laboratory analyses of samples	Monthly	LGED
Monitoring of the ambient air quality	Vicinity of proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations, Results of laboratory analyses of samples	Monthly	LGED

Activities or Items to Monitor	Location	Responsible for Activities	Monitoring Method	Monitoring Frequency	Monitoring Responsibility
Monitoring of the ambient noise	Vicinity of proposed site of composting plant	KCC PIU or Compost Plant Operator	Site observations, results of laboratory analyses of samples	Monthly	LGED

EHS = environmental, health and safety, IEE = initial environmental examination, KCC = Khulna city corporation, LGED = Local Government Engineering Department, PDSC = preparation, design and supervision consultant, SEMP = site-specific environmental management plan, TMP = traffic management plan, O&M = operation and maintenance.

D. Capacity Development Training

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

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

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

124. The proposed training program along with the frequency of sessions is presented in Table 26.

Table 26:Training Program for Environmental Management

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

Items	Pre-construction	Construction	
	Review of environmental assessment report to comply with ADB requirements Incorporation of EMP into the project design and contracts		
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

ADB = Asian Development Bank, EMP = environmental management plan, PDSC = preparation, design and supervision consultant, PIU = project implementation unit, PMCU = project management and coordination unit.

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

125. Most of the costs associated with environmental mitigation and enhancement measures are included in the EMP budget. In consideration to the environmental impacts and their mitigation measures for this subproject, some items need to be incorporated in the Bill of Quantity 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 27 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 27: Tentative Environmental Management Plan Budget for Bill of Quantity
(the following items need to be incorporated in the Bill of Quantity of this subproject)

Item No.	Description of Items	Unit	Quantity	Unit Rate (Tk)	Item Total (Tk)
1	Environmental Monitoring (i) Air Quality, (ii) Noise level, (iii) Water quality, (iv) Sediment at work site to the entire satisfaction of engineer-in-charge.	LS			20,000.00
2	Dust suppression measures (excluding watering for compaction) to the entire satisfaction of the engineer-in-charge.	m	9,970	2.00	19,940.00
3	Prevention of spillage, leakages of polluting materials to the entire satisfaction of the engineer-in-charge.	LS			5,000.00
4	Providing and maintaining adequate potable water supply facilities (Shallow Tube well) at camp site and work site to the entire satisfaction of engineer-in-charge. Water Supply Tube well 02.	Nos.	1	10,000.00	10,000.00
5	Providing and maintaining adequate sanitation facilities at camp site and work site to the entire satisfaction of engineer-in-charge. Sanitation Toilet 02 (01 no. for women and 01 no. for men)	Nos.	2	5,000.00	10,000.00

Item No.	Description of Items	Unit	Quantity	Unit Rate (Tk)	Item Total (Tk)
6	Rehabilitation of ancillary sites including stockpile sites, brick crushing sites, borrow areas, workforce camp, to the entire satisfaction of the engineer-in-charge.	m	5,000	2.00	10,000.00
7	Proper disposal of camp site wastes to the entire satisfaction of the engineer-in-charge.	LS			10,000.00
8	Maintain First aid box at camp site to the entire satisfaction of the engineer-in-charge.	LS			5,000.00
9	Implementation of mitigation measures indicated in the EMP and SEMP.	LS			3,320,000
Estimated cost for additional environmental items (over 4-year period)					**3,409,940.00**

EMP = environmental management plan, m = meter, SEMP = site-specific environmental management plan, Tk = taka.

VIII. MONITORING AND REPORTING

126. 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.

127. The contractor will submit monthly reports to the PIU with jurisdiction over the subproject sites. The monthly reports will include compilation of copies of monitoring sheets accomplished and duly signed by the contractor's EHS supervisor (or equivalent) on a daily basis. A sample daily monitoring sheet which can be used by the contractors is in Appendix 7. This monitoring sheet is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

128. 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 8. This checklist is indicative which can be further enhanced depending on the actual situations at subproject construction sites.

129. PMCU shall consolidated quarterly reports from the PIUs including KCC PIU and results of its independent monitoring or inspection activities. PMCU shall accomplish semi-annual environmental monitoring report (SEMRs), which shall be submitted to ADB for review and disclosure on ADB website. Submission of SEMR will continue until ADB issues a project completion report. The template for the SEMR is attached as Appendix 9.

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

(i) On a need basis, conduct site visits for subproject with potential adverse environmental or social impact;
(ii) Conduct supervision missions with detailed review by ADB's environment/social safeguard specialists and/or officers and/or consultants for subprojects with adverse environmental and social impacts;

(iii) Review the SEMRs submitted by PMCU to ensure that adverse impacts and risks are mitigated as planned in the EMP;
(iv) Work with LGED to rectify to the extent possible any failures to comply with its environmental safeguard commitments, as covenanted in the loan agreement and elaborated in all environmental safeguard documents; and formulate and implement a corrective action plan to re-establish compliance as appropriate; and
(v) Prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

IX. FINDINGS, RECOMMENDATION AND CONCLUSION

131. The subproject components will help improve the current but worsening SWM system in KCC. It is noted that present SWM initiative in the city only serves few and selected areas. Review of the existing conditions suggests the need for developing a comprehensive SWM plan that will cater to the entire population and areas of KCC for the long term. Based on the comprehensive SWM plan that will be developed, a composting plant will be constructed to help in significantly reducing the solid wastes that will be sent for final disposal and treatment.

132. The proposed subproject is not an environmentally critical undertaking. This IEE indicates that the proposed components of the subproject, particularly the composting plant component, will be located in KCC– a city which is not located within or adjacent any environmentally sensitive areas.

133. The extent of adverse impacts from the construction of composting plant within KCC is expected to be local, confined within the city's main areas of influence. With mitigation measures to be in place, the potential adverse impacts during construction would be easily managed.

134. 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 site and are well known to contractors. Hence, mitigation measures would not be difficult to implement.

135. **Comprehensive Solid Waste Management Plan.** In the comprehensive SWM planning activities, the following are recommendations that may be considered in order to ensure compliance of any future SWM infrastructures with ADB SPS, 2009 and international best practices on SWM. For the detailed step-by-step activities and sample illustrations on how to proceed with the tasks, it is recommended that the comprehensive SWM planning team refer to ADB's Practical Guide on Integrated Solid Waste Management for Local Governments (**Error! Reference source not found.**).

Activities	Recommendations
1. Waste Management Planning Assess the overall or holistic waste management strategy of the city, that should integrate all necessary elements of an effective SWM such as: (i) waste prevention, (ii) recycling and reuse, (iii) waste storage and collection,	1. PMCU to engage a team of international experts that has sufficient and actual experience in SWM projects in developing countries. 2. PMCU, with the assistance of the international SWM experts, to undertake the following activities step by step:

Activities	Recommendations
(iv) transportation, (v) treatment and disposal, (vi) program/plan for existing disposal sites, (vii) manpower and financial sustainability of the entire SWM, and (viii) budget (and source of budget) for the entire operation of the SWM. Describe how the above elements are linked together as a strategy. Use diagrams/organograms to illustrate the linkages. Undertake waste characterization and waste volume determination that covers all sources of domestic, commercial, industrial, and medical wastes in the entire city. Use established scientific methods for any sampling activities to be undertaken. Note: For design purposes, ensure to use the total calculated waste generation volume of the entire city as default. Do not exclude any portion of the total calculated waste generation volume based on assumptions only. Any exclusion should be supported by a factual basis, such as results of actual experiments or scientific field studies	**Step 1:** Conduct a feasibility study specific for KCC on the implementation of an integrated solid waste management. The study should include, among others, the following aspects of solid waste management planning: (i) municipal solid waste characterization audit; (ii) solid waste weight and volume (tonnage) determination; (iii) impact of climate change and seasonal weather; (iv) assessment of existing solid waste handling from collection to disposal; (v) assessment of existing and future logistics (manpower and equipment) needs; (vi) assessment of existing and future financial requirements to sustain SWM implementation; (vii) status of existing dumpsites, including planned remediation or closure; (viii) analysis of waste processing and treatment options given the impact of climate change and the limited land area for sanitary landfill development (e.g. recycling, composting, waste-to-energy/biodigestion, sanitary landfill, etc.) (ix) in case of landfill development option, assessment of siting and geotechnical aspects of the site; (x) budget requirements for logistics and transport, infrastructure components, and operation and maintenance; and (xi) other aspects as may be determined by the SWM experts, and ADB's Practical Guide on Integrated Solid Waste Management for Local Governments (See Appendix 6).[a]
2. Waste Prevention Assess the waste prevention program that is or will be implemented all over the city. (i) components of the existing waste prevention program. (ii) stakeholders in the implementation of this existing program. (iii) How is the program being implemented? (iv) What are the resources needed in terms of manpower and cost in order to implement the program in the entire city? (v) What are the gaps on the existing manpower and costs?	
3. Recycling and Reuse Assess and describe the recycling and reuse program of the city, if any. Guide questions are as follows: (i) What are the components or elements of this recycling/reuse program? (ii) Who are the key players in the implementation of this program? (iii) How is program being implemented and how is this going to be implemented to cover all areas of the city? (iv) What are the resources needed in terms of manpower and cost in order to implement the program in the entire city? (v) What are the gaps on the existing manpower and costs? (vi) (vi) What strategies (or market-based instruments) are available to ensure that the program will be sustainable?	**Step 2:** With direct collaboration with KCC, conduct an environment audit on any existing dumpsites and/or transfer stations, which may be considered as associated facilities of the proposed SWM subproject. This is a requirement of ADB SPS. **Step 3:** Complete the engineering designs of all infrastructure components, including sanitary landfill, of the SWM program based on the options provided in the output of the feasibility study. For a sanitary landfill option, ensure that the following are considered in the design: (i) characteristics and volume of wastes to be handled; (ii) exclusion of medical wastes; (iii) lining systems; (iv) leachate collection system; (v) leachate treatment system; (vi) stormwater runoff system; (vii) landfill gas collection system; (viii) layout of cells and other landfill site components, including access road and areas to be utilized for equipment parking and maneuvering;
4. Waste Storage and Collection Assess and describe the - Is there a standard waste storage and collection program for KCC? - How are wastes stored at the household level?	

Activities	Recommendations
- How are wastes transported? - Are there secondary transfer stations? - Are the resources (manpower and financial) available to sustain the waste storage and collection program? - Who will provide these resources? - If KCC will provide these resources, are these exclusive and included in the permanent budget line items of KCC?	(ix) cell depth and projected height relative to ground level; (x) waste compaction; (xi) litter handling; (xii) perimeter fence and buffer zone; and (xiii) other design considerations as may be determined by the SWM experts.
5. Transportation - Describe in detail the on-site and off-site transportation needs of the entire SWM. - What is the existing account of vehicles/equipment? - Are these enough to serve the entire KCC? - Discuss the scheduling and dispatch of fleet on a daily basis from collection to final disposal. Who maintains this fleet? - Are the resources (manpower and financial) available to sustain this fleet? - Who will provide these resources? - If KCC will provide these resources, are these exclusive and included in the permanent budget line items of KCC?	**Step 4:** Conduct consultation meetings with KCC to: (i) discuss current SWM status and presentation of proposed SWM program taken from the feasibility study; (ii) identify the funding requirements to sustain the SWM program; (iii) discuss the source of fund to operate sustainably the SWM program; (iv) measures to ensure availability of the funding requirements, including timeline to execute these measures (e.g. if planned funding source is through new tax or user charging scheme, how soon can a local regulation be passed by KCC?); (v) secure commitment from KCC management to undertake these measures; (vi) secure endorsement and acceptance by the KCC management of the results of the feasibility study; (vii) secure endorsement and acceptance by KCC management of the engineering designs developed based on the feasibility study; and (viii) other important matters requiring management approvals, commitments and decisions as may be determined by PMCU and SWM experts.
6. Treatment and Disposal - What is the existing treatment and disposal of waste in Khulna city corporation? - If existing disposal is through open dumping, what is the plan for the open dumping sites? Closure or conversion? How will this be implemented? Does KCC have resources (manpower and financial)? What is the timeline? - Discuss the proposed treatment and disposal options for the SWM. What are the technologies to be used? -For a sanitary landfill, discuss in detail the following: (i) land area; (ii) google map and locational map showing surrounding receptors, including residential areas; (iii) layout, including offices, parking, open spaces, waste reception areas, mandatory buffer zone, etc.; (iv) engineering design, technologies/components, layout; (v) detailed calculations proving the capacity of the landfill cells to accommodate the volume of waste generation of the entire KCC; (vi) lifespan of the landfill site; (vii) inventory of fleet/equipment needed to maintain operation of landfill site, including equipment for compaction, daily soil cover, and other solid waste handling equipment at the site; (viii) manpower resources; (ix) financial resources to sustain the operation of the landfill site up to closure; and (x) closure plans. - Are manpower resources enough? Show shifting schedule of all the manpower needs of the landfill site. Who will provide the manpower and financial needs to operate and maintain the landfill site? If the KCC will provide these resources, are these exclusive and included in the permanent budget line items of the KCC? If the landfill operation will be contracted to another entity, how will the KCC ensure that this entity will operate the landfill site effectively and efficiently? Will this entity be legally liable? How?	**Step 5:** Draft the appropriate environmental assessment report. The technical information in the environmental assessment report should be based from all information gathered in Steps 1 – 4 above. Drafting of IEE may commence after the output of Step 1 (Feasibility Study) and Step 3 (Detailed designs) are already available and accepted. All other information from the outputs of Steps 2 and 4 may be integrated in the course of drafting the report. In addition, PMCU should develop the following Khulna City-specific programs with assistance from the SWM experts and include results in the environmental assessment report: (i) appropriate grievance redress mechanism; (ii) appropriate and implementable training program; (iii) appropriate and implementable information, education, and communication (IEC) plan; (iv) appropriate capacity building and training program;

Activities	Recommendations
- Who will design the sanitary landfill? Please take note that designing a sanitary landfill is **not** a simple desk work. This is done by experienced professionals/firms in the field.	(v) appropriate and implementable waste collection and storage plan; and (vi) efficient SWM vehicle scheduling and deployment plan.
7. Implementation Capacity - an integrated SWM program can't be successful without the appropriate capacity of the implementing agencies. Describe the current capacity of the KCC in implementing an integrated SWM. What are the gaps? - Is there a capacity building program specifically for each of the stakeholders in the different layers of the integrated SWM? Describe. - Is there an available funding to implement the capacity building program?	

ADB = Asian Development Bank, IEC = information, education and communication, KCC = Khulna city corporation, PMCU = project management and coordination unit, SPS = Safeguard Policy Statement, SWM = solid waste management.

[a] ADB. 2017. *Integrated Solid Waste Management for Local Governments: A Practical Guide*. Manila.

136. **Composting Plant.** This IEE shall be updated to include the detailed design of the composting plant based on the comprehensive SWM plan that will be developed for Khulna City under the subproject. In addition, the design consideration for the composting plant shall follow international best practices on SWM such as the relevant guidelines on composting found in ADB's Practical Guide on Integrated Solid Waste Management for Local Governments (Appendix 10).

137. The EMP for composting plant from design phase to operation and maintenance phase as discussed in this draft IEE shall be used as working matrix in updating the EMP during detailed design. The updated EMP will form part of the updated IEE, which shall be subsequently submitted to ADB for final review and disclosure.

138. After approval by LGED and ADB, the updated IEE shall be attached to bid and contract documents for the composting plant component under the subproject.

RAPID ENVIRONMENTAL ASSESSMENT FOR A COMPOSTING PLANT AND KHULNA CITY AS GENERAL SITE

Country/Project Title: Bangladesh / Second City Region Development Project

Subproject / Package No.: Composting Plant for Khulna City

Screening Questions	Yes	No	Remarks
A. Project Sitting Is the project area adjacent to or within any of the following environmentally sensitive areas?			Khulna city corporation is third largest city of Bangladesh. It is predominantly an urban setting, with commercial and residential areas.
▪ Cultural heritage site		✓	Based on desk review of locations and field verifications by PMCU, there are no environmentally sensitive areas located in Khulna city corporation where the proposed composting plant is to be set up. There is no specific site for the composting plant as yet. However, EARF includes the selection criteria which need to be followed in identifying location or site for the composting plant. Impacts due to location of the composting plant will be re-assessed during detailed design stage.
▪ Protected Area		✓	
▪ Wetland		✓	
▪ Mangrove		✓	
▪ Estuarine		✓	
▪ Buffer zone of protected area		✓	
▪ Special area for protecting biodiversity		✓	
C. Potential Environmental Impacts Will the Project cause...			
▪ impacts associated with transport of wastes to the disposal site or treatment facility	✓		Subproject will improve current management of solid wastes in the city.
▪ impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not applicable
▪ degradation of aesthetic and property value loss?	✓		Subproject location may impact the property values of lands nearby. However, this scenario will also bring other business opportunities for land owners near the composting plant.
▪ nuisance to neighboring areas due to foul odor and influx of insects, rodents, etc.?	✓		Subproject will improve the current situation. During construction, problem may increase. However, this impact will be mitigated with the implementation of related measures in the EMP. O&M Manual to be developed under the subproject will include odor and pest control.
▪ dislocation or involuntary resettlement of people?		✓	Not applicable.
▪ disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	Not applicable.
▪ risks and vulnerabilities related occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?	✓		Anticipated during construction activities. However, impacts are temporary and short in duration. These can be mitigated through the implementation of related measures in the EMP, and such measures will be updated during the detailed design stage.

Screening Questions	Yes	No	Remarks
▪ public health hazards from odor, smoke from fire, and diseases transmitted by flies, insects, birds and rats?	✓		O&M Manual to be developed under the subproject will include fire, odor and appropriate pest control.
▪ land use conflicts?		✓	Not anticipated. The composting plant will be located in an area appropriate for the purpose and in accordance with the site selection criteria in the EARF. Khulna city corporation (KCC) PIU will ensure that there is no land use conflict.
▪ pollution of surface and ground water from leachate coming from the composting plant or methane gas produced from decomposition of solid wastes in the absence of air, which could enter the aquifer or escape through soil fissures?	✓		These impacts are anticipated. However, the EMP defines measures to mitigate these impacts. The EMP will be updated during the detailed design stage. Leachate management measures will be incorporated in the preliminary design. Detailed design will include construction of impermeable layer at the base of the site and inner side slope of the embankment for groundwater protection (subject to detailed geological investigation during detailed design).
▪ inadequate buffer zone around the composting plant site to alleviate nuisances?		✓	Buffer zone and greenery will be included in the design for the composting plant. Proper site selection is considered during the design stage.
▪ road blocking and/or increased traffic during construction and O&M phases of the composting plant?		✓	Not anticipated. The selection of site will ensure that construction of the composting plant will not cause traffic congestion in the area. Besides, the footprint of the composting plant is expected to be small. Nonetheless, the EMP provides measures in any case of traffic disturbance in the area. These measures will be updated during the detailed design stage.
▪ noise and dust from construction and operation of the composting plant?	✓		The impacts are negative but short-term, site-specific within a relatively small area and reversible through mitigation measures. The EMP defines these mitigation measures and will be updated during the detailed design stage.
▪ temporary silt runoff due to construction of the composting plant?	✓		Due to excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants. The impacts are negative but short-term, site-specific within a relatively small area and reversible through mitigation measures. The EMP defines these mitigation measures and will be updated during the detailed design stage.
▪ hazards to public health due to inadequate management of the composting plant	✓		Appropriate institutional development and capacity building for KCC is included under the project. This issue will also be considered in the comprehensive SWM planning component under the subproject.
▪ emission of potentially toxic volatile organic compounds (VOCs) from the composting plant?	✓		This is possible in the operation of a composting plant. Some VOCs may be released from mismanaged organic wastes. However, the EMP provides

Screening Questions	Yes	No	Remarks
			measures to mitigate this impact and will be updated during detailed design stage. The O&M manual for the composting will also define all measures to ensure efficient functioning of all components of the composting plant during O&M phase.
▪ surface and ground water pollution from leachate and methane gas migration?	✓		This is possible in the operation of a composting plant. Some greenhouse gases like methane may be released from mismanaged organic wastes. However, the EMP provides measures to mitigate this impact, which will be updated during the detailed design stage. The O&M manual for the composting will also define all measures to ensure efficient functioning of all components of the composting plant during O&M phase.
▪ contamination of air quality from composting plant operation?	✓		The ambient air quality around the composting plant may be degraded due to generation of dusts. However, the EMP defines measures to mitigate this impact, which will be updated during the detailed design stage.
▪ public health hazards from odor, smoke from fire, and diseases transmitted by flies, rodents, insects and birds, etc.?	✓		These hazards are expected in operation of composting plants. However, the EMP defines measures to mitigate these hazards following international best practices such as the EHS Guidelines on Waste Management Facilities, which will be updated during the detailed design stage. Personal protective equipment will be provided to workers. Regular training will also be conducted to ensure that workers are aware of construction hazards and risks of chemicals during O&M.
▪ health and safety hazards to workers from toxic gases and hazardous materials in the site?	✓		These hazards are expected in operation of composting plants. However, the EMP defines measures to mitigate these hazards following international best practices such as the EHS Guidelines on Waste Management Facilities, which will be updated during the detailed design stage. Personal protective equipment will be provided to workers. Regular training will also be conducted to ensure that workers are aware of construction hazards and risks of chemicals during O&M.
▪ large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		✓	Labor requirements will be sourced locally.
▪ social conflicts if workers from other regions or countries are hired?		✓	Labor requirements will be sourced locally.
▪ risks to community health and safety due to the transport, storage, and use and/or disposal of materials such as explosives, fuel and other chemicals during construction and operation?	✓		Fuels and other chemicals that may be used during the construction and operation of the composting plant, and may raise risks of explosions or fires at

Screening Questions	Yes	No	Remarks
			the site. However, the EMP defines measures to manage these risks, including the implementation of proper handling and storage of these chemicals. These will be updated during the detailed design stage.
▪ community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the composting plant are accessible to members of the affected community or where their failure could result in injury to the community throughout project construction, operation and decommissioning?	✓		These risks are potential in the operation of the composting plant. However, the EMP defines measures in order to manage these risks based on international best practices for SWM such as the EHS Guidelines on Waste Management Facilities. These will be updated during the detailed design stage. Operational area will be clearly demarcated and access will be controlled. Only workers and project concerned members will be allowed to visit the composting plant site.

A Checklist for Preliminary Climate Risk Screening

Country/Project Title: Bangladesh / Second City Region Development Project
Subproject / Package No. :

Screening Questions		Score	Remarks[a]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	1	
	Would the project design (e.g., the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc.)?	1	
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g., prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g., construction material)?	1	
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	1	
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	1	

[a] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high-risk project.
Result of Initial Screening (Low, Medium, High): Medium

Other Comments:_____
_____

Prepared by: _____

TEMPLATE FOR APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE FROM BANGLADESH DEPARTMENT OF ENVIRONMENT

Application for Environmental Clearance Certificate
[See Rule 7(5) of ECR]

Director/Deputy Director
Department of Environment
Dhaka Division/Chittagong Division/Khulna Division/Rajshahi Division (Bogra),

Sir,

I do hereby apply for Environmental Clearance Certificate for my proposed industrial unit or project, or for the existing industrial unit or project, and enclose papers and furnish information as follows:

1.	(a) Name of the industrial unit or project	:
	Address of location of the industrial unit of Project	:
	(b) Address of the present office	:
2.	(a) Proposed industrial unit or project	
	Expected date of starting construction	:
	Expected date for completion of construction	:
	Expected date of trial production, in case of industrial unit, in other cases, date of starting operation of the project	:
	(b) Existing industrial unit or project	
	Date of starting trial production in case of industrial unit, in other cases, date of starting operation of the project	:
3.	Name of product and quantity to produced (daily/monthly/yearly)	:
4.	(a) Name of raw material and quantity (daily/monthly/yearly)	:
	(b) Source of raw material	:
5.	(a) Quantity of water to be used daily	:
	(b) Source of water	:
6.	(a) Name of fuel and quantity (daily/monthly/yearly)	:
	(b) Source of fuel	:
7.	(a) Probable quantity of daily liquid waste	:
	(b) Location of waste discharge	:
	(c) Probable quantity of daily emission of gaseous substance	:
	(d) Mode of emission of gaseous substance	:
8.	Mouza (village) map indicating “Daag” (plot) and “Khatiyan” (land tax account) number	:
9.	Approval of Rajdhani Unnayan Katripakkhya / Chittagong Development Authority / Khulna Development Authority / Local Authority (if applicable)	:
10.	(a) Design and time schedule of proposed Effluent Treatment Plant	:
	(b) Fund allocated	:

	(c) Area	:
11.	Process Flow Diagram	:
12.	(a) Location map of industrial unit or project	:
	(b) Layout plan (with location of Effluent Treatment Plant)	:
13.	(a) IEE / EIA report * (if applicable)	:
	(b) Environmental Management Plan*(if applicable)	:
14.	Feasibility Report (if applicable)	:

Seal

Signature of the entrepreneur:
Name:
Address:
Phone:
Date:

Declaration

I do hereby declare that all information provided by me in this application are true to the best of my knowledge and no information has been concealed or distorted.

Name and Signature of Entrepreneur

* Each page must be countersigned by the person who fills out this application form and by the entrepreneur.

DOCUMENTATION OF PUBLIC CONSULTATIONS CONDUCTED

Public Consultation-Flood Protection Road and Drainage/Solid Waste/Waste Water in Khulna

Name of the Component /Site: Flood Protection Road and Drainage/Solid Waste/Waste Water in Khulna
Number of Participants: 10 (ten); three women and seven man.
Location: Councilor Office, Ward No-30, Toothpara, Khulna
Date: 5-6-17
Time: 12:00 noon to 1:00 p.m.

Issues that are discussed in the Consultation Meeting

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.

1. Support of local people for the proposed project?
2. Any critical issue or concern by the local people regarding the project?
3. Employment potential in the project which is of benefit to village
4. Number of households in the village/district
5. General socio-economic standing: What are the economic activities? Land use, cropping pattern (seasonal), types of crops, value of the crops, average land holding size etc.
6. Loss of residential/commercial structures, if any due to the project
7. Loss of community life like any market places or community activities to be affected
8. Resettlement and land acquisition (if foreseen specially on private land).
9. Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites), if any
10. Will the project siting adversely impact the water or soil resource in the locality
11. What other organizations of a social nature (NGOs/community-based organizations/civil society) active in the area? Name of these organizations
12. Any other Issues you may feel to share: (whether they welcome the project, will there be cooperation from the local community during the implementation, security measures, etc.)

Finding in the public consultation meeting

- Local people will support the project activities.
- The main issue arising from the consultation is that during monsoon period the roads of the area is inundated due to rain water and hinder the movement of people. Due to high tide the sluice gates are closed due to higher water level of the river than inside area. Local people propose to build pump station for drain out flood water during monsoon period. About 25,000 peoples are affected by flood water who are residing the area.
- The area is purely urban area and the residents depend on trade, business and service.
- There is no affect on residential/commercial structures due to the project.
- During construction period short term community activities will be affected.
- No resettlement and land acquisition required for due to the project. There is no protected area in and around the project area. Sundarban the World"s biggest mangrove forest is about 40 km away from the project site.
- 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 etc.
- It assured by the participant, that they will be welcome the project, and will be cooperating by the local community during the implementation, security measures, etc.

List of Participants

Sl. No.	Name of the Participant	Gender	Occupation	Cell Number
1	Md.Amanullah Aman	Male	Councilor, Ward-30,KCC	01924187522
2	Dr.Abul Kalam	Male	Consultant, Second CRDP	01720039503
3	Mrs. Ferdous Ara	Female	Councilor, Ward-30, 28 and 29,KCC	01712156214
4	Md. Ashraful Islam Sagor	Male	Businessman	01733811435
5	Mrs. Rahela Begum	Female	CDC Leader	01934509318
6	Mrs. Sonia	Female	CDC Member	01866539776
7	Mowarul Islam	Male	Service	01716839991
8	Md. Mohoshin Alam	Male	Businessman	01724534096
9	Syed Nasar Ahmed	Male	Consultant, Second CRDP	01711131448
10	Dewan Abdul Quader	Male	Consultant, Second CRDP	01717265102

Photograph of Public Consultation

Public Consultation- Flood Protection Road and Drainage/Solid Waste/Waste Water in Khulna

Name of the Component /Site: Flood Protection Road and Drainage/Solid Waste/Waste Water in Khulna
Number of Participants: 9 (nine); all are man.
Location: KCC wholesale Vegetable Market Society Office, Sonadanga STS, Khulna Date: 7-6-17
Time: 10:00 AM to 1:00PM

Issues that are discussed in the Consultation Meeting
General perception about the project and the awareness about the proposed project are disseminated in the meeting. The following pre-defined issues are discussed during consultation.

1. Support of local people for the proposed project?
2. Any critical issue or concern by the local people regarding the project?
3. Employment potential in the project which is of benefit to village
4. Number of households in the village/district
5. General socio-economic standing: What are the economic activities? Land use, cropping pattern (seasonal), types of crops, value of the crops, average land holding size etc.
6. Loss of residential/commercial structures, if any due to the project
7. Loss of community life like any market places or community activities to be affected
8. Resettlement and land acquisition (if foreseen specially on private land).

9. Protected areas (national park, protected forest, religiously sensitive sites, historical or archaeological sites), if any
10. Will the project siting adversely impact the water or soil resource in the locality
11. What other organizations of a social nature (NGOs/community-based organizations/civil society) active in the area? Name of these organizations
12. Any other Issues you may feel to share: (whether they welcome the project, will there be cooperation from the local community during the implementation, security measures, etc.)

Finding in the public consultation meeting

- Local people will support the project activities.
- The main issue arising from the consultation is that delay of transfer of solid waste from this STS to dumping station create nuisance odor due to decomposing of organic waste. [KCC have 40 numbers of trucks in operations and which are not sufficient to carry the solid waste to dump site. KKC have plan to establish new sanitary land fill site proposed at Scholua and is located in the NW of the city and slightly further away.
- The areas of STSs are purely urban area and the residents depend on trade, business and service. The area sanitary land filed area is outside the urban area. At present there are some fish ponds which will convert to sanitary land field.
- There is no effect on residential/commercial structures due to the project.
- During construction period short term community activities will be affected.
- No resettlement and land acquisition required for due to the project because the land is owned by KCC.
- There is no protected area in and around the project area. Sundarban the World"s biggest mangrove forest is about 40 km away from the project site.
- 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 etc.
- It assured by the participant, that they will be welcome the project, and will be cooperating by the local community during the implementation, security measures, etc.

LIST OF PARTICIPANTS

Sl. No.	Name of the Participant	Gender	Occupation	Cell Number
1	Md. Nazrul Islam	Male	President, Vegetable Market Society	01764249009
2	Md. Abdur Rakib	Male	ACO, KCC	01733616141
3	Md. Alomgir	Male	Conservator, KCC	01922381521
4	Md. Motiul Morselin	Male	Office Secretary, Vegetable Market Society	01718287220
5	Md. Mazhar Zoarder	Male	Collector	01735371569
6	Md. Qumruzzaman Bablu	Male	Electrician	01937453065
7	Dr.Abul Kalam	Male	Consultant, Second CRDP	01720039503
8	Syed Nasar Ahmed	Male	Consultant, Second CRDP	01711131448
9	Dewan Abdul Quader	Male	Consultant, Second CRDP	01717265102

Photograph of Public Consultation

SAMPLE GRIEVANCE REGISTRATION FORM

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

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

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

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

FOR OFFICIAL USE ONLY

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

SUGGESTED TEMPLATE FOR RECORD-KEEPING OF GRIEVANCES

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

INDICATIVE TERMS OF REFERENCE FOR SAFEGUARDS SPECIALIST FOR PROJECT MANAGEMENT AND COORDINATION UNIT, PROJECT IMPLEMENTATION UNITS AND PREPARATION, DESIGN AND SUPERVISION CONSULTANT

A. Preparation, Design, and Supervision Consultants

1. Environmental Safeguards Specialist (National)

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

2. Detailed Tasks:

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

supervising consultant in relevance to effective project implementation.

B. Project Management Coordination unit

1. Environmental Safeguards Officer – PMCU

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

4. Detailed Tasks:

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

1. Environmental Engineer

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

6. Detailed Tasks.

(i) Review the IEE Document and contract clauses and ensure adequacy under ADB's Environmental Assessment Guidelines, 2003 and the updated Safeguards Policy Statement, 2009 and identify any areas for improvement;

(ii) Ensure that the subproject design and specifications adequately reflect the IEE;
(iii) Monitor construction activities to ensure that identified and appropriate control measures are effective and in compliance with the IEE;
(iv) Review and approve the Contractor's Implementation Plan for the environmental measures, as per IEEs/EMPs;
(v) Liaise with the Contractors and Consultants on the implementation of the Environmental management measures proposed in the IEE/EMP;
(vi) Jointly (with the environmental safeguards officer of the PMCU), review the environmental performance of the project through an assessment of the periodic environmental monitoring reports submitted by the PDSC; provide a summary of the same to the Project Director, and initiate necessary follow-up actions; and
(vii) Document the good practices in the project, with support from Environmental Specialists of the PDSC and PIU on (a) incorporation and integration of environmental issues into engineering design; and (b) on implementing environmental measures in the construction, and dissemination of the same.

C. Project Implementation Unit

1. Environmental Officer

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

8. Detailed tasks:

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

SAMPLE DAILY MONITORING SHEET FOR CONTRACTORS

Second City Region Development Project
Contractor Monitoring Sheet

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

Summary of Findings

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

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

Other Issues: _____

_____

_____

_____

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

Prepared by: _____
Name, Designation and Signature

SAMPLE INSPECTION REPORT FOR PMCU AND PIUS

Second City Region Development Project
Site Inspection Checklist

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

Monitoring/Inspection Questions		Findings			Comments / Clarifications
1.	Supervision and Management On-SIte	Yes	No	NA	
	a. Is an EHS supervisor available?				
	b. Is a copy of the SEMP available?				
	c. Are daily toolbox talks conducted on site?				
2.	The Facilities	Yes	No	NA	
	a. Are there a medical and first aid kits on site?				
	b. Are emergency contact details available on-site?				
	c. Are there PPEs available? What are they?				
	d. Are the PPEs in good condition?				
	e. Are there firefighting equipment on site?				
	f. Are there separate sanitary facilities for male and female workers?				
	g. Is drinking water supply available for workers?				
	h. Is there a rest area for workers?				
	i. Are storage areas for chemicals available and with protection? in safe locations?				
3.	Occupational Health and Safety	Yes	No	NA	
	a. Are the PPEs being used by workers?				
	b. Are excavation trenches provided with shores or protection from landslide?				
	c. Is breaktime for workers provided?				
	d. How many for each type of collection vehicle is in current use?				
4.	Community Safety	Yes	No	NA	
	a) Are excavation areas provided with barricades around them?				
	b) Are safety signages posted around the sites?				
	c) Are temporary and safe walkways for pedestrians available near work sites?				
	d) Is there a record of treated wastewater quality testing/measurement?				
5.	Solid Waste Management	Yes	No	NA	
	a. Are excavated materials placed sufficiently away from water courses?				
	b. Is solid waste segregation and management in place?				
	c. Is there a regular collection of solid wastes from work sites?				
6.	Wastewater Management	Yes	No	NA	
	a) Are there separate sanitary facilities for various types of use (septic tanks, urination, washing, etc.)?				
	b) Is any wastewater discharged to storm drains?				
	c) Is any wastewater being treated prior to discharge?				
	d) Are measures in place to avoid siltation of nearby drainage or receiving bodies of water?				
	e) Are silt traps or sedimentation ponds installed for surface runoff regularly cleaned and freed of silts or sediments?				

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

SEMI-ANNUAL ENVIRONMENTAL MONITORING TEMPLATE

INTRODUCTION

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

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

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

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

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

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

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

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

COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT PLAN (REFER TO EMP TABLES IN APPROVED IEE/S)

- Confirm if IEE/s require contractors to submit site-specific EMP/construction EMPs. If not, describe the methodology of monitoring each package under implementation.

Package-wise IEE Documentation Status

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

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

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

Package Name	Contractor	Nodal Person	Email Address	Contact Number

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

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

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

[a] Attach Laboratory Results and Sampling Map/Locations.

Overall Compliance with CEMP/ EMP

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

APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

- Briefly describe the approach and methodology used for environmental monitoring of each subproject.

MONITORING OF ENVIRONMENTAL IMPACTS ON PROJECT SURROUNDINGS (AMBIENT AIR, WATER QUALITY AND NOISE LEVELS)

- Discuss the general condition of surroundings at the project site, with consideration of the following, whichever are applicable:
    - Confirm if any dust was noted to escape the site boundaries and identify dust suppression techniques followed for site/s.
    - Identify if muddy water is escaping site boundaries or if muddy tracks are seen on adjacent roads.
    - Identify type of erosion and sediment control measures installed on site/s,

condition of erosion and sediment control measures including if these are intact following heavy rain;
- Identify designated areas for concrete works, chemical storage, construction materials, and refueling. Attach photographs of each area in the Appendix.
- Confirm spill kits on site and site procedure for handling emergencies.
- Identify any chemical stored on site and provide information on storage condition. Attach photograph.
- Describe management of stockpiles (construction materials, excavated soils, spoils, etc.). Provide photographs.
- Describe management of solid and liquid wastes on-site (quantity generated, transport, storage and disposal). Provide photographs.
- Provide information on barricades, signages, and on-site boards. Provide photographs in the Appendix.
- Indicate if there are any activities being under taken out of working hours and how that is being managed.

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

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

Air Quality Results

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

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

Water Quality Results

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

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

Noise Quality Results

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

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

GRIEVANCE REDRESS MECHANISM

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

COMPLAINTS RECEIVED DURING THE REPORTING PERIOD

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

SUMMARY OF KEY ISSUES AND REMEDIAL ACTIONS

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

APPENDIXES

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

ADB'S PRACTICAL GUIDE ON INTEGRATED SOLID WASTE MANAGEMENT FOR LOCAL GOVERNMENTS
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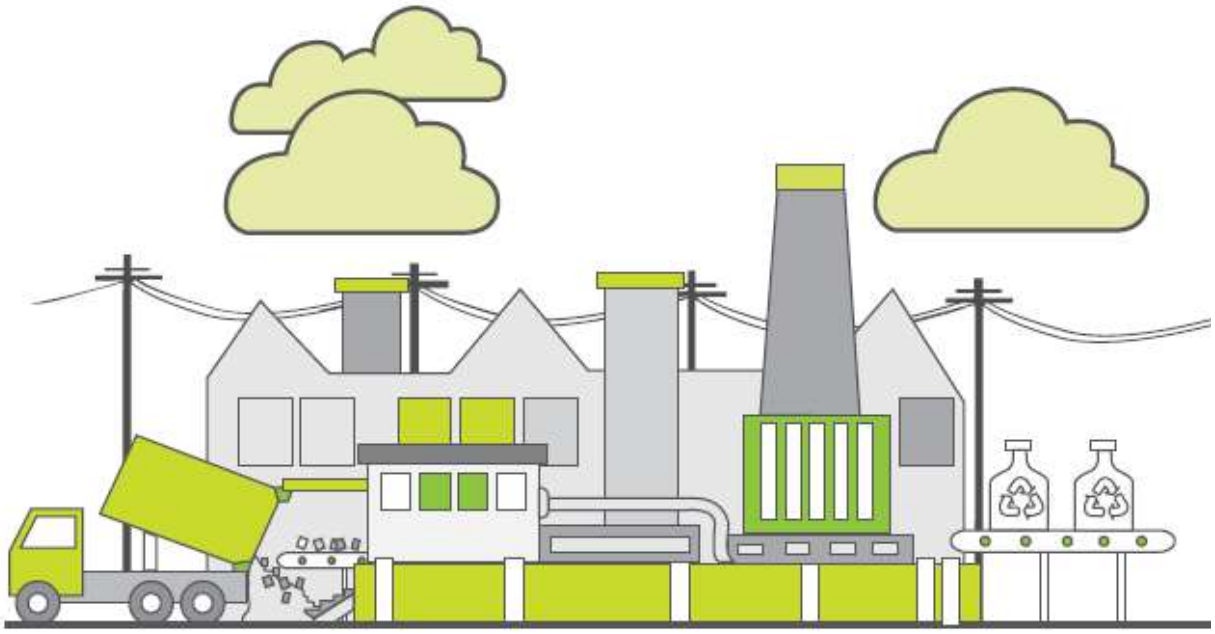

INTEGRATED SOLID WASTE MANAGEMENT FOR LOCAL GOVERNMENTS

A Practical Guide

ASIAN DEVELOPMENT BANK

50 YEARS ADB

Note: Full text available at *https://www.adb.org/documents/solid-waste-mgt-local-gov*.

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