Initial Environmental Examination

April 2017

BAN: Third Urban Governance and Infrastructure Improvement (Sector) – Additional Financing – Kushtia Sanitation Subproject

Prepared by Local Government Engineering Department – Government of Bangladesh for the Asian Development Bank. This is an initial draft available on http://www.adb.org/projects/39295-038/documents.

CURRENCY EQUIVALENTS

(as of 3 March 2017)

Currency Unit	=	BDT
BDT1.00	=	$0.01260
$1.00	=	BDT79.36

ABBREVIATIONS

ADB	-	Asian Development Bank
AM	-	Accountability Mechanism
AP	-	Affected Person
BBS	-	Bangladesh Bureau of Statistics
BSCIC	-	Bangladesh Small and Cottage Industries Corporation
BDT	-	Bangladesh Taka
BMD	-	Bangladesh Meteorological Department
BNBC	-	Bangladesh National Building Code
BOD	-	Biochemical Oxygen Demand
BOD_5	-	5-day Biochemical Oxygen Demand
CC	-	cement concrete
CCA	-	Climate Change Adaptation
COD	-	Chemical Oxygen Demand
CRO	-	Complaint Receiving Officer
dB	-	Decibel
DFR	-	Draft Final Report
DO	-	Dissolved Oxygen
DoE	-	Department of Environment
DPHE	-	Department of Public Heath Engineering
EA	-	Environmental Assessment
EARF	-	Environmental Assessment and Review Framework
ECA	-	Environmental Conservation Act
ECC	-	Environmental Clearance Certificate
ECR	-	Environment Conservation Rules
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
FGD	-	Focus Group Discussion
GHG	-	Green House Gas
GoB	-	Government of Bangladesh
GRC	-	Grievance Redress Committee
GRM	-	Grievance Redress Mechanism
H&S	-	Health and Safety
IEE	-	Initial Environmental Examination
IUCN	-	International Union for Conservation of Nature
LGD	-	Local Government Division
LGED	-	Local Government Engineering Department
MDSC	-	Management Design and Supervision Consultant
MLGRDC	-	Ministry of Local Government, Rural Development, and Cooperatives
NEMAP	-	National Environmental Management Action Plan
NGO	-	Nongovernment Organization
O&M	-	Operation and Maintenance
PIU	-	Project Implementation Unit
PM	-	Particulate Matter

PMU	-	Project Management Unit
RP	-	Resettlement Plan
RCC	-	Reinforced Cement Concrete
ROW	-	Right of Way
RUCCA	-	Rapid Urban and Climate Change Assessment reports
SPM	-	Suspended Particulate Matter
SPS	-	Safeguard Policy Statement
TDS	-	Total Dissolved Solids
TSS	-	Total Suspended Solids
USEPA	-	United States Environmental Protection Agency
WHO	-	World Health Organization
WLCC	-	Ward Level Coordination Committee

GLOSSARY OF BANGLADESHI TERMS

beel	Permanent water body
bosti	Slum
charra	Natural drainage channel
ghat	Boat landing station
khal	Drainage ditch/canal
katcha	Poor quality, poorly built
lakepar	Side of lake
mahalla	Community area
mouza	Government-recognized land area
parashad	Authority (*pourashava*)
pourashava	Municipality
pucca	Good quality, well built, solid
thana	Police station
upazila	Sub-district

UNITS

ha	-	hectare
km	-	kilometer
m	-	meter
mm	-	millimeter
km/h	-	kilometer per hour

NOTES

(i) The fiscal year of the Government of Bangladesh and its agencies ends on 30 June.
(ii) In this report, "$" refers to US dollars.

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EXECUTIVE SUMMARY

1. After the successful implementation of the first and second Urban Governance and Infrastructure Improvement (Sector) Project (UGIIP-1 and UGIIP-2)[1] in 78 *pourashavas* (municipalities), Local Government Engineering Department (LGED) with the financial assistance of Asian Development Bank (ADB) have been implementing UGIIP-3 in selected 30 *pourashavas* over a period of six years (2014 to 2020). The on-going UGIIP-3 (current project) supports strengthening of urban governance and improvement of urban infrastructure and service delivery in *pourashavas* by providing investment support to *pourashavas* based on their governance performance.[2] The additional financing will expand the current project and invest in (i) additional priority infrastructure and governance improvement in *pourashavas* under the current project, and (ii) infrastructure and governance improvement in five new *pourashavas*.[3] With additional financing the project implementation period is proposed to be extended for one year to 2021.

2. **Subproject Scope.** The subproject is formulated under this project to provide accessible, reliable and climate-resilient sanitation facilities in a holistic and integrated manner. Investments under this subproject include (i) Construction of Community Toilet for 5- 10 families: 75 nos. (ii) Construction of New Public Toilets at different locations: 20 nos (iii) Installation of Twin pit Latrines for 3 ~ 5 poor families: 1290 sets and associated development for sanitation infrastructure along with awareness campaign.

3. Screening and Categorization. An environmental assessment of the subproject is required per ADB's Safeguard Policy Statement (SPS, 2009). An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for sanitation- public toilet and community toilet (**Appendix 1**) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus Kushtia sanitation subproject is classified as environmental category B as per ADB SPS and an initial environmental examination (IEE) has been prepared in accordance with ADB SPS's requirements for environment category B projects.

4. This is the draft Initial Environmental Examination (IEE) based on the feasibility study and preliminary engineering designs prepared during project preparation. This IEE will be finalized during detailed design stage to reflect any changes and latest subproject designs.

5. As per Government of Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 1997), Kushtia sanitation subproject is categorized as "orange B" and location clearance certificate (LCC) and environmental clearance certificate (ECC) must be obtained from the DoE.

6. **Implementation arrangements.** LGED and Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC), are the executing agencies (EA). LGED is

[1] With limited but effective incentives for *pourashavas* to improve their governance, the first UGIIP introduced a performance-based fund allocation strategy through the urban governance improvement action plan (UGIAP) ensuring governance reforms while creating tangible development impacts in an integrated manner.

[2] Under UGIIP-3 the UGIAP covers the areas (i) citizen awareness and participation, (ii) urban planning, (iii) gender equality and social inclusion, (iv) local resource mobilization, (v) financial management and accountability, (vi) administrative transparency, and (vii) keeping essential *pourashava* services functional.

[3] P*ourashavas* to be included under additional financing are Cox's Bazar, Faridpur, Gopalganj, Kushtia, and Mymensingh.

responsible for providing support and guidance to *pourashavas* concerning performance criteria and *pourashava* development planning. DPHE will provide support in water supply and sanitation schemes. Implementation activities will be overseen by a project management unit (PMU). Participating *pourashavas* are the implementing agencies (IA), with a project implementation unit (PIU) within the *pourashava* structure. Consultant teams, composed of Management Design and Supervision Consultants, and Governance Improvement and Capacity Development Consultants, are responsible for (i) detailed engineering design, contract documents preparation and safeguards facilitation; (ii) project management and administration support; (iii) assistance in supervising construction; (iii) strengthening of local governance, conducting required studies/surveys and (iv) awareness raising on behavioral change in water, sanitation and solid waste management activities.

7. **Description of the environment.** Subproject components are located in Kushtia urban area or in its immediate surroundings, which were developed into urban land uses. The subproject sites are located in existing government-owned land. There are no protected areas, wetlands, mangroves, or estuaries in or near the subproject location. There are no forest areas within or near Kushtia town.

8. **Environmental management.** An environmental management plan (EMP) is included as part of this IEE, which includes (i) mitigation measures for environmental impacts during implementation; (ii) an environmental monitoring program, and the responsible entities for mitigating, monitoring, and reporting; (iii) public consultation and information disclosure; and (iv) a grievance redress mechanism. A number of impacts and their significance were reduced through mitigation measures in the preliminary design stage. The EMP will form part of the civil work bidding and contract documents.

9. Locations and siting of the proposed infrastructures were considered to further reduce impacts. The concepts considered in design of the Kushtia sanitation subproject are: (i) sites should be located within or very close to locality of users; (ii) sites must be prioritized in educational or institutional compound where concerned authority has no objection; (iii) sites should be selected in the area where significant number of population live; (iv) locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; (v) sites are selected according to the environmental criteria for project selection specified in the environmental assessment and review framework; (vi) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

10. Preliminary designs integrate a number of measures, both structural and non-structural, to mainstream climate resilience into the Kushtia sanitation subproject, including: (i) proposed remedial measures to overcome existing problems in pit latrines; (ii) use of septic tanks in public toilets, school latrines and community latrines based on availability of land size, flooding condition, location and use; and (iii) combination of treatment modules that are applicable for diverse land uses for the pilot septage treatment plants. As a result, some measures have already been included in the subproject designs. This means that the impacts and their significance have already been reduced.

11. During the construction phase, impacts mainly arise from (i) disturbance of residents, businesses, and traffic; (ii) need to manage excess construction materials and spoils; and (iii) community and workers health and safety. These are common impacts of construction in urban areas, and there are well developed methods for their mitigation. Measures such as conducting

work in lean season and minimizing inconvenience by best construction methods will be employed.

12. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. The toilets and latrines will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. While pit latrines must be emptied frequently, solids that accumulate in septic systems (septage) must also be removed periodically, usually every 2 to 5 years depending on design and usage to maintain proper function and prevent plugging, overflows, and the resulting release of septic tank contents. Recommended measures to prevent, minimize, and control releases of septage and other fecal sludge are included in the EMP. Operation and maintenance of community toilet will be shared responsibility between the user communities or maintenance committee formed by the local community, who will be educated on the technology and with support from the pourashava for periodical maintenance.

13. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

14. **Consultation, Disclosure and Grievance Redress.** The stakeholders were involved in developing the IEE through discussions on-site and public consultation. Their views were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB, LGED, and DPHE websites. The consultation process will be continued and expanded during project implementation to ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

15. **Monitoring and Reporting.** The PMU, PIU (Kushtia *pourashava*), and Management Design and Supervision Consultants (MDSC) will be responsible for safeguard monitoring. The MDSC will submit monthly monitoring reports to PMU, and the PMU will send semi-annual monitoring reports to ADB. ADB will post the semi-annual environmental monitoring reports on its website as part of its disclosure requirements.

16. **Conclusions and Recommendations.** The citizens of Kushtia will be the major beneficiaries of this subproject. The benefits of improved sanitation translate into improved health, an increase in productivity, fewer days absent from school for children, and improved quality of life. In addition to improved environmental conditions, the subproject will reduce exposure to climate extremes. On-site/decentralised systems of waste management will improve community health and hygiene, particularly in socially deprived groups, and reduce financial burden of Kushtia pourashava. People would spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health. Therefore the proposed subproject is unlikely to cause significant adverse impacts and net environmental and health benefits to citizens of Kushtia will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

17. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

I. INTRODUCTION

1. After the successful implementation of the first and second Urban Governance and Infrastructure Improvement (Sector) Project (UGIIP-1 and UGIIP-2)[4] in 78 *pourashavas* (municipalities), Local Government Engineering Department (LGED) with the financial assistance of Asian Development Bank (ADB) have been implementing UGIIP-3 in selected 30 *pourashavas* over a period of six years (2014 to 2020). The on-going UGIIP-3 (current project) supports strengthening of urban governance and improvement of urban infrastructure and service delivery in *pourashavas* by providing investment support to *pourashavas* based on their governance performance.[5] The additional financing will expand the current project and invest in (i) additional priority infrastructure and governance improvement in *pourashavas* under the current project, and (ii) infrastructure and governance improvement in five new *pourashavas*.[6] With additional financing the project implementation period is proposed to be extended for one year to 2021.

2. LGED and Department of Public Health Engineering (DPHE), both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC), are the executing agencies (EA). LGED is responsible for providing support and guidance to *pourashavas* concerning performance criteria and *pourashava* development planning. DPHE will provide support in water supply and sanitation schemes. Implementation activities will be overseen by a project management unit (PMU). Participating *pourashavas* are the implementing agencies (IA), with a project implementation unit (PIU) within the *pourashava* structure. Consultant teams, composed of Management Design and Supervision Consultants, and Governance Improvement and Capacity Development Consultants, are responsible for (i) detailed engineering design, contract documents preparation and safeguards facilitation; (ii) project management and administration support; (iii) assistance in supervising construction; (iii) strengthening of local governance, conducting required studies/surveys and (iv) awareness raising on behavioral change in water, sanitation and solid waste management activities.

3. **Subproject Scope.** Kushtia sanitation subproject is formulated to provide accessible, reliable and climate-resilient sanitation facilities in a holistic and integrated manner. Investments under this subproject include (i) construction of 75 community toilets; (ii) construction of 20 new public toilets; (iii) installation 1,290 sets of twin pit latrines for poor families: (iv) ward-wise motivational meeting with 21 ward beneficiaries; and (v) campaign program and social rally using banners, posters, etc.

4. **Screening and Categorization.** An environmental assessment of the subproject is required per ADB's Safeguard Policy Statement (SPS, 2009). An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for sanitation- public toilet and community toilet (**Appendix 1**) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts. Thus Kushtia sanitation subproject is classified as environmental category B as per ADB SPS and an initial environmental

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II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

A. ADB Policy

6. ADB requires the consideration of environmental issues in all aspects of ADB's operations, and the requirements for environmental assessment are described in ADB SPS, 2009. This states that ADB requires environmental assessment of all project loans, program loans, sector loans, sector development program loans, loans involving financial intermediaries, and private sector loans.

7. **Screening and categorization.** The nature of the environmental assessment required for a project depends on the significance of its environmental impacts, which are related to the type and location of the project; the sensitivity, scale, nature, and magnitude of its potential impacts; and the availability of cost-effective mitigation measures. Projects are screened for their expected environmental impacts, and are assigned to one of the following four categories:

(i) **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
(ii) **Category B.** Projects could have some adverse environmental impacts, but of lesser degree or significance than those in category A. An IEE is required to determine whether significant environmental impacts warranting an EIA are likely. If an EIA is not needed, the IEE is regarded as the final environmental assessment report.
(iii) **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
(iv) **Category FI.** Projects involve a credit line through a financial intermediary or an equity investment in a financial intermediary. The financial intermediary must apply an environmental management system, unless all projects will result in insignificant impacts.

8. **Environmental management plan.** An EMP, which addresses the potential impacts and risks identified by the environmental assessment, shall be prepared. The level of detail and complexity of the EMP and the priority of the identified measures and actions will be commensurate with the project's impact and risks.

9. **Public disclosure.** ADB will post the safeguard documents on its website as well as disclose relevant information in accessible manner in local communities:

(i) for environmental category A projects, draft EIA report at least 120 days before Board consideration;
(ii) final or updated EIA and/or IEE upon receipt; and
(iii) environmental monitoring reports submitted by the Project Management Unit (PMU) during project implementation upon receipt.

10. **Pollution Prevention and Control Technologies.** During the design, construction, and operation of the project the PMU and PIUs will 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 Environment, Health and Safety Guidelines. These standards contain performance levels and measures that are normally acceptable and applicable to projects. When Government of Bangladesh regulations differ from these levels and measures, the PMU and PIUs will achieve whichever is more stringent. If less stringent levels or measures are appropriate in view of specific project circumstances, the PMU and PIUs will provide full and detailed justification for any proposed alternatives that are consistent with the requirements presented in ADB SPS.

Table 1: Applicable WHO Ambient Air Quality Guidelines

Table 1.1.1: WHO Ambient Air Quality Guidelines[7,8]		
	Averaging Period	Guideline value in $\mu g/m^3$
Sulfur dioxide (SO_2)	24-hour 10 minute	125 (Interim target-1) 50 (Interim target-2) 20 (guideline) 500 (guideline)
Nitrogen dioxide (NO_2)	1-year 1-hour	40 (guideline) 200 (guideline)
Particulate Matter PM_{10}	1-year 24-hour	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline) 150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter $PM_{2.5}$	1-year 24-hour	35 (Interim target-1) 25 (Interim target-2) 15 (Interim target-3) 10 (guideline) 75 (Interim target-1) 50 (Interim target-2) 37.5 (Interim target-3) 25 (guideline)
Ozone	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

Table 2: World Bank Group's Noise Level Guidelines

Table 1.7.1- Noise Level Guidelines[54]		
	One Hour L_{Aeq} (dBA)	
Receptor	Daytime 07:00 - 22:00	Nighttime 22:00 - 07:00
Residential; institutional; educational[55]	55	45
Industrial; commercial	70	70

B. National Laws

11. Implementation of all subprojects will be governed by the environmental acts, rules, policies, and regulations of the Government of Bangladesh. These regulations impose restrictions on the activities to minimize/mitigate likely impacts on the environment. Many of these are cross-sectoral and several of them are directly related to environmental issues. The

most important of these are the Environment Conservation Act, 1995 (ECA, 1995), and the Environment Conservation Rules (ECR, 1997).

12. Table 3 presents specific requirements for the Kushtia sanitation subproject. **Appendix 8** provides the environmental standards for air, surface water, drinking water, emissions, noise and vehicular exhaust.

Table 3: Applicable Government of Bangladesh Environmental Legislations

	Legislation	Requirements for the Project	Relevance
1.	Environmental Conservation Act of 1995 and amendments in 2000, 2002 and 2010 [a]	• Restriction on operation and process, which can be continued or cannot be initiated in the ecologically critical areas • Regulation on vehicles emitting smoke harmful to the environment • Remedial measures for injuries to ecosystems • Standards for quality of air, water, noise and soil for different areas for various purposes and limits for discharging and emitting waste • Environmental guidelines	The provisions of the act apply to the entire subproject in the construction and operation and maintenance (O&M) phases.
2.	Environmental Conservation Rules of 1997 and amendments in 2002 and 2003	• Environmental clearances • Compliance to environmental quality standards	The subproject is categorized as Orange-B and requires locational clearance certificate (LCC) and environmental clearance certificate (ECC). All requisite clearances from DoE shall be obtained prior to commencement of civil works.
3.	Forest Act of 1927 and amendments (2000)	• Clearance for any felling, extraction, and transport of forest produce	Considered in subproject preparation and implementation.
4.	Bangladesh Climate Change Strategy and Action Plan of 2009	• Ensure existing assets is put in place to deal with the likely impacts of climate change. • Enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change	Considered in subproject preparation and implementation.
5.	Bangladesh Labor Law of 2006	• Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement • Prohibition of employment of children and adolescent	Considered in the EMP.

[a] *ECA Amendment 2000* focuses on ascertaining responsibility for compensation in cases of damage to ecosystems, increased provision of punitive measures both for fines and imprisonment and the authority to take cognizance of offences. *ECA Amendment 2002* elaborates restrictions on polluting automobiles; restrictions on the sale, production of environmentally harmful items like polythene bags; assistance from law enforcement agencies for environmental actions; break up of punitive measures; and authority to try environmental cases. In *ECA Amendment 2010,* no individual or institution (government or semi-government/non-government/self-governing can cut any hill or hillock; fill-up or changed any remarked water body however in case of national interest; the mentioned activities can be done after getting clearance from respective the departments.

C. Government of Bangladesh Environmental Assessment Procedures

13. Under ECA, 1995 and ECR, 1997 industrial units and projects are classified into four categories according to "their site and impact on the environment" and investment size, and each category (Green, Orange-A, Orange-B and Red) requires a different level of environmental assessment as a prerequisite for the Department of Environment (DoE) in granting the locational clearance certificate (LCC) and environmental clearance certificate (ECC) that allow the project to proceed.

14. As per Schedule 1 of ECA, 1995 Kushtia sanitation subproject is likely to be classified as red category (Table 4). Thus LCC and ECC are required from the DoE prior to commencement of the subproject.

Table 4: Likely Government of Bangladesh Classification of Kushtia sanitation Subproject

	Subproject	Component	Equivalent in Schedule I of ECR 1997	DoE Classification
1.	Sanitation Infrastructure	Toilet facilities and latrines	Public Toilet	Orange-B

15. Rule 7 of the ECR, 1997 indicates that the application for ECC must be made to the relevant DoE Divisional Officer, and the application for Orange-B category projects will include the following:

(i) Completed Application for ECC, and the appropriate fee;
(ii) Report on the feasibility of the project;
(iii) Report on the IEE for the project;
(iv) Report on the environmental management plan (EMP);
(v) No objection certificate from the local authority;
(vi) Emergency plan relating to adverse environmental impact and plan for mitigation of the effect of pollution; and
(vii) Outline of the relocation and rehabilitation plan (where applicable).

16. DoE has 30 days to respond to receipt of the ECC application for an Orange-B category project.

17. This draft IEE will serve the basis for the ECC application and will be supplemented to fulfill any additional government requirements.

D. Relevant Occupational Health and Safety Laws and Rules

18. The implementation of the subproject shall comply with the relevant occupational health and safety Laws and Rules as shown in Table 5.

Table 5: Relevant Occupational Health and Safety Laws and Rules

Title of Laws and Rules	Descriptions
Social Security under the Act, 1923 and an amendment in 1980	According to the Act social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions.
Bangladesh Labor Law of 2006	Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labor relations and social dialogue, and enforcement

Title of Laws and Rules	Descriptions
	Prohibition of employment of children and adolescent
The Employer's Liability Act, 1938	The Act declares that the doctrine of common employment and of assumed risk shall not be raised as a defense in suits for damages in respect of employment injuries. Under the Maternity Benefit Act, 1939, the Maternity Benefit Act, 1950, the Mines Maternity Benefit Act, 1941, and finally the rules framed there under, female employees are entitled to various benefits for maternity, but in practice they enjoy leave of 6 weeks before and 6 weeks after delivery.
Public Health (Emergency Provisions) Ordinance, 1994	The ordinance calls for special provisions with regard to public health. Whereas an emergency has arisen, it is necessary to make special provision for preventing the spread of human disease, safeguarding public health and providing them adequate medical service and other services essential to the health of respective community and workers in particular during the construction related work.
The Employees State Insurance Act, 1948	It has to be noted that health, injury and sickness benefit should be paid to people, particularly respective workers at work place under the Act.
Bangladesh Factory Act, 1979	The Act requires every workplace including small or large scale construction where women are employed to have an arrangement of childcare services. Based on this Act and Labor Laws - medical facilities, first aid and accident and emergency arrangements are to be provided by the authority to the workers at workplaces.
Water Supply and Sewerage Authority Act, 1996	The Act specify WASA's responsibility to develop and manage water supply and sewerage systems for the public health and environmental conservation.

E. Conventions, Treaties and Protocols

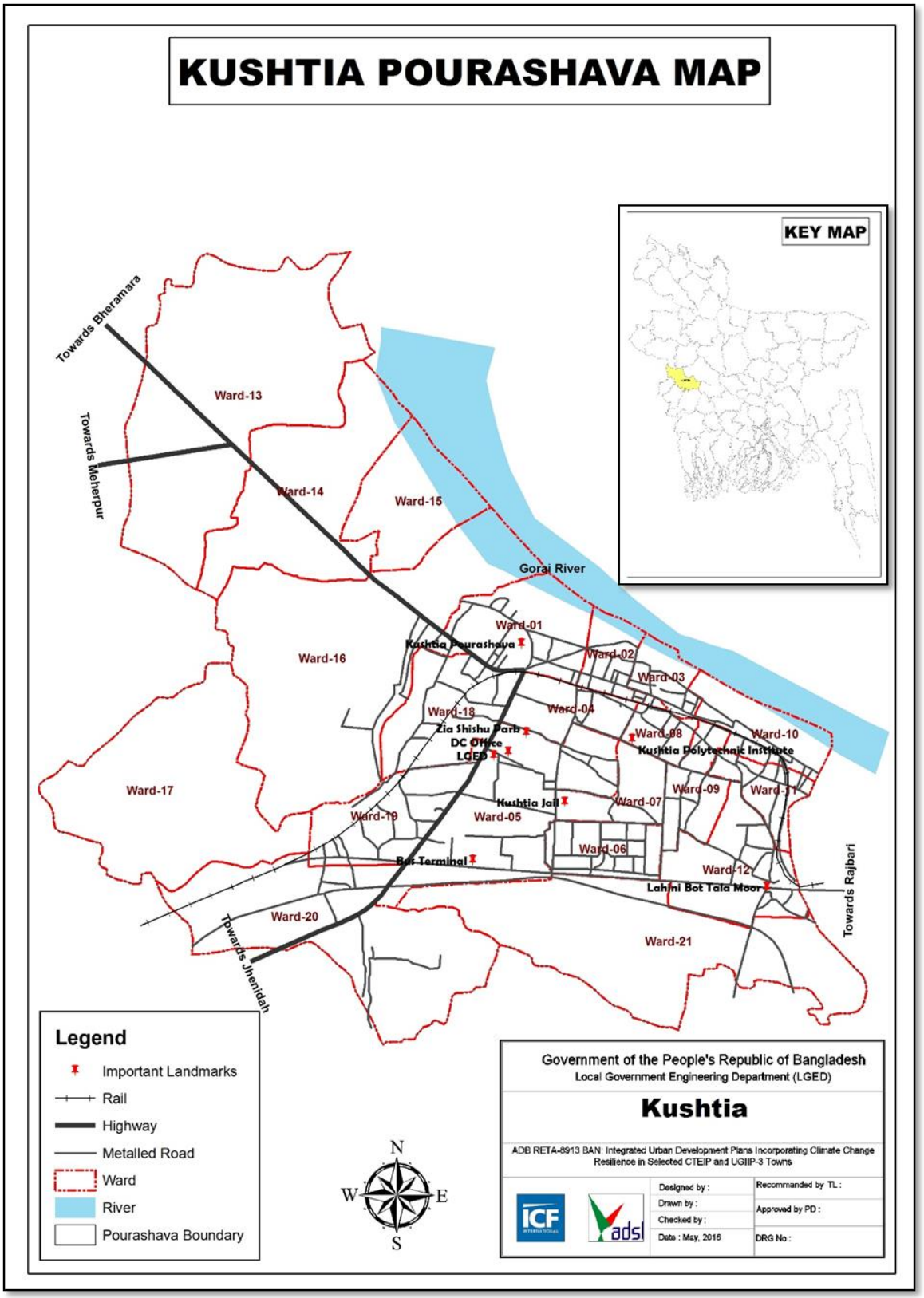
19. Bangladesh has consented to be bound by the terms of some 21 of the 44 principal international conventions, treaties and protocols relating to the environment (Islam, 1996). Those with partial and indirect relevance to industrial projects are the Paris convention of 1972 concerning the protection of the World cultural and natural Heritage, Convention concerning safety in the use of chemicals at work, Geneva 1990, Biodiversity convention, Rio-de-Janeiro, 1992, Convention concerning occupational health services, Geneva 1985 etc.

III. DESCRIPTION OF THE PROJECT

A. The Study Area

20. Kushtia *Pourashava* is located on the bank of the River Gorai, which is connected to the River Padma, and has a rich history of cultural heritage. It was one of the original district towns during the British period. In 2011 the porashava consisted of 12 wards but since then has expanded to 21. The pourashava covers an area of 42.79 sq.km. The 2011 population of the 21 wards has been calculated as 226,316, based on BBS 2011 data; the population density is 5,289 persons per km^2. The land and dwellings are affected by flooding every year with the average depths range 1–100 cm. The *pourashava* map of the town is shown as Figure 1.

Figure 1: Kushtia Pourashava Map



Source: TA 8913 Report for UGIIP-3 additional financing project preparation

B. Existing Situation

21. The environmental sanitation situation in Kushtia is not satisfactory. 48.65% (rural 38.35% and urban 84.85%) of dwelling households of the upazila use sanitary latrines and 31.66% (rural 37.19% and urban 12.21%) of dwelling households use non-sanitary latrines, while 19.69% of households do not have latrine facilities.

22. No disposal and treatment facilities are available in the *pourashava*. No sewerage system is available. In Kushtia *Pourashava* 76% of the area is sub-urban and housing is not developed in a planned way, and over all sanitation is not hygienic. During the rainy season most of the suburban area is flooded due to poor drainage. More over the latrines are not well maintained. Sludge from pits flow over ground to the nearby ditches, khal or canals causing environmental and health hazards and pollution. Most of the latrines, especially in slum and low income areas, are very unhygienic. The present infrastructure situation for sanitation found is as follows:

(i) Total households (HH) number: 53,228
(ii) % of HH toilets with septic tank + soak pit: 02 %
(iii) % of HH toilets having septic tank: 30 %
(iv) % of HH with ventilated improved pit latrine: 10 %
(v) % of HH having other latrines: 10 %
(vi) Twin-Pit latrine constructed at slum area under UPPR P, LGED: 846 nos.
(vii) Existing community latrines constructed under UPPR P : 4 nos.
(viii) No. of existing public toilets : 9 nos.

Figure 2: Existing Twin-pit latrine for 3 families at Char Bundth para, Ward No. 10, constructed under UPPR P LGED in 2008, Kushtia

23. **Public toilets.** There are few public toilets in Kushtia, which are in fairly good condition as the pits/septic tanks are in good conditions and superstructures are slightly damaged. There are arrangement for electricity and water supply, and separate provision for females. Only problem identified is improper design of septic tank. Septic tank is found to be connected with drain at the bottom side that mean there is not much solids storing in the septic tank; it is removing along the drained water. It is supposed to be connected at the upper part so that only supernatant water from the septic tank would be drained.

Figure 3: Existing public toilet inside a market.

24. Latrines. The latrines are generally located in relatively low areas in the household. The latrines consists of 4/5 nos. rings placed to the depth of around 3-4ft (0.9-1.2m) in the ground; a platform is simply positioned on the uppermost ring of the pit which is almost at the ground level. Consequently the latrines are easily inundated due to rainwater accumulation in the monsoon season, resulting in a loss of accessibility to the latrine and pollution caused by discharge of the contents.

C. Proposed Components

25. Kushtia Pourashava has proposed a significant quantity of infrastructure interventions to fulfill the increased sanitation demand of the core as well as fringe areas, and also considering the extended area of 29.33 sq. km: total 75 nos. community toilets for 5~10 families, 20 public toilets at different locations, and 1,290 nos. twin-pit latrines (21 wards x 50nos. = 1,050 nos, 8 slums x 30 nos. = 240 nos.; total 1,290 nos.) for 3~5 poor families. Some sanitation awareness programs have also been included.

26. The proposed interventions of public toilet and community latrine all are located in the *pourashava* land and/or other government land. For the other government land, it is required to get NOC from the respective government institute. During detailed design, it is required to ensure that detailed design of community latrine and public toilet is completed along with design

of improved septic tank and soak pit.[7] Improved septic tank design is shown in Figure 4. Improved twin pit latrine design is shown in Figure 5. It is required to keep separate facilities and provision for male and female.

27. Cost estimation of proposed sanitation interventions are shown in Table 6. Design of public toilet for Kushtia is shown in Figure 6 and soak well design is shown in Figure 7.

Table 6: Cost Estimates of Proposed Sanitation Subprojects – Kushtia

Sl. no.	Subproject/Component	Quantity	Preliminary Cost Estimate	
			BDT million	USD million
a.	Construction of Community Toilet for 5-10 families	75 nos.	90.207	1.172
b.	Construction of New Public Toilets at different locations	20 nos.	34.805	0.453
c.	Installation of Twin pit Latrines for 3 ~ 5 poor families	1290 sets	112.039	1.455
d.	Ward wise Motivational Meeting with beneficiaries	21 wards	0.401	0.005
e.	Campaign program and social rally with banner, posters	1	0.179	0.002
	Total		**237.68**	**3.03**

Source: TA 8913 Report for UGIIP-3 additional financing project preparation.

D. Implementation Schedule

28. Implementation of UGIIP-3 is in three phases based on achievement of governance criteria of the *pourashavas*. The additional financing will provide support for the project's (i) second phase = 24 months of that 18 months is assumed for construction, and (ii) third phase of UGIIP-3 = 26 months.

29. All the proposed sanitation interventions will be implemented under second phase of UGIIP-3. Preliminary design of sanitation facilities has been done by the TA consultants and will be finalized during detailed design stage. It is estimated that construction period for implementation will cover 18 months. The final detailed implementation schedule will be provided in the updated IEE once the detailed design phase will be completed.

[7] Improved septic tank designs are developed to enhance the removal efficiency of unsettleable and dissolved solids, a major drawback of conventional septic tank. The basic principle of such a system is to increase contact between entering wastewater and active biomass in the accumulated sludge. This can be achieved by constructing additional compartments (2 to 3) with vertical baffle system in to the conventional septic tank to force the wastewater to flow through the accumulated biomass as it passes from the inlet to outlet. Wastewater flowing from bottom to top passes through the settled sludge and enables contact between incoming wastewater and bio mass. The treatment efficiency of this system is 20 to 30% higher than the conventional septic tank in terms of BOD and TSS removal. The first chamber is made twice the size of other chambers. In order to ensure anaerobic condition within the system, a minimum depth of 1.8 to 2 m is maintained. The retention time is designed for a minimum of 24 to 48 hrs. A vent pipe is provided over the tank slab so that gases produced in the degradation process can escape in the atmosphere. The system is designed for a minimum desludging period of 2 to 3 years. The effluent from the improved septic tank flows out into the soak pit for further treatment. Soak pits can be circular or like a trench in shape. In case of high ground water level, a collection device is provided along with the percolation system. This is mainly to prevent back flow of water from soak pit to septic tank. The soak pit is a covered, porous walled pit that allows water to slowly redistribute and infiltrate it in surrounding soil for absorption.

Figure 4: Design for Improved Septic Tank

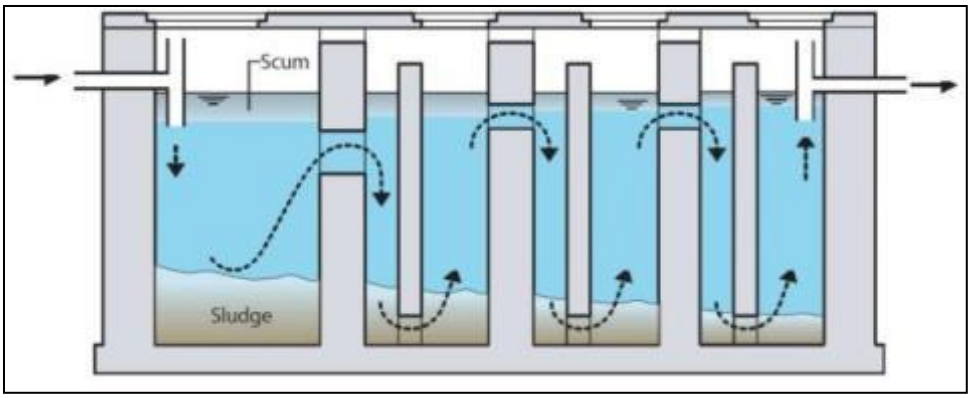
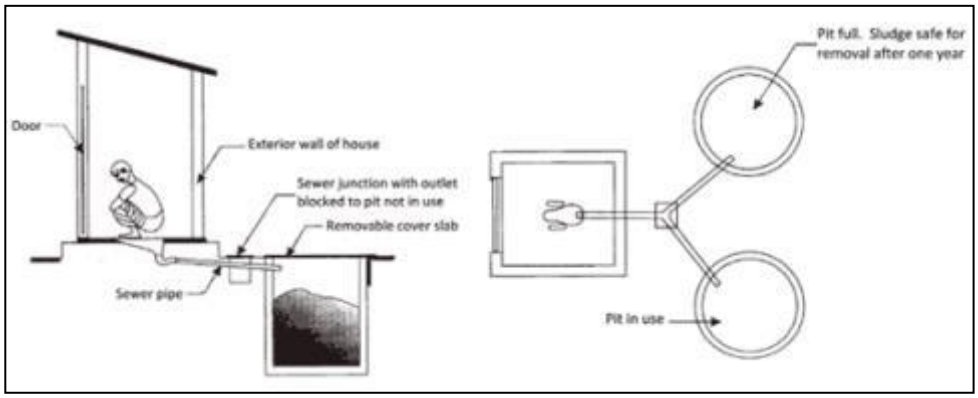


Figure 5: Design for Improved Twin Pit System



Source: *Pourashava* and TA 8913 Report for UGIIP-3 additional financing project preparation.

Figure 6: Plan of public toilet

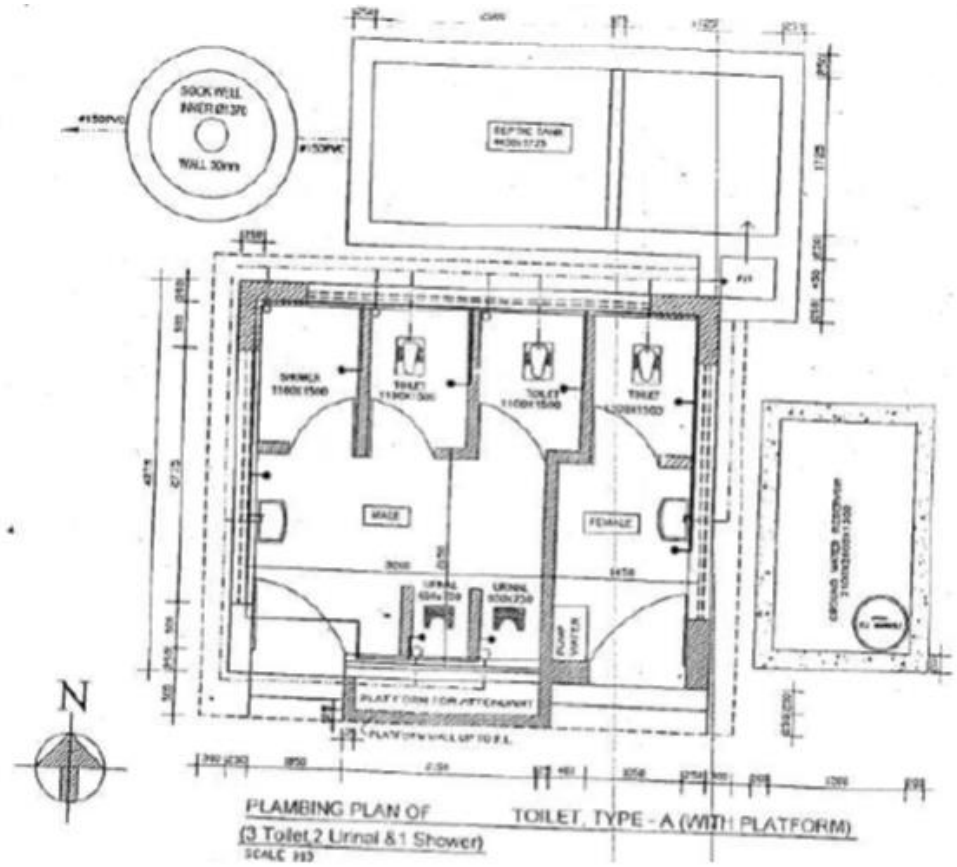
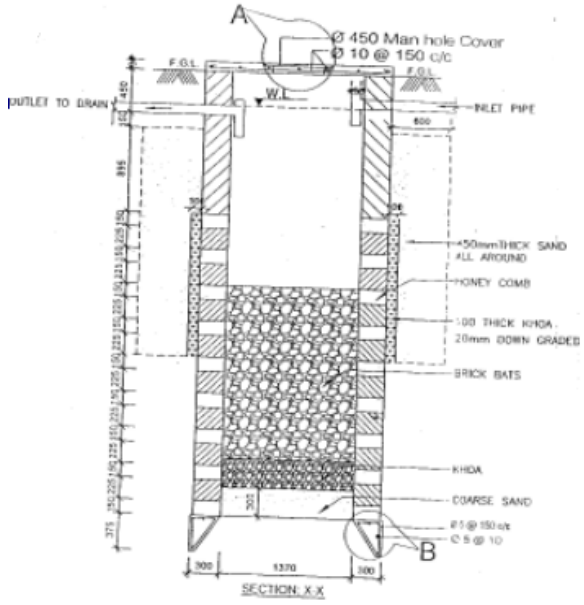


Figure 7: *Cross-section of Soak well*



IV. DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Landforms, Geology and Soils

30. The evaluation of Bengal Basin is resulted from the collision of Indian plate and the Eurasian plate. The Bengal basin contains 15 km thick sequence of Cretaceous to Resent sediments and occupies 100,000 km^2 low land flood plain and delta. The combined deltas of Ganges, Brahamaputra and Meghna (GBM) river system lie within Bangladesh. The geological succession of Bangladesh shows that the sub-surface stratigraphy includes: (i) the Precambrian, (ii) the Permain Gondwana sediments, (iii) the upper Jurassic Volcanic rocks, and (iv) a thin mantle of Cretaceous sedimentary rocks originating mainly from deposition of the denuded volcanics. Overlaying these deposits are the tertiary lime stones, sandstones, and shales. The surface geology of the country consists of holocene deposits (80%), tertiary sedimentary rocks (12%), and uplifted Pleistone clay residual (8%). The holocene deposits, consisting of unconsolidated sand, silt and clay of varying amounts, are the products of piedmont alluvial, fluvial, deltaic, or coastal activities

31. The Precambrian basement hosts the so called Gondwana basins. These, initially much bigger basins are remains of Intercontinental grabens which consist of Lower Gondwana formation dominated by terrestrial organic matter (coal) of upper Carboniferous and Permian age, followed by the influx of Triassic to Lower Jurassic clastic sediments (Upper Gondwana) during increasing lateral crustal stretching. At present in the Sherpur/ Pabna/ Kushtia area, Gondwana sediments indicated by interpreting the seismic line and by extrapolating the geological situation from Indian West Bengal- must have reached their paleomaturity again in Miocen time. Thus, since then here a postcoalification and second phase of methan generation has been taking place. However, because most of the methan from coals has been generated up to their paleomaturity of about 1.6 Rm, there was/ is only an amount of gas left to be generated and subsequently captured in possible traps of Cretaceous/ or Tertiary age.

32. Kushtia *Pourashava* is located on the bank of the River Gorai, which is connected to the River Padma, and has a rich history of cultural heritage. It was one of the original district towns during the British period. Kushtia being located along the Gorai River has relatively flat topography mostly lying below an elevation of 10m with some scattered undulated areas.

2. Soil

33. Geographically, the soil can be classified into three: the Ganga Polol, the Mixed Ganga Polol and the Ganga Kotal Polol. While northern part is appropriate for good crop production, soils in the south are both saline and clayed. The Kushtia district depends upon it for the annual deposit of silt. Soils differ from other inland soils as they are subjected to the effects waterlogging, which naturally affect the vegetation. In places soils are semi-solid and poorly consolidated. The pH ranges widely from 5.3 to 8.0. Although the soil is in general medium textured, sandy loam, silt loam or clay loam, the grain size distribution is highly variable. Silt loam is dominant textural class.

3. Earthquake

34. Kushtia is located in a seismic zone III,[8] referred to as the low risk zone for earthquake in the country. Seismic events in Bangladesh are relatively infrequent, but historically, have been severe, 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, including the choice of materials and methods for construction work.

4. Ambient Air Temperature, Humidity and Rainfall

35. The temperature of the country has the relationship with the period of rainfall. In general, cool seasons coincide with the period of lowest rainfall. Table 7 and Figure 8 show the monthly average temperature along with average monthly humidity of the project area. Maximum mean temperature of 29.42°C was observed in May and minimum average temperature was 16.15°C in January.

Table 7: Temperature (1999-2015) and humidity (1989-2015) for project area

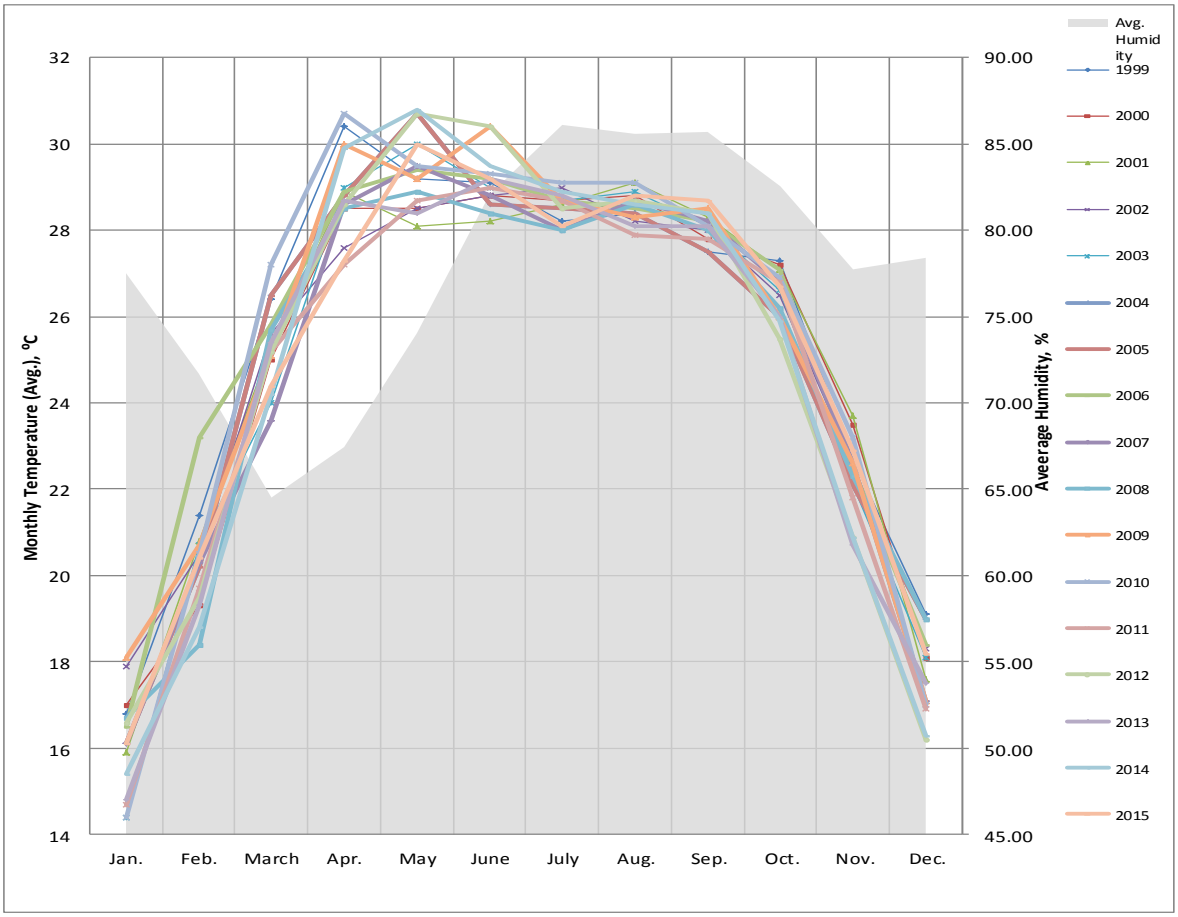
Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg.
Mean Temp (°C)	16.15	20.34	25.35	28.86	29.42	29.19	28.56	28.58	28.14	26.51	22.28	17.77	25.10
Average Humidity (%)	77.52	71.70	64.52	67.44	74.04	82.07	86.11	85.59	85.70	82.56	77.74	78.41	77.48

Source: Bangladesh Meteorological Department.

36. According to the data collected from Bangladesh Meteorological Department (BMD), April to June appears to be the hottest period of the year while November to February is the coolest. Average annual rainfall in Kushtia is 1487.77 mm, with maximum in July = 329 mm. During heavy rainfall, water logging causes 20-25 cm inundation, which lasts for 4-8 hours

[8] The National Seismic Zoning Map produced by the Geological Survey of Bangladesh (GSB) divides the country into three 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.

Figure 8: Average Temperature and Humidity in Kushtia



37. June-October is observed to be the most humid period of the year which matches the rainfall pattern of this region as more than 70% of the yearly precipitation is encountered during this four months.

5. Water Quality

38. Surface Water: Main rivers in the district are Ganges (Padma), Garai, Mathabhanga, Kaliganga and Kumar. Gorai runs beside Kushtia town. The river water is saline with high sediment load and high turbidity. Kushtia consists of many ponds that were once used for drinking water.

39. Kushtia *Pourashava* performed water quality tests of different parameters for surface water (Gorai River) on 27th July, 2016 from KUET, Khulna. The summary of test results is shown in Table 8. Result shows that concentration of Chloride is within the limit of Bangladesh Inland Surface Water Quality Standard for drinking, while Turbidity was found to be way above the standard (ECR, 1997). River water quality can be monitored during construction and operation period.

Table 8: Water Quality Analyses – Gorai River

Sl No	Water quality parameters	Unit	Bangladesh Inland Surface Water Quality Standard for Recreation Purpose (ECR, 1997)	Bangladesh Drinking Water Quality Standard	Concentration present
1	Chloride	mg/l	-	150-600	14
2	Turbidity	NTU	-	10	775

Source: Kushtia *Pourashava* and KUET, Khulna.

40. **Groundwater:** 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.

41. According to the local DPHE office, safe drinking water is available at between 250~260 ft depth (76-79 m) in the extended area, especially at Mojompur and Barokhada. But in the old/ core urban area, safe water is available at between 350~400 ft depths (107-122 m).

42. The present water supply system is based on groundwater, abstracted from seventeen production tube-wells (PTW) located at different places in the pourashava area with 138.30 km of pipelines of diameters between 75 mm to 250 mm. 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).

43. The local groundwater level is lowered to approximately 6 m below ground level during the dry seasons, with levels returning to their normal position before the end of the monsoon reported by DPHE. This fall in groundwater levels is an entirely natural process that arises because of the hydrological link with the river.

44. For sanitation subproject, there might have impact on groundwater, hence it is necessary to establish baseline environment for groundwater quality monitoring.

6. Air Quality

45. Kushtia is a sub-urban area of Bangladesh. In the sub-urban areas ambient air quality is dependent on many factors like air movement, traffic volume, congestion, emissions from motor vehicles, and suspended dust particles. The proposed sites are visually not found as polluted; therefore, no primary data was collected. However, a continuous monitoring scheme is essential to evaluate air quality and for the development of any plan for mitigation of health risks caused by polluted air. The six “criteria pollutants”, particulate matter (PM_{10}, $PM_{2.5}$), CO, SOx and NOx have to be monitored more or less. Hence, to establish the baseline air quality, a primary analysis of air quality is proposed before start of construction.

Table 9: Bangladesh National Ambient Air Quality Standard comparing the WHO Guideline and US EPA (Source: Country Synthesis Report on Urban Air Quality Management on Bangladesh, ADB 2006)

Pollutant	Averaging Period	Bangladesh Standards[a]	WHO[b] Guideline Values (µg/m³)	US EPA Standards (µg/m³)[d]
CO	8-hour	10,000 µg/m³ (9 ppm)	10,000 [c]	10,000
	1-hour	40,000 µg/m³ (35 ppm)	30,000 [c]	40,000
Pb	Annual	0.5 µg/m³	0.5	–
NO_x	Annual	100 µg/m³ (0.053 ppm)	–	–
TSP	8-hour	200 µg/m³	–	–
PM_{10}	Annual	50 µg/m³	20	revoked
	24-hour	150 µg/m³	50	150
$PM_{2.5}$	Annual	15 µg/m³	10	15
	24-hour	65 µg/m³	25	35
O_3	1-hour	235 µg/m³ (0.12 ppm)	–	235
	8-hour	157 µg/m³ (0.08 ppm)	100	157
SO_2	Annual	80 µg/m³ (0.03 ppm)	–	78
	24-hour	365 µg/m³ (0.14 ppm)	20	365

CO = Carbon monoxide; NO_x = Nitrogen oxide; O_3 = ozone; Pb = lead; PM_{10} = particulate matter with a diameter of not more than 10 microns; $PM_{2.5}$ = particulate matter with a diameter of not more than 2.5 microns; SO_2 = Sulfur dioxide; S.R.O. = US EPA = United States Environmental Protection Agency; TSP = total suspended particulates; WHO = World Health Organization; µg/m³ = micrograms per cubic meter; ppm = parts per million; – = no value
Source: [a]S.R.O. No: 220-Law, 2005; [b]WHO, 2005; [c]WHO, 2000; and [d]US EPA, 2006.

7. Acoustic Environment

46. Sound is transmitted through air when an object moves, like water flowing over rocks, or air passing through vocal cords. This movement causes air waves, similar to ripples in water. When these waves reach human ears, they are transformed into sound. Sound is usually measured in decibels (dB). A decibel is a relative measure that is accompanied by a reference scale. Technically, sound pressure is 20 times the logarithm (base 10) of the ratio of the pressure level of any sound to the reference sound pressure in decibels. Sound (noise) levels can be measured and quantified in several ways. All of them use the logarithmic decibel (dB) scale. The dB scale is logarithmic to accommodate the wide range of sound intensities found in the environment. Table 11 shows typical sound levels generated by common indoor and outdoor activities, along with its effect on human.

47. Existing ambient noise levels can serve as a baseline from which to measure potential disturbance caused by project activities. Hence, to establish the baseline noise quality, a primary analysis of noise quality is proposed before start of construction at the proposed site of the subproject. The standard for noise is shown in Table 10.

Table 10: Noise Quality Standards, by Zone and Time of Day

Zone Class	Limits in dB(A)	
	Daytime (6 am – 9 pm)	Nighttime (9 pm – 6 am)
Silent zone	45	35
Residential zone	50	40
Mixed (residential/commercial/industrial) zone	60	50
Commercial zone	70	60
Industrial zone	75	70
Source: Department of Environment (DoE), Bangladesh		

Table 11: Sound levels and human response

Common Sounds	Noise Level (dB)	Effect
Rocket launching pad (no ear protection)	180	Irreversible hearing loss
Carrier deck jet operation; Air raid siren	140	Painfully loud
Thunderclap	130	Painfully loud
Jet takeoff (200 feet); Auto horn (3 feet)	120	Maximum vocal effort
Pile driver; Rock concert	110	Extremely loud
Garbage truck; Firecrackers	100	Very loud
Heavy truck (50 feet); City traffic	90	Very annoying Hearing damage (8 hours)
Alarm clock (2 feet); Hair dryer	80	Annoying
Noisy restaurant; Freeway traffic; Business office	70	Telephone use difficult
Air conditioning unit; Conversational speech	60	Intrusive
Light auto traffic (100 feet)	50	Quiet
Living room; Bedroom; Quiet office	40	Quiet
Library/soft whisper (15 feet)	30	Very Quiet
Broadcasting studio	20	Very Quiet
Threshold of hearing	0	Hearing begins
Source: Davis and Cornwell (1998)		

B. Biological Environment

48. There are no endangered species or critical habitats in the subproject areas. The ecological environment is characterized by a human managed sub-urban landscape. In the study area, terrestrial floras are present mainly in the homestead regions, roadsides, village groves, and cultivated lands. Homesteads and orchards have: 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 includes: datepalm, sal, road chambol, koroi, krishnachura, rain tree, banyan, shisoo, babla, akashmoni, eucalyptus, mango, blackberries, raj koroi, etc. Main crops Paddy, potato, wheat, vegetables. None of these species are listed as Threatened, Nearly Threatened or Rare list in IUCN Red List.

49. Fish species include ruhi, katla, mrigel, boal, gazar, kaliboush, shoil, puti, pabda, mola, koi, khorsala, kholisha, kakila, guchi baem, airh, bacha, bain, batasi, bele, chanda, chang, chapila, chela, chitol, datina, taki, tatkini, veda, magur, shing, shorputi, phali, and tengra. Exotic fishes like grass carp, silver carp, telapia, nilotica, etc. have also been introduced for commercial pisciculture in ponds and tanks.

50. Reptile includes Anjila, Dhura Shap, Matia Shap, Tiktiki, Daraish Shap, Gui Shap, etc. Comon mamals are Babur, Idur, Shial, Chika, Beji, etc. Avifauna (birds) includes Choroi, Doyel, Kak, Ghugho, Shalik, Tuntuni, Machranga, Haludpakhi, Gangchil, etc. Insect fauna includes Dragon fly nymph, Damsel fly nymph, Water strider, Midge, Flies, Ant, Caddisfly, etc. None of these species are listed as Threatened, Nearly Threatened or Rare list in IUCN Red List.

51. This bio-survey data might not reflect the actual biodiversity of that area. One species found in the monsoon might not be seen in the winter. Extensive survey over the year might give an actual status of biodiversity. Present bio-survey list is a snapshot prepared based on the species found during the field visit time. This bio-survey data might not reflect the actual biodiversity of that area. One species found in the monsoon might not be seen in the winter. Extensive survey over the year might give an actual status of biodiversity. Present bio-survey list is a snapshot prepared based on the species found during the field visit time.

C. Physical and Cultural Heritage

52. Kushtia district had been included within the ancient Kingdom of Chandradvipa. Kachua under Bauphal upazila had once been the capital of the kingdom. Due to natural calamities on the coastal areas and the frequent Partuguese and Magh raids the capital was transferred to Madhabpasha in Barisal.

53. Kushtia is famous in Archaeological as physical and cultural heritage. Archaeological heritage sites are Sutabaria Dayamayee Mandir (1208 BS), Gurinda Masjid at Ratandi, Sreerampur Mian Bari Mosque, Talukdar Bari Jami Mosque (Dashmina), Betagi Sikdaria Jami Mosque, Dighi of Kaviray-bari (Dashmina), Kuakata Buddist Vihara, Kapradanga Buddhist Math, Mistri-para Buddist Vihara (Kalapara), Mosque of Ghaseti Begum (1757) at village Shaula, Pakdal Mian Bari Masjid, Bauphal Central Kalibari Mandir (1875), Kachari (revenue office) of Rajendra Mahendra Babu and of Som at Daspara in Bauphal, Tomb of Syed Arefin at Kalisuri, Ashram of Mahendra Pagla, Dargah of Tamir at Kalaya, Mitha Pukur (pond) at Daspara, Kanai Balai dighee, Kamala Rani dighee at Kachua, Mosque of Munshi Amirullah, Holy bathing place at Ponahura, Tomb of Sultan Fakir at Baufal, Dol Samudra dighee, Blackhole at Sikdar house of Madanpura, Rajapur wall, Shahi Mosque at Masjidbaria of Mirzaganj etc.

54. There are about 10 daily bazars and 49 weekly hats in Kushtia Sadar upazila (BBS 2013). There are also 230 restaurants and 28 residential hotels in the project area.

D. Socio-economic environment

1. Population

55. Kushtia (Town) consists of 9 wards and 29 mahallas. The *pourashava* covers an area of 26 sq.km (BBS, 2011). In 2011 the population of the *pourashava* was 65,000 (BBS, 2011); the population density is 2,500 persons per km^2; male 51%, female 49%. The literacy rate among the town people is 84%.

56. Kushtia *Pourashava* has been experiencing lower annual average population growth than the national average urban population growth over a long period in the past (1981-2011). The annual population growth rate varies significantly between various intercensus periods. The *pourashava* has experienced 3.47 percent annual average population growth rate during the period of 1981-1991, which is higher than other inter-census periods over a 30-year period between 1981 and 1991-2001. The average annual growth rate of 1.91 over the period between 1991 and 2011, however, seems to be reasonable for this *pourashava*. Infrastructure improvements will help sustain a reasonably higher growth of population in the *pourashava* in the future. The *pourashava* is a district headquarters and may in future remain important for development as the Padma Bridge starts functioning in 2019. These positive qualities in favor of the *pourashava* may help to sustain a higher growth rate than before. An average annual population growth of 2.25 percent, therefore, seems to be reasonable and may continue in the long-term future.

2. Livelihood Practices and Economic Activities

57. Main occupations: Agriculture 45.44%, non-agricultural laborer 6.15%, industry 1.02%, commerce 16%, transport and communication 3.15%, service 13.55%, construction 2.76%, religious service 0.35%, rent and remittance 0.90% and others 10.68%. (Source: Banglapedia). Ownership of agricultural land Landowner 79.99%, landless 29.01%. Both fresh water and

marine fishes as very essential staple play a very important role in the economy of the locality. The fresh water fishes are ruhi or salmon, mrigel or trout, kalboush, katla or carp etc. However, some of these varieties, especially those which inhabit the marshes and tanks, are dwindling due to over catching and other reasons such as use of insecticides and pesticides for crop production, etc. Other than these, diary, poultry and hatchery are also present. Noted manufactories are rice mill, flour mill, oil mill, fish feed mill, ice factory, chanachur (fried chick-pea) factory, bidi factory. Among small industries citable are cottage industries, Goldsmith, blacksmith, potteries, wood work, bamboo work, honey cultivation, cane work, tailoring, etc. Main exports are Coconut, betel nut, dry fish.

58. Main crops are Paddy, jute, potato, mug, lentil, khesari, gram, sesame, chilli, mustard, linseed, coriander seed, ground nut, betel leaf, sugarcane, watermelon, vegetables etc. Main fruits are Mango, jackfruit, banana, papaya, guava, plum, lemon, coconut, betel nut, palm, wood nut, kaijou nut etc.

59. The pourashava does not have a strong commercial and industrial base and is dependent on agricultural cash crops such as fisheries, rice and jute. Riverine fishing is one of the municipality's most important livelihood sources. The RUCCA report noted that about 65% of businessmen are engaged in fish-related businesses. The Climate Resilient Integrated Urban Plan report prepared by TA 8913 consultants for preparation of additional financing report noted that while much of the district's trading and export occurs in the municipality's markets, and though the municipality has a growing urban footprint, its overall sphere of influence is very small. The master plan considers economic activity in Kushtia to be rudimentary in nature, based on an unskilled labor force and low investment levels, resulting in a high poverty rate and high levels of participation in the informal labor market.

3. Infrastructures

60. **Electricity.** All the wards and unions of the upazila are under rural electrification net-work. However 25.30% of the dwelling households have access to electricity.

61. **Water Supply.** At present, water is supplied to the existing water supply network by groundwater withdrawn from 17 nos. existing production tubewells (PTW) located at different places, through 138.30 km of pipelines of diameters varying from 75 mm to 250 mm; 28.80 km of the pipes were installed under the 37-Districts Towns Water Supply Project. Total production of supply is 28,800 m^3/day. Presently, water is supplied to consumers through 7,136 nos. service connections. At present, water supply coverage is only 32% (by production). Water is supplied to consumers 6 hours per day.

62. **Drainage system.** The existing drainage system in Kushtia *Pourashava* is characterized by open and covered drains with some silted up khals. The noted khal in the *pourashava* is the Mora Gorai, which falls to the Gorai River. Main outfall of the *pourashava* is Gorai River. The bed is silted and the sections are irregular, with growing of weeds and vegetations. Kushtia *Pourashava* is facing both water logging and drainage congestion in the original part of the town (Wards 1 through 12) during high precipitation periods and extreme rainfall events. Some drains are falling to the Gorai River directly with provision of gates to stop backflow during high floods. Most of the remaining existing drains are linked with the poorly functioning siphon under GK canal. Encroachments and filling of the drains with domestic and commercial waste and the related poor management of municipal solid and hazardous waste also drives a large percentage of drainage congestion, creating an increasingly grave environmental threat and health hazard.

63. In the recently added areas of the *pourashava* (Wards 13 through 21) the drainage system not yet developed and now mostly relies on natural drainage. The natural system is obstructed by unplanned and erratic constructions and the absence of a sufficient number of road cross-drains, causing water logging and drainage congestions.

64. The other main problem with the drains of the *pourashava* is connection of latrines with the drains which is deteriorating the environment of the *pourashava* severely. The *Pourashava* Development Plan (PDP) report says that about 30% of households have connected their latrines with drains. The drainage system of the *pourashava* is curtailed due to proper nonfunctional condition of the main outfall, the siphon under the GK canal. Out of the four vents only one is functioning well and two of them are closed by siltation—for which storm water runoff cannot be discharged in time, causing water logging and inundation of many areas several times during monsoon.

65. Water Logging. Because of the lack of an integrated drainage system, heavy rainfall causes disruption to road communication. In the most water logged areas water logging lasts for 3~4 hours and depth of inundation is about 1~2 feet. In some areas which are not connected with any drainage system, water logging can continue for several days and even months. The main water logging areas are:

(i) Thana para (Shashi Bhushon Pramanik road, Shatis Chandra Saha Road, Joarder Sarak).
(ii) Whole Nabab Sirajouddala road area from Pourashava gate. • Uttor mill para area.
(iii) Mill para and Harishankar road (west side rail line).
(iv) Deshwali para area.
(v) Eidgah para;; Kushtia Sadar hospital area; court para area and T&T colony area.

66. Areas that are vulnerable to water logging include all the areas along the embankment: Wards 1, 2, 3, 10 and 11. In Ward 1, the area called Jogia (northwest section) is especially vulnerable. Other vulnerable areas are parts of Ward 5 and 6, especially the areas known as Chechua and Jagati (located in the southwest) and Kumargara (in the south).

67. **Disposal Area.** Currently, all the collected waste by the municipality is disposed in a landfill site located at Baradi. The total area of the landfill site is 9.27 acres. The site is owned by the municipality and it is under use. Currently, 30% of the landfill site is filled up. Uncontrolled crude dumping methods are used for waste disposal. The height of the landfill site is 1 m above the existing ground level and most of the waste is already decomposed. There is a potential to expand the landfill site since 70% of the vacant land is available within the existing landfill site. The potential also exists to increase the height of the existing landfill to 4m above ground level by extensive redesigning and use of excavators.

68. **Fecal Sludge Management.** Kushtia Municipality has a well-organized system for fecal sludge collection. The collection of fecal sludge is undertaken by the conservancy section of the municipality. At present, the municipality charges BDT 800 for cleaning the pit latrines and BDT 1000 for cleaning the septic tanks. For peripheral wards, the municipality charges BDT 1000 for pit latrines and BDT 1500 for septic tanks. On average, the municipality collects fecal sludge from 3-4 pit latrines/septic tanks (which is equivalent to 4000-8000 liters of fecal sludge per day). The operational cost for fecal sludge collection is almost fully recovered by the service

charge collected from the households. For the year 2014-15, Kushtia municipality collected service charge of BDT 600,000 for providing fecal sludge collection and treatment services.

69. From July 1, 2016, the O&M of the fecal sludge treatment plant and the compost plant have been handed over to a private operator as a management contract. The agreement for handing over the fecal sludge treatment plant has been prepared by Waste Concern. Under the agreement, the municipality will deliver both fecal sludge and solid waste to the plant free of cost, and all the O&M costs of the plant shall be borne by the private operator. The private operator will recover the O&M costs by selling the compost and co-compost. The private operator possesses the license to produce and market compost from the Ministry of Agriculture.

E. Description of Site and Surroundings

70. The *pourashava* is free from any large scale carbon emission as there is small number of vehicular transport and small number of smoke emitting industries in the *pourashava*.

71. Enquiries about the extent to which land and dwellings are affected by flooding reveal that the land around just under 40% of households is flooded every year. Almost 8% of the land around other households is flooded only some years. The number of times ranges from 1 to 10 times. The average is just over 2.3, while the average depths range 1–100 cm.

72. Kushtia is an old town and historically has served as a regional growth center in the south coastal region of Bangladesh. The Climate Resilient Integrated Urban Plan report prepared by TA 8913 consultants for preparation of additional financing report noted that the historic development pattern has encouraged a widespread distribution of housing and commerce that current municipal services have not been able to match. The wood based and food production industries are the most important industries within the *pourashava* boundary. The master plan notes that less than 3% of the population is engaged in these industries.

73. Kushtia was known as an important industrial production center and transportation route. The Kushtia District is known for its tobacco production, and 70% of total tobacco produced in Bangladesh comes from the district. British-American Tobacco has production facilities in the municipality. Rice production is widespread in the Kushtia District, which has around 350 rice mills. The Bangladesh Small and Cottage Industries Corporation (BSCIC) established an industrial zone less than 5 km from Kushtia's municipal boundaries. One of the biggest employers in Kushtia is BRB Cable Industries Ltd. (BRB), a private company that manufactures industrial wires and cables, whose activities also have a large export driven component.

F. Impact of Climate Change

74. Besides, fast growing town, Kushtia is under threat of climate change impact. It is likely to face the following potential climate change impacts:

(i) Due to increase of rainfall, drainage congestion, water logging and flash flood will increase. Low laying areas will be inundated, prevail unhygienic condition in drainage and sanitation, will result disease spreading.
(ii) There will be an increase in the number and severity of tropical cyclones causing damage to property and life.
(iii) The major problem contributing to Kustia's vulnerability as a whole is the lack of basic services, especially water supply, drainage, sanitation and waste management.

(iv) Unplanned development and lack of control over development arising from lack of attention to urban planning, will cost dearly in the long run.
(v) There will be increased costs of infrastructure development, and O&M.
(vi) Agriculture will be affected leading to an increase in poverty. More funds will have to be injected to tackle unemployment and poverty.
(vii) River bed rise already makes gravitational flow of drainage water into the river difficult.
(viii) With agriculture affected in rural areas, there will be poverty and increased rural-urban migration. Urban poverty will increase, requiring more money for poverty alleviation.

V. ASSESSMENT OF ENVIRONMENTAL IMPACTS AND SAFEGUARDS

A. Methodology

75. Issues for consideration have been raised by the following means: (i) input from interested and affected parties; (ii) desktop research of information relevant to the proposed subproject; (iii) site visits; and (iv) evaluation of proposed design scope as per PPTA study and potential impacts.

76. The corridors of impact considered include: (i) sanitary infrastructure to be constructed; and (ii) existing toilets and available space. Categorization of the subproject and formulation of mitigation measures have been guided by ADB's REA Checklist for Sanitary Infrastructure (Appendix 1) and ADB SPS, 2009.

B. Screening Out Areas of No Significant Impact

77. From the preliminary design and results of the rapid environmental assessment, it is clear that implementation of Kushtia sanitation subproject will not have major negative impacts because activities will be localized/site-specific and short in duration and construction will be conducted within a relatively small area. Because of these there are several aspects of the environment that are not expected to be affected by the subproject (Table 12) thus can be screened out of the assessment at this stage but will be assessed again during detailed design stage and before implementation.

Table 12: 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 excavation works will be conducted only during construction stage (short-term) and specific to subproject sites.
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.
Water quality	Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water (*khals*). However, impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate

Field	Rationale
	matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. However, impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
Acoustic environment	Construction activities will be on settlements, in and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. However, the 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 Kushtia *pourashava* will not cause direct impact on biodiversity values. Based on preliminary design construction activities do not anticipate any cutting of trees (to be reassessed during detailed design stage).
C. Socioeconomic Characteristics	
Land use	No alteration on land use. Sanitation facilities will be constructed in vacant government land, and built up areas of the *pourashava*.
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 impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
Socio-economic status	There is no requirement for land acquisition or any resettlements. Manpower will be required during the 24-month construction stage. This can result to 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 Kushtia *pourashava* where there are a variety of human activities, will result to impacts to the sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are temporary and for short duration. Deep tube wells may be shifted to ensure water contamination is prevented.
D. Historical, Cultural, and Archaeological Characteristics	
Physical and cultural heritage	The subproject components are not located in or near and excavation works will not be conducted in the vicinities of identified historical and sites.

C. Anticipated Impacts and Mitigation Measures – Planning and Design Phase

78. Subproject selection criteria. The project environmental assessment and review framework specifies environmental criteria to avoid or minimize adverse impacts during the identification and finalization of road subproject. Table 13 summarizes site and design considerations as per preliminary design.

Table 13: Site and Design Considerations to Meet EARF Environmental Criteria

	Components	Environmental Selection Guidelines	Remarks
	Overall selection guideline	Comply with all requirements of relevant national and local laws, rules, and guidelines.	- Requisite LCC and ECC to be obtained prior to commencement of works
		Avoid/minimize where possible locations in protected areas, including notified reserved forests or biodiversity conservation hotspots (wetlands, national reserves, forest reserves, and sanctuaries).	- Not present in Kushtia *pourashava*
		Avoid possible locations that will result in	-- Use of “chance find” procedures in the

	Components	Environmental Selection Guidelines	Remarks
		destruction/disturbance to historical and cultural places/values.	EMP that include a pre-approved management and conservation approach for materials that may be discovered during project implementation.
		Avoid tree-cutting where possible. Retain mature roadside trees which are important/valuable or historically significant. If any trees have to be removed, plant two new trees for every one that is lost.	- Permit for tree-cutting to be obtained by contractor/s prior to commencement of work - Compensatory plantation for trees lost at a rate of 2 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.
		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.	- All consultations during project preparation are documented and concerns expressed by public addressed in the IEE.
	Sanitation	Ensure sanitation facilities are provided with electric power and water supply. Ensure that water and waste disposal in constructed facilities are designed to national standards.	
		Ensure no immediate drinking water intakes downstream of discharge point of effluent from sanitation facilities	Include design measures and consider relocating existing deep tube wells.
		Locate sanitation facilities (public toilets and latrines) and septage/sludge treatment plants preferably (a) 20 m from any source of water supply; (b) 30 m from drainage lines and (c) 100 m to a designated waterway.	Distance restriction may be reviewed depending on the technology adopted for the sanitation facilities and treatment of septage, site plant availability, and buffer zone planning.
		Locate septage/sludge treatment plants preferably 50 m from any inhabited areas, in locations where no urban expansion is expected in the next 20 years, so that people are not affected by odor or other nuisance from the septage treatment plant.	Distance restriction may be reviewed depending on the technology adopted for the treatment of wastewater, site plant availability, and buffer zone planning.
		Locate at sites septage/sludge treatment plant where there is a suitable means of disposal for the treated wastewater effluent and bio-solids.	Include design measures and follow guidelines to ensure the safe disposal of bio-solids without causing environmental hazards, and if possible to promote its safe and beneficial use as an agricultural fertilizer. Any wastewater and bio-solids reuse shall be to improve soil properties and sustain soil fertility and avoid any contamination risks.

79. **Land acquisition and resettlement.** The proposed sanitation facilities will be located in government-owned land, and common community areas. There are no encroachers or residential/commercial structures in these lands. Cutting of trees, if required based on detailed design, will be minimized. Compensatory plantation for trees lost at a rate of 02 trees for every tree cut, in addition to the required tree plantation in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.

80. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. Locations and siting of the proposed infrastructures were considered to further reduce impacts. The subproject will be in properties

held by the pourashava and access to the subproject sites is thru public ROW and existing roads.

81. The concepts considered in design of the Kushtia sanitation subproject are: (i) sites should be located within or very close to locality of users; (ii) sites must be prioritized in educational or institutional compound where concerned authority has no objection; (iii) sites should be selected in the area where significant number of population live; (iv) locating facilities on government-owned land to avoid the need for land acquisition and relocation of people; (v) sites are selected according to the environmental criteria for project selection specified in the environmental assessment and review framework; (vi) ensuring all planning and design interventions and decisions are made in consultation with local communities and reflecting inputs from public consultation and disclosure for site selection.

82. Preliminary designs integrate a number of measures, both structural and non-structural, to mainstream climate resilience into the Kushtia sanitation subproject, including: (i) raising the floor level of latrines and associated facilities including access, to protect them from flooding; (ii) application of sufficient buffer zones between water supply and sanitation facilities to protect contamination of the water supply; and (iii) use of appropriate liner materials to protect the groundwater from contamination in septage treatment sites as the project sites are low lying. As a result, some measures have already been included in the subproject designs. This means that the impacts and their significance have already been reduced.

83. **Climate Change Adaptation and Disaster Risk Management Considerations.** The expected climate change impacts on Kushtia are mainly associated with: tidal flooding; cyclone related storm surge and rainfall driven drainage congestion. The by-products of these include temperature variations, monsoon-, flash- and tidal flooding and increased water logging.

84. Projected sea level rise due to climate change will exacerbate salinity intrusion along the rivers. This may have impact on subproject. Frequent flash flood and water logging due to heavy rainfall is an issue for Kushtia *pourashava*. This will be accelerated due to increase of climate change impacts. It is recommended that project design construction, especially design material, method of construction should be taken appropriate to make the Project climate-proof and disaster resilient. During the detailed design, the Environment Specialist properly consulted with the design team to incorporate this impact. The climate change impact and necessary consideration in design for adaptation is shown in Table 14.

Table 14: Climate change impact and design considerations

Climate change effect/impact factor	Impact	Design consideration for mitigation
Salinity	Water source becomes saline, all construction material will be impacted due to salinity: corrosion and dampness	All construction material should saline resistant, anti-saline admixture can be used
Floods and water logging	Overflow of sanitation can create nuisance and disease spreading, tube-well can be contaminated due to intrusion of flood water	Toilet and other sanitation structure should constructed on raised ground, tube-well should be also placed raised ground
Lack of water supply in pit latrine	Unhygienic situation, improper cleaning, disease can be spread.	Sufficient water supply should be ensured.
Construction materials' quality		Most durable materials possible, even if higher cost, e.g. concrete, high quality bricks should be chosen; anti saline admixture should be used; Construction

Climate change effect/impact factor	Impact	Design consideration for mitigation
		quality should be monitored and controlled
Rising temperatures		Works during most favorable times of year and day should be executed; Preparing, placing and curing concrete and mortar, to ensure placement, etc., during most favorable times should be monitored and controlled; plain high-quality un-rendered brickwork and high quality cement mortar in preference to rendered low-grade bricks should be used; sulphate resisting cement should be used in vulnerable locations (higher heat gain during curing) or cement containing fly ash (less heat gain, so preferred)

D. Anticipated Impacts and Mitigation Measures – Construction Phase

85. In the case of this subproject (i) most of the individual elements are relatively small and involve straightforward construction, so impacts will be mainly localized and not greatly significant; (ii) most of the predicted impacts are associated with the construction process, and are produced because that process is invasive, involving excavation and earth movements; and (iii) being located in the built-up area of the *pourashava*, will not cause direct impact on biodiversity values.

86. **Construction method.** Tasks to be performed for construction of the sanitation facilities are: (i) demolition of any existing structures; (ii) site clearing and shifting of any affected deep tube wells; (iii) laying of foundations; (iv) casting of ground floor slab; (v) construction of floor beams and floor slabs; (vi) construction of roof beams and roofing; (vii) installation of doors; (viii) architectural components and finishes; and (ix) ordering, procurement and installation of water and electrical services. Excavation for the foundation will be dug by backhoe digger, supplemented by manual digging where necessary. Excavated soil will be placed nearby, and the materials (brought to site on trucks and stored on unused land nearby) will be placed in the trench by crane or using a small rig. The infrastructures will be constructed manually according to design specifications. Any excavated road will be reinstated.

87. There is sufficient space for a staging area, construction equipment, and stockpiling of materials. However, the contractor will need to remove all construction and demolition wastes on a daily basis.

88. Although construction of these subproject components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites in built-up areas of Kushtia where there are a variety of human activities, will result to impacts to the environment and sensitive receptors such as residents, businesses, and the community in general. These anticipated impacts are short-term, site-specific and within a relatively small area. There are no impacts that are significant or complex in nature, or that need an in-depth study to assess the impact. Thus, Kushtia sanitation subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with construction activities can be mitigated to acceptable levels with the following mitigation measures (Table 15).

Table 15: Anticipated Impacts and Mitigation Measures – Construction Phase

Field	Impacts	Mitigation Measures
A. Physical Characteristics		
Topography, landforms,	Significant amount of gravel, sand, and cement will be	- Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries,

Field	Impacts	Mitigation Measures
geology and soils	required for this subproject. Extraction of construction materials may cause localized changes in topography and landforms. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	ensure these conform to all relevant regulatory requirements. - Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.
Water quality	Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Prepare and implement a spoils management plan (Appendix 3). - Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Kushtia local authority on designated disposal areas. - All earthworks must to be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season such as problems from runoff. - Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. - Take all precautions to minimize the wastage of water in the construction activities. - Take all precautions to prevent entering of wastewater into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. - Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. - While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels. - Monitor water quality according to the environmental management plan.
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Damp down exposed soil and any sand stockpiled on site by spraying with water when necessary during dry weather; - Use tarpaulins to cover soils, sand and other loose material when transported by trucks. - Unpaved surfaces used for haulage of materials within settlements shall be maintained dust-free. - Arrangements to control dust through provision of windscreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). - Monitor air quality.
Acoustic environment	Construction activities will be on settlements, in and near schools, and areas with small-scale businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. However,	- Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid sensitive times. - Plan activities in consultation with Kushtia local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Use of high noise generating equipment shall be stopped during night time.

Field	Impacts	Mitigation Measures
	the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; - Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). - Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s. - If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. - Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
Aesthetics	The construction activities do not anticipate any cutting of trees but will produce excess excavated earth (spoils), excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Prepare the Debris Disposal Plan - Remove all construction and demolition wastes on a daily basis. - Coordinate with Kushtia local authority for beneficial uses of excess excavated soils or immediately dispose to designated areas Avoid stockpiling of any excess spoils - Suitably dispose of collected materials from drainages, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. - All vehicles delivering fine materials to the site and carrying waste debris for disposal shall be covered to avoid spillage of materials. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. - Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. - In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction. - The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;
B. Biological Characteristics		
Biodiversity	Activities being located in the built-up area of Kushtia pourashava. There are no protected areas in or around subproject sites, and no known areas of ecological interest. Based on preliminary design there are no trees at the site that need to be removed (to be reassessed based on detailed design).	- Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be removed or vegetation stripped without the prior permission of the environment management specialist. - If during detailed design cutting of trees will be required, compensatory plantation for trees lost at a rate of 10 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract. - All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. - Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. - Prevent workers or any other person from removing and

Field	Impacts	Mitigation Measures
		damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body in the subproject vicinity. - Prohibit employees from poaching wildlife and cutting of trees for firewood.
C. Socioeconomic Characteristics		
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 follow existing ROW alignment. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Prepare and implement a Traffic Management Plan (Appendix 4) - Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. - Maintain safe passage for vehicles and pedestrians throughout the construction period. - Schedule truck deliveries of construction materials during periods of low traffic volume. - Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. - Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. - Leave spaces for access between mounds of soil. - Provide walkways and metal sheets where required to maintain access across for people and vehicles. - Increase workforce in front of critical areas such as institutions, place of worship, business establishment, hospitals, and schools. - Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. - Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Socio-economic status	Subproject components will be located in government land and existing school compounds thus there is no requirement for land acquisition or any resettlements. Manpower will be required during the 24-month construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term.	- Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. - Secure construction materials from local market.
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 Kushtia pourashava where there are a variety of human activities, will result to impacts to the sensitive receptors such as residents, businesses, and the community in general. Excavation may also damage existing infrastructure (such as water distribution pipes,	- Obtain details from pourashava nature and location of all existing infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; - Integrate construction of the various infrastructure subprojects to be conducted in Kushtia (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. - Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. - Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites.

Field	Impacts	Mitigation Measures
	electricity pylons, etc) located alongside the roads. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water users. - If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Contractor's activities and movement of staff will be restricted to designated construction areas. - Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be shall be located at least 100 m away from the nearest dwelling preferably in the downwind direction. - Consult with Kushtia local authority on the designated areas for stockpiling of, soils, gravel, and other construction materials. - If the contractor chooses to locate the work camp/storage area on private land, he must get prior permission from the environment management specialist and landowner. - Use small mechanical excavators to attain faster excavation progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[a] - Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. - Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. - A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. - Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the environment management specialist's attention immediately; and (iv) taking remedial action as per environment management specialist's instruction. - The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the action taken to the environment management specialist within 48 hours of receipt of such complaint/grievance.
Workers health and safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of	- Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers' health and safety (H&S). - Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the

Field	Impacts	Mitigation Measures
	the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.	environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. - Produce and implement a site H&S plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training[b] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records. - Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances - Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. - Provide medical insurance coverage for workers; - Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; - Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be present. Ensure also that visitor/s do not enter hazard areas unescorted; - Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; - Ensure moving equipment is outfitted with audible back-up alarms; - Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and - Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.
D. Historical, Cultural, and Archaeological Characteristics		
Physical and cultural heritage	Construction works will be in built-up areas of Kushtia thus risk for chance finds is low.	- All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. - Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. - Stop work immediately to allow further investigation if any finds are suspected.

[a] These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

[b] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job.

The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

E. Anticipated Impacts and Mitigation Measures – Operations and Maintenance Phase

89. In the operational phase, all facilities and infrastructure will operate with routine maintenance, which should not affect the environment. The toilets and latrines will need to be repaired from time to time, but environmental impacts will be much less than those of the construction period as the work will be infrequent, affecting small areas only. While pit latrines must be emptied frequently, solids that accumulate in septic systems (septage) must also be removed periodically, usually every 2 to 5 years depending on design and usage to maintain proper function and prevent plugging, overflows, and the resulting release of septic tank contents. Recommended measures to prevent, minimize, and control releases of septage and other fecal sludge are included in the EMP. Operation and maintenance of pilot septage treatment plants will be shared responsibility between the user communities or maintenance committee formed by the local community, who will be educated on the technology and with support from the pourashava for periodical maintenance. The potential adverse impacts that are associated with O&M activities can be mitigated to acceptable levels with the following mitigation measures (Table 16).

90. **Improved twin pit system.** The pits must be used alternately and the diversion chamber must be accessible so that flow can be diverted between chambers. Wastewater should never be diverted back to the first chamber before digested sludge has been removed from it. The seal on 'Y' junction should be checked regularly to prevent infiltration of water. To avoid the clogging in the pipes as well as 'Y' junction a minimum of 1.5 to 2 L of water should be used for each flush. If the pits are directly below the superstructure then adequate access to each pit should be ensured for regular maintenance. If digestion of fecal matter cannot be ensured due to high moisture content then it has to be transported for further treatment in sludge drying beds (or can be used in co-composting) prior to reuse or disposal. Collection methods need to be hygienic, preventing contact between workers and feces. Operation and maintenance of the improved twin pit system will be shared responsibility between the user communities or maintenance committee formed by the local community

91. **Improved septic tank with soak pit.** One of the major advantages of the septic tank is that it has no moving parts and, therefore, needs very little routine maintenance. A well-designed and maintained concrete, fiberglass, or plastic tank should last for 50 years. The inlet, outlet and tank condition has to be monitored regularly. The scum generated from the system should be removed regularly. Desludging needs to be carried out as per the design period (2-3 years). The sludge has to be removed manually or by pumping. Some amount of activated sludge should be left in the baffle compartments to ensure continuity of treatment process. If the soak pit is provided with a filter media, then once in 3-5 years it needs to be removed and cleaned or replaced. If not provided with filter media, then desludging of accumulated biomass needs to be ensured. If discharge of effluent is not possible through soak pit, then further treatment needs to be ensured. The sludge accumulated in the septic tank needs to be desludged through appropriate mechanical means and transported to designated sludge treatment facility. Operation and maintenance of the toilets will be shared responsibility between the user communities or maintenance committee formed by the local community.

92. **Pilot projects.** The site specific O&M manual needs to be developed as per the actual designs of the chosen treatment modules and handed over to the owner of the facility, concerned staff/unit or agency dedicated to O&M with adequate training.

93. **Hazard potentials.** Biosolids are non-hazardous and non-toxic. If a spill occurs, there is no need for special equipment or emergency protocol. Biosolids are primarily processed solids produced by sewage treatment plants. Biosolids are not combustible under ordinary circumstances. If stored in airtight containers for an extended period, methane gas may be produced which could ignite in the presence of a spark or open flame. Hydrogen sulfide may also be generated in sufficient quantities to be a hazard in enclosed areas. Hydrogen sulfide gas, which smells like rotten eggs, can be toxic. Biosolids spilled onto pavement pose a potential road hazard because they can create wet, slick surfaces for motor vehicles, and/or can obstruct traffic flow.

94. **Land application of biosolids.** Land application is an economical and environmentally sound method of handling biosolids that is the method of choice for most rural communities with sufficient suitable land. A properly managed land application program achieves beneficial reuse of waste organic matter and nutrients without adversely affecting public health. Meeting regulatory requirements, finding suitable sites, and overcoming local opposition may be difficult, however. In many cases, septage is stabilized before application to land to reduce levels of pathogenic organisms, lower the potential for putrefaction, and reduce odors. The simplest and most economical technique for stabilization of septage is the addition of lime or other alkaline material which is added to liquid septage in quantities sufficient to increase the pH of the septage to at least 12.0 for 30 minutes. O&M requirements for land application of biosolids vary widely depending on the application technique and the type of equipment used.

Table 16: Anticipated Impacts and Mitigation Measures – O&M Phase

Field	Impacts	Mitigation Measures
A. Physical Characteristics		
Sludge from twin pit latrines	Source of potential contamination of nearby storm drains, waterways, or groundwater.	- Re-use sludge from twin pits - Use adequate water for flushing to prevent clogging - Further treatment of sludge if sludge is not fully digested - Temporary stockpiles of biosolids to be covered with lime mud (high pH) that acts as an odor control measure until material is reused
Septage from septic tanks	Groundwater contamination	- Secondary treatment for sludge required - Temporary stockpiles of biosolids to be covered with lime mud (high pH) that acts as an odor control measure until material is reused - Construct roofed facilities to prevent water or precipitation from contacting biosolids, and provide additional water management as needed.
Cleaning and maintenance	Inadequate cleaning and maintenance of public toilet create environmental nuisance	Provide sufficient water supply for regular cleaning; train the concerned staff for proper maintenance
Overflow and flooding	Overflow and flooding may create environmental pollution	Latrine should place in higher ground to avoid flooding
Land application of biosolids	Improper land application of biosolids from septic tank and pit latrine may increase disease spreading	A properly managed land application program achieves beneficial reuse of waste organic matter and nutrients without adversely affecting public health. In many cases, septage is stabilized before application to land to reduce levels of pathogenic organisms, lower the potential for putrefaction, and reduce odors. The simplest and most economical technique for stabilization of septage is the addition of lime or other alkaline material which is added to liquid septage in quantities sufficient to increase the pH of the septage to at least 12.0 for

Field	Impacts	Mitigation Measures
		30 minutes. As fecal sludge management is a separate sub-project, it is strictly necessary to follow the handling of biosolids produced from septic tank and pit latrine under fecal sludge management practice described under SWM and fecal sludge management subproject.
Odor	Inefficient emptying pit latrines create nuisance and disease spreading	Pit latrines must be emptied frequently, solids that accumulate in septic systems (septage) must also be removed periodically, usually every 2 to 5 years depending on design and usage to maintain proper function and prevent plugging, overflows, and the resulting release of septic tank associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.
Acoustic environment	Temporary increase in noise level and vibrations. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Plan activities in consultation with Kushtia local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.
Collection and conveyance	Septage spilled onto pavement pose a potential road hazard because they can create wet, slick surfaces for motor vehicles, and/or can obstruct traffic flow.	- Regular check of desludging pump and attending the wear and tear - Regular check of desludging equipment and attending the wear and tear - Regular chemical coating of the collection tank - Prevent biosolids from being tracked onto public roadways - Desludging equipment should be inspected for cleanliness before leaving the site - Use mud flaps on the back of desludgers to preclude biosolids getting on tires or undercarriage during unloading operations - Public roadways accessing the site should be inspected each day during operational periods, and cleaned promptly (shovel and sweep).
Treatment and disposal		- Cleaning of intermediate sewer pipes once in 15 days - Ensuring the regular desludging of biogas digester as per the detention time - Desludging of anaerobic modules once in two to three years depending on the desludging period adopted for the designs - Cleaning of filter media in the planted gravel filter once in two to three years - Regular emptying of sludge drying beds (once in 10 days) and storing the dried compost for its use - If planted drain provided then cleaning of filter media once in two to three years - Ensure biosolids are stabilized before land application
B. Socioeconomic Characteristics		
Workers health and safety	Workers need to be mindful of the occupational hazards. Potential impacts are negative and long-term but reversible by mitigation measures.	- Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. - Ensure that all site personnel have a basic level of H&S training. - Mark and provide sign boards. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate. - Always wash hands after contact with biosolids. - Avoid touching face, mouth, eyes, nose, or genitalia before washing hands. - Eat in designated areas away from biosolids handling activities.

Field	Impacts	Mitigation Measures
		- Do not smoke or chew tobacco or gum while working in direct contact with biosolids - Use gloves, when applicable. - Keep wounds covered with clean, dry bandages. - Change into clean work clothing on a daily basis. - If contact occurs, wash contact area thoroughly with soap and water. Use antiseptic solutions on wounds, and bandage with a clean, dry dressing. For contact with eyes, flush thoroughly but gently. - Consult a doctor regarding direct exposure to an open wound or mouth.
Hazard potentials	Accumulated methane and hydrogen sulfide in enclosed containers that can cause fire (methane) and foul odor (hydrogen sulfide)	- Extinguish flames/fires caused by methane accumulation with dry chemical, water spray or foam. - Avoid use of open flames in confined areas and around sealed transport containers. - Vent confined areas and transport containers if biosolids have been stored for any significant length of time.
Community health and safety	Non-acceptance of the sanitation facilities and pilot projects by the community ; complaints from community	- Operator staff should politely receive citizen questions or complaints, collect the individual's name and phone number, conduct a prompt investigation, undertake control measures, if necessary, follow-up with the person who filed the complaint, and document the event and actions.

F. Cumulative Impact Assessment

95. The cumulative impact assessment examined the interaction between the subproject's residual effects (i.e., those effects that remain after mitigation measures have been applied) and those associated with other past, existing, and reasonably foreseeable future projects or activities. The interaction of residual effects associated with multiple projects and/or activities can result in cumulative impacts, both positive and negative. The project's potential cumulative effects were considered with respect to valued components in environmental and socioeconomic categories, in four areas:

(i) of any potential residual project effects that may occur incrementally over time;
(ii) consideration of other known relevant projects or activities within the specified study area boundaries, even if not directly related to the project;
(iii) potential overlapping impacts that may occur due to other developments, even if not directly related to the proposed subproject; and
(iv) future developments that is reasonably foreseeable and sufficiently certain to proceed.

96. The project has identified the valued components as acoustic environment, socioeconomic and socio-community components, and human health and safety. There are no foreseeable projects that will overlap with the subproject. The spatial boundary of the subproject is the area along alignment of the cyclone shelters. The temporal boundary can be considered as the whole Kushtia *pourashava*.

97. **Acoustic environment.** Noise levels during construction activities in immediate proximity of work sites are expected to increase. The duration of exposure will be relatively brief and imperceptible. The exposure represents a temporary, localized, adverse residual effect of low significance for affected receptors.

98. **Socioeconomic and socio-community.** Concerns on existing provisions for pedestrians and other forms of transport will occur spatially during construction activities. Traffic

movement along the access roads will be improved once the activities are completed. The subproject will not conflict with existing or planned land use. However, following improvement in infrastructures and services, added residential developments, commercial, and business facilities and increased densities are expected to develop and enhance Kushtia pourashava. This can be considered a long-term cumulative benefit of the subproject.

99. Given the scale of the project it is likely that large numbers of local people will obtain at least temporary socio-economic benefits, by gaining employment in the construction workforce, and thus raising their levels of income. These benefits can bring wider social gains if they are directed at vulnerable[9] groups.

100. Upon completion of the project, the socio-community will be the major beneficiaries of this subproject. The citizens of Kushtia will be the major beneficiaries of this subproject. The benefits of improved sanitation translate into improved health, an increase in productivity, fewer days absent from school for children, and improved quality of life. In addition to improved environmental conditions, the subproject will reduce exposure to climate extremes. On-site/decentralized systems of waste management will improve community health and hygiene, particularly in socially deprived groups, and reduce financial burden of Kushtia *pourashava*. People would spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health. Cost savings in health care are mainly due to the reduced number of treatments of diarrheal cases. Also, patients will avoid costs incurred by seeking treatment, including expenditures on care, drugs and transport and the opportunity costs of time spent on seeking care. Another set of benefits related to less illness are the avoided days lost, with respect to formal or informal employment, other productive activities in the household, or school attendance. These are considered a long-term cumulative benefit.

101. **Community and workers health and safety.** No adverse residual effects to human health will occur as a result of construction. While exposure to elevated noise levels, fugitive dust and common air pollutants will occur in proximity to work sites during construction, due to their short-term and localized nature, these effects are expected to be minor and insignificant with no measurable effects on human health. The sanitation facilities will improve hygiene behavior practices thereby reducing transmission of diseases and cleaner environment for the community.

102. Therefore the project will benefit the general public by contributing to the long-term improvement of municipal services and community livability in Kushtia *pourashava*.

VI. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

A. Approach

103. During inception stage of PPTA's engagement, consultations were held with the LGED, ADB and during site visits, consultation were held with *pourashava* local staff, local people and beneficiaries on issues pertaining to the selection of subprojects and identification of key issues including addressing the current gaps in provision of basic services and improvement of municipal infrastructures within Kushtia *pourashava*. These consultations provided inputs in

[9] Vulnerable groups as those without legal title to land and other assets; households headed by single earner females, the elderly or disabled; indigenous peoples (based on ADB OM); and households with incomes that are below the poverty line.

identification of the subprojects' needs of the communities, and the relevant stakeholders, awareness about subprojects, benefits of subprojects, possible environmental impacts and possible mitigation measures. The REA Checklist for each subproject was also shared during the consultations. Table 17 provides the summary of consultations carried out.

104. The environmental experts of the TA 8913 consultants (Safeguard Specialists and Junior Environmental Engineers) has contacted the local people through field workers and Kushtia *pourashava* staff. Meetings were arranged in the form of Focus Group Discussion (FGD) with the consent of the local stakeholders at scheduled venues chosen by the locals (Figure 9). Participant attendance is attached in Appendix 5.

B. Major Findings

105. The information on the conducted FGD and key issues identified during consultations is presented on the Table 17.

Table 17: Focus group discussion and key issues identified during Consultations

Place, Date and Discussion on Subprojects	Participants	Key issues discussed
Location: Soyrastar Moar (Six Road connecting round-up), Ward-2, In front of Masque Date: 22-08-16 Subproject under discussion: Public Toilet	Councelor, business man, service, retired service, Khadem of Mosque, Imam of Masque, Student No. of participants: 15	• In existing public toilets, pans are dirty, female portion is in lock and key, less water supply, poor maintenance • Pit cleaning is done within 2-4 years, no fecal sludge management, • Special care should be taken to minimize noise pollution during construction period. • All the proposed infrastructure implementation is needed for Kushtia town, all will provide benefit, no major environmental concern • All development works are essential but sound design and construction is necessary so that they are not affected by environmental pollution. • Water logging and flooding are major concerns, • During construction period public safety and workers' safety is important • Noise and air pollution is required to be controlled • Fecal sludge management is important

C. Summary

106. People want to have all development works with adequate design and effective implementation for proper environment management and pollution control. Construction supervision will ensure sound and sustainable engineering practices to avoid any further environmental impact to people's life.

Figure 9: Stakeholders consultations at Kushtia (FGDs at Kushtia)


D. Proposed Future Consultation Plan

107. The future public involvement in monitoring impacts and mitigation measures during the construction and operation stages and includes a Public Consultation Plan as shown in Table 18, Public consultation plans are part of the project implementation and management plan. The Executive Agency (LGED) and Implementing Agency (Kushtia *pourashava*) are responsible for public consultation during project implementation. Costs for public consultation activities during construction are proposed to be covered from budget of supervision consultancy contract.

Table 18: Public Consultation Plan

Organizer	Approach	Time and Frequency	Subject	Participants
Pre-Construction stage				
LGED and Kushtia *pourashava*	Workshop	Before starting of construction	Disclosure of all development activities and its impact and disclosure of possible conservation and restoration of the mosque	All people of Kushtia local government people, administrative staff, LGED local staff, Porashava staff, PWD, RHD, Water Development Board, BMD, DPHE and other government departments, local public representatives, educationalist, environmentalist, business man, service holder, beneficiaries, NGOs, local leaders, local concerned people, general peoples, media, etc.
Construction stage				
LGED and Kushtia *pourashava*	Public consultation and site visits	At least once a year	Adjusting mitigation measures if necessary, construction impacts, comments and suggestions	Work staff within construction area; Residents within Construction area
	Expert workshop or press conference	As needed, based on public consultation	Comments and suggestions on mitigation measures, public opinions; adjusting mitigation measures accordingly	Experts from various sectors, media
	Public workshop	At least once a year	Adjusting mitigation measures if necessary	Representatives of residents and social sectors

Organizer	Approach	Time and Frequency	Subject	Participants
			construction impacts, comments and suggestions	
Operation Stage				
Pourashava	Public consultation and site visits	At least once	Effectiveness of mitigation measures, impacts of operation, mitigation measures, comments and suggestions	Residents adjacent to project sites, users and beneficiaries
	Public satisfaction survey	At least once	Comments and Suggestions	Project beneficiaries and users

VII. GRIEVANCE REDRESS MECHANISM

108. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the resolution of AP's concerns, complaints, and grievances about the social and environmental performance at the level of the project. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project.

109. **Common GRM.** A common GRM will be in place for social, environmental, or any other grievances related to the project; the resettlement plans (RPs) and IEEs will follow the GRM described below, which is developed in consultation with key stakeholders. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The multi-tier GRM for the project is outlined below, each tier having time-bound schedules and with responsible persons identified to address grievances and seek appropriate persons' advice at each stage, as required.

110. *Pourashava*-wide public awareness campaigns will ensure that awareness on grievance redress procedures is generated through the campaign. The project implementation unit (PIU) designated safeguard focal person and governance improvement and capacity development consultants (GICDC) will conduct *pourashava*-wide awareness campaigns to ensure that poor and vulnerable households are made aware of grievance redress procedures and entitlements, and will work with the PMU and management, design and supervision consultants (MDSC) to help ensure that their grievances are addressed.

111. Affected persons (APs) will have the flexibility of conveying grievances/suggestions by dropping grievance redress/suggestion forms in complaints/suggestion boxes that have already been installed by project *pourashavas* or through telephone hotlines at accessible locations, by e-mail, by post, or by writing in a complaints register in *pourashava* offices. Appendix 6 has the sample grievance registration form. Careful documentation of the name of the complainant, date of receipt of the complaint, address/contact details of the person, location of the problem area, and how the problem was resolved will be undertaken. The project management unit (PMU) safeguard officer will have the overall responsibility for timely grievance redressal on environmental and social safeguards issues and for registration of grievances, related disclosure, and communication with the aggrieved party through the PIU designated safeguard focal person.

112. **Grievance redress process.** In case of grievances that are immediate and urgent in the perception of the complainant, the contractor and MDSC on-site personnel will provide the most easily accessible or first level of contact for quick resolution of grievances. Contact phone numbers and names of the concerned PIU safeguard focal person and contractors will be posted at all construction sites at visible locations.

(i) **1st Level Grievance.** The phone number of the PIU office should be made available at the construction site signboards. The contractors and PIU safeguard focal person can immediately resolve on-site in consultation with each other, and will be required to do so within 7 days of receipt of a complaint/grievance.

(ii) **2nd Level Grievance.** All grievances that cannot be redressed within 7 days at field/ward level will be reviewed by the grievance redress cell (GRC) headed by Panel Mayor of the *pourashava* with support from PIU designated safeguard focal person and MDSC regional environment and resettlement specialists. GRC will attempt to resolve them within 15 days. The PIU designated safeguard focal person will be responsible to see through the process of redressal of each grievance.

(iii) **3rd Level Grievance.** The PIU designated safeguard focal person will refer any unresolved or major issues to the PMU safeguard officer and MDSC national environmental and resettlement specialists. The PMU in consultation with these officers/specialists will resolve them within 30 days.

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

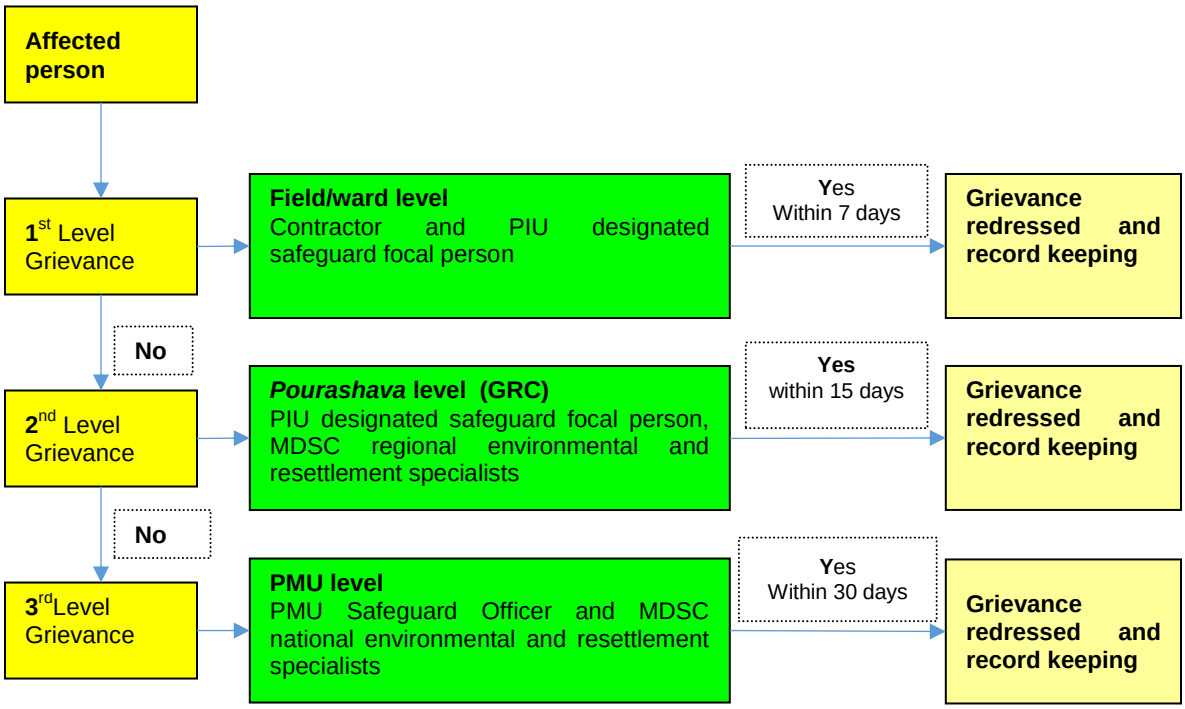
114. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use the ADB Accountability Mechanism (AM) through directly contacting (in writing) the Complaint Receiving Officer (CRO) at ADB headquarters or the ADB Bangladesh Resident Mission (BRM). The complaint can be submitted in any of the official languages of ADB's DMCs. The ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

115. **Recordkeeping**. Records of all grievances received, including contact details of complainant, date the complaint was received, nature of grievance, agreed corrective actions and the date these were effected and final outcome will be kept by PIU. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU office, *pourashava* office, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis.

116. **Periodic review and documentation of lessons learned.** The PMU safeguard officer will periodically review the functioning of the GRM in each *pourashava* and record information on the effectiveness of the mechanism, especially on the project's ability to prevent and address grievances.

117. **Costs.** All costs involved in resolving the complaints (meetings, consultations, communication and reporting/information dissemination) will be borne by the concerned PIU at *pourashava*-level; while costs related to escalated grievances will be met by the PMU. Cost estimates for grievance redress are included in resettlement cost estimates.

Figure 10: Grievance Redress Process



Note: GRC = Grievance Redressal Cell, GICDC = governance improvement and capacity development consultants, PIU = project implementation unit, MDSC = management design and supervision consultants, PMU =project management unit.

VIII. ENVIRONMENTAL MANAGEMENT PLAN

118. The purpose of the environmental management plan (EMP) is to ensure that the activities are undertaken in a responsible, non-detrimental manner with the objectives of: (i) providing a proactive, feasible, and practical working tool to enable the measurement and monitoring of environmental performance on-site; (ii) guiding and controlling the implementation of findings and recommendations of the environmental assessment conducted for the project; (iii) detailing specific actions deemed necessary to assist in mitigating the environmental impact of the project; and (iv) ensuring that safety recommendations are complied with.

119. A copy of the EMP must be kept on work sites at all times. This EMP will be included in the bid documents and will be further reviewed and updated during implementation. The EMP will be made binding on all contractors operating on the site and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document constitutes a failure in compliance.

120. For civil works, the contractor will be required to (i) establish an operational system for managing environmental impacts (ii) carry out all of the monitoring and mitigation measures set forth in the EMP; and (iii) implement any corrective or preventative actions set out in safeguards monitoring reports that the employer will prepare from time to time to monitor implementation of this IEE and EMP. The contractor shall allocate a budget for compliance with these EMP measures, requirements and actions.

A. Institutional Arrangement

121. **Executing and implementing agencies**. LGED and DPHE, both under the Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MLGRDC), are the executing agencies (EA). LGED is responsible for providing support and guidance to *pourashavas* concerning performance criteria and *pourashava* development planning. DPHE will provide support in water supply and sanitation schemes. Participating *pourashavas* are the implementing agencies (IA).

B. Safeguard Implementation Arrangement

122. **Project management unit**. A PMU is established for the overall management of the project. The PMU is headed by Project Director (PD) supported by officials including three project managers in charge of (i) municipal infrastructure (excluding water supply and sanitation), (ii) water supply and sanitation, and (iii) governance improvement and capacity development, respectively. The PMU will receive support from national environmental specialist and national resettlement specialist on the MDSC team. Key tasks and responsibilities of the PMU safeguard (environment) officer are as follows:

(i) confirm existing IEEs/EMPs are updated based on detailed designs, and that new IEEs/EMPs are prepared in accordance with the EARF and subproject selection criteria related to safeguards;
(ii) confirm whether IEEs/EMPs are included in bidding documents and civil works contracts;
(iii) provide oversight on environmental management aspects of subprojects and ensure EMPs are implemented by project implementation unit (PIU) and contractors;
(iv) establish a system to monitor environmental safeguards of the project, including monitoring the indicators set out in the monitoring plan of the EMP;
(v) facilitate and confirm overall compliance with all government rules and regulations regarding site and environmental clearances, as well as any other environmental requirements (e.g., location clearance certificates, environmental clearance certificates, etc.), as relevant;
(vi) supervise and provide guidance to the PIUs to properly carry out the environmental monitoring and assessments as per the EARF;
(vii) review, monitor, and evaluate the effectiveness with which the EMPs are implemented, and recommend necessary corrective actions to be taken as necessary;
(viii) consolidate monthly environmental monitoring reports from PIUs and submit semi-annual monitoring reports to ADB;
(ix) ensure timely disclosure of final IEEs/EMPs in locations and form accessible to the public; and
(x) address any grievances brought about through the grievance redress mechanism in a timely manner.

123. **Project implementation unit.** The participating *pourashavas* will establish a PIU within the *pourashava* structure. The PIUs will (i) be responsible for land acquisition; (ii) take necessary action for obtaining rights of way; (iii) plan, implement and monitor public relations activities, gender mainstreaming initiatives and community participation activities at *pourashava* level; (iv) disseminate information related to the project to the public and media; (v) ensure

compliance with loan covenants concerning safeguards measures; and (vi) facilitate implementation of safeguards plans. The PIUs will each designate a Safeguard Officer[10] and will receive assistance from the assigned MDSC regional environmental specialist to:

(i) update IEEs/EMPs during detailed design stage and prepare new IEEs/EMPs in accordance with the EARF;
(ii) conduct environmental compliance audit of existing facilities as per Item F, Appendix 6 of ADB SPS, 2009;
(iii) include IEEs/EMPs in bidding documents and civil works contracts;
(iv) comply with all government rules and regulations;
(v) take necessary action for obtaining rights of way;
(vi) oversee implementation of EMPs including environmental monitoring by contractors;
(vii) take corrective actions when necessary to ensure no environmental impacts;
(viii) submit monthly environmental monitoring reports to PMU,
(ix) conduct continuous public consultation and awareness;
(x) address any grievances brought about through the Grievance Redress Mechanism in a timely manner as per the IEEs; and
(xi) organize an induction course for the training of contractors preparing them on EMP implementation, environmental monitoring requirements related to mitigation measures; and taking immediate actions to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation.

124. **Project Management, Design and Supervision Consultants (MDSC).** MDSC will be engaged to work closely with and advise the PMU, to be involved in project supervision including monitoring during construction phase. The MDSC will have one national environmental specialist and three regional environmental specialist as well as one national resettlement specialist and three regional resettlement specialist. The MDSC national environmental specialist will, but not limited to:

(i) work under the general supervision of the team leader and the deputy team leader;
(ii) review the environmental guidelines and requirement of the government of Bangladesh and ADB SPS, 2009, environmental subproject selection guidelines and EARF;
(iii) Guide the implementation of future subprojects;
(iv) provide technical support to the PMU and PIUs including review and update of EARF and guidelines for specific type of subprojects and assist in preparing terms of reference for environmental assessment;
(v) assist and guide the MDSC regional environmental specialists to provide support to environmental management functions including updating subproject IEEs in respect to EMP;
(vi) assist in preparing IEEs and in monitoring impact and mitigation measures associated with subprojects;
(vii) assist PIUs and MDSC regional environmental specialists working in the steps for preparing the EIA/IEE, capacity building and training, preparation of guidelines and procedure and subproject specific guidance;

[10] It is recommended that existing *pourashava* health officer or executive engineer will also work as safeguard officer in addition to his/her regular responsibilities within the *pourashava*.

(viii) provide support and guidance to PIUs in undertaking environmental monitoring
(ix) support PMU in submitting semi-annual environmental monitoring reports to ADB;
(x) facilitate in grievance redress and corrective actions;
(xi) train PIU officials regarding environmental requirement and issues; and
(xii) perform any other task assigned by the team leader, deputy team leader and the project director.

125. The MDSC regional environmental specialists will, but not limited to:
(i) work under the supervision and guidance of the team leader, deputy team leader and MDSC national environmental specialist;
(ii) assist PIUs in preparing and updating IEEs including EMPs in accordance with the EARF, and assist in monitoring impact and mitigation measures associated with subprojects including implementation of EMPs by contractors;
(iii) assist in preparation of IEEs and in the environmental review of subproject consisting of screening at *pourashava* level by PIU through a committee formed with municipal mayor as chairman and representatives from DOE, LGED and other relevant district office as members;
(iv) assist PIUs in the steps for preparing EIA/IEE, capacity building and training, preparation of guidelines and procedure and subproject specific guidance;
(v) support PIU in environmental monitoring and submit monitoring reports to PMU as inputs into the semi-annual monitoring report submitted to ADB;
(vi) undertake mitigation measures and other specific measures in the construction contract;
(vii) facilitate in grievance redress and corrective actions;
(viii) follow subproject selection guidelines and EARF to ensure compliance with the environmental guidelines and requirement of the Government of Bangladesh and ADB SPS, 2009;
(ix) support PMU and MDSC national environment specialist by providing data, information and all other requested assistance;
(x) train PIU officials regarding environmental issues
(xi) perform any other task assigned by MDSC national environment specialist, team leader, deputy team leader and the project director.

126. **Civil works contracts and contractors.** EMPs are to be included in bidding and contract documents and verified by the PIUs and PMU. The contractor will be required to designate an environmental supervisor to (i) coordinate with MDSC on updating the IEE/EMP based on detailed designs, and (ii) ensure implementation of EMP during civil works. Contractors are to carry out all environmental mitigation and monitoring measures outlined in their contract.

127. **Governance Improvement and Capacity Development Consultants (GICDC).** The PMU and PIUs will require support on a range of activities related to governance improvement and capacity development of *pourashavas*. The GICDC will support PMU and PIUs in implementing urban government improvement action plan (UGIAP) by providing capacity development, community mobilization and other facilitation services. There will be 4 GICDC regional offices consisting of 4 regional coordinators at each regional office. There will be 2community mobilizers in each project *pourashava*. The regional coordinators will assist *pourashavas* and the local capacity development experts in the activities related to community participation and inclusive development. The community mobilizers will be posted at the pourashava and will (i) have to work maintaining close liaison with the mayor, councilors,

pourashava staffs and communities, (ii) provide assistance and support to PIU regarding planning and implementation of citizen awareness and participation activities, urban planning, equity and inclusiveness of women and urban poor. The GICDC will also have a training specialist who will be responsible for identifying and coordinating capacity building activities at *pourashava* level.

Figure 11: Safeguards Implementation Arrangement

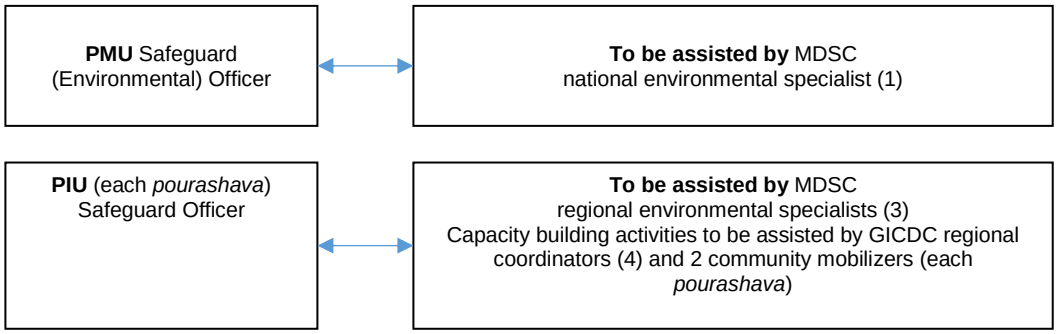


Table 19: Program of Actions – Prior, During, and Post Construction Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
1. Prior to Construction Activities						
Land acquisition and resettlement	Land acquisition and resettlement impacts	There is no resettlement impact for community latrine. However, This impact is addressed through the RAP under social safeguard	Project management unit (PMU), project implementing unit (PIU), Management Design Supervision Consultants (MDSC)	Covered under RP	Covered under RP	Covered under RP
Consents, permits, clearances, no objection certificate (NOC), etc.	Failure to obtain necessary consents, permits, NOCs, etc can result to design revisions and/or stoppage of works	- Obtain all necessary consents, permits, clearance, NOCs, etc. prior to start of civil works. - Acknowledge in writing and provide report on compliance all obtained consents, permits, clearance, NOCs, etc. - Include in detailed design drawings and documents all conditions and provisions if necessary	PMU, PIU, MDSC	Incorporated in final design and communicated to contractors.	Prior to award of contract	No cost required. Cost of obtaining all consents, permits, clearance, NOCs, etc. prior to start of civil works responsibility of PMU and PIU. Mitigation measures are included as part of TOR of PMU, PIU, and MDSC.
Existing utilities	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 activities - Require construction contractors to prepare a contingency plan to include actions to be done in case of unintentional interruption of services. - Require contractors to prepare spoils management plan (Appendix 3) and traffic	PMU, PIU, and MDSC	- List of affected utilities and operators; - Bid document to include requirement for a contingency plan for service interruptions (example provision of water if disruption is more than 24 hours), spoil management plan (Appendix 3), and traffic management plan (Appendix 4) - Number of deeptube wells to	During detailed design phase	No cost required. Mitigation measures are included as part of TOR of PMU, PIU, MDSC. Cost of shifting deep tube to be included in the detailed design documents

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		management plan (Appendix 4)		be shifted		
Construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas.	Disruption to traffic flow and sensitive receptors	- Determine locations prior to award of construction contracts.	PMU, PIU, and MDSC	(i) List of selected sites for construction work camps, hot mix plants, stockpile areas, storage areas, and disposal areas. (ii) Written consent of landowner/s (not lessee/s) for reuse of excess spoils to agricultural land	During detailed design phase	No cost required. Mitigation measures are included as part of TOR of PMU, PIU, and MDSC.
Sources of Materials	Extraction of materials can disrupt natural land contours and vegetation resulting in accelerated erosion, disturbance in natural drainage patterns, ponding and water logging, and water pollution.	- Prepare list of approved quarry sites and sources of materials	PMU, PIU, and MDSC	(i) List of approved quarry sites and sources of materials; (ii) Bid document to include requirement for verification of suitability of sources and permit for additional quarry sites if necessary.	During detailed design phase	No cost required. Mitigation measures are included as part of TOR of PMU, PIU, and MDSC.
EMP Implementation Training	Irreversible impact to the environment, workers, and community	- Project manager and all key workers will be required to undergo EMP implementation including spoils management, Standard operating procedures (SOP) for construction works; health and safety (H&S), core labor laws, applicable environmental laws, etc	Construction Contractor with assistance of PIU and MDSC Environmental Safeguards Specialist	- Proof of completion (Safeguards Compliance Orientation) (ii) Posting of proof of completion at worksites (iii) Posting of EMP at worksites	During detailed design phase prior to mobilization of workers to site	Cost of EMP Implementation Orientation Training to contractor is responsibility of PMU and PIU. Other costs responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
2. During Construction Activities						
A. Physical Characteristics						
Topography, landforms, geology and soils	Significant amount of gravel, sand, and cement will be required for this subproject. Extraction of construction materials may cause localized changes in topography and landforms. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries, ensure these conform to all relevant regulatory requirements. - Borrow areas and quarries (If these are being opened up exclusively for the subproject) must comply with environmental requirements, as applicable. No activity will be allowed until formal agreement is signed between PIU, landowner and contractor.	Construction Contractor	- Records of sources of materials	Monthly by PIU	Cost for implementation of mitigation measures responsibility of contractor.
Water quality	Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall which may cause siltation and reduction in the quality of adjacent bodies of water. The impacts are	- Prepare and implement a spoils management plan (Appendix 3). - Prioritize re-use of excess spoils and materials in construction activities. If spoils will be disposed, consult with Kushtia local authority on designated disposal areas. - All earthworks must to be conducted during dry season to maximum extent possible to avoid the difficult working conditions that prevail during monsoon season	Construction Contractor	- Areas for stockpiles, storage of fuels and lubricants and waste materials; - Number of silt traps installed along trenches leading to water bodies; - Records of surface water quality inspection; - Effectiveness of water management measures; - No visible degradation to nearby drainages,	- Visual inspection by PIU and supervision consultants on monthly basis - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
	negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	such as problems from runoff. - Location for stockyards for construction materials shall be identified at least 300m away from watercourses. Place storage areas for fuels and lubricants away from any drainage leading to water bodies. - Take all precautions to minimize the wastage of water in the construction activities. - Take all precautions to prevent entering of wastewater into streams, watercourses, or irrigation system. Install temporary silt traps or sedimentation basins along the drainage leading to the water bodies. - Ensure diverting storm water flow during construction shall not lead to inundation and other nuisances in low lying areas. - While working across or close to any water body, the flow of water must not be obstructed. Ensure no construction materials like earth, stone, or appendage are disposed of in a manner that may block the flow of water of any watercourse and cross drainage channels.		khals or water bodies due to construction activities		

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		- Monitor water quality according to the environmental management plan.				
Air quality	Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulfur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Damp down exposed soil and any sand stockpiled on site by spraying with water when necessary during dry weather; - Use tarpaulins to cover soils, sand and other loose material when transported by trucks. - Unpaved surfaces used for haulage of materials within settlements shall be maintained dust-free. - Arrangements to control dust through provision of windscreens, water sprinklers, and dust extraction systems shall be provided at all hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject). - Monitor air quality.	Construction Contractor	- Location of stockpiles; - Number of complaints from sensitive receptors; - Heavy equipment and machinery with air pollution control devices; - Certification that vehicles are compliant with air quality standards.	- Visual inspection by PIU and supervision consultants on monthly basis - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.
Acoustic environment	Construction activities will be on settlements, in and near schools, and areas with small-scale	- Involve the community in planning the work program so that any particularly noisy or otherwise invasive activities can be scheduled to avoid	Construction Contractor	- Number of complaints from sensitive receptors; - Use of silencers in noise-producing equipment and sound barriers;	- Visual inspection by PIU and supervision consultants on monthly basis - Frequency and	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
	businesses. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	sensitive times. - Plan activities in consultation with Kushtia local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Use of high noise generating equipment shall be stopped during night time. - Horns should not be used unless it is necessary to warn other road users or animals of the vehicle's approach; - Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. - All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required). - Monitor noise levels. Maintain maximum sound levels not exceeding 80 decibels (dBA) when measured at a distance of 10 m or more from the vehicle/s.		- Equivalent day and night time noise levels	sampling sites to be finalized during detailed design stage and final location of subproject components	

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		- If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. - Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.				
Aesthetics	The construction activities do not anticipate any cutting of trees but will produce excess excavated earth (spoils), excess construction materials, and solid waste such as removed concrete, wood, packaging materials, empty containers, spoils, oils, lubricants, and other similar items. The impacts are negative but short-term, site-specific within a relatively small	- Prepare the Debris Disposal Plan - Remove all construction and demolition wastes on a daily basis. - Coordinate with Kushtia local authority for beneficial uses of excess excavated soils or immediately dispose to designated areas Avoid stockpiling of any excess spoils - Suitably dispose of collected materials from drainages, unutilized materials and debris either through filling up of pits/wasteland or at pre-designated disposal locations. - All vehicles delivering fine materials to the site and carrying waste debris for disposal shall	Construction Contractor	- Number of complaints from sensitive receptors; - Worksite clear of hazardous wastes such as oil/fuel - Worksite clear of any wastes, collected materials from drainages, unutilized materials and debris - Transport route and worksite cleared of any dust/mud	- Visual inspection by PIU and supervision consultants on monthly basis - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
	area and reversible by mitigation measures.	be covered to avoid spillage of materials. All existing roads used by vehicles of the contractor, shall be kept clear of all dust/mud or other extraneous materials dropped by such vehicles. - Lighting on construction sites shall be pointed downwards and away from oncoming traffic and nearby houses. - In areas where the visual environment is particularly important or privacy concerns for surrounding buildings exist, the site may require screening. This could be in the form of shade cloth, temporary walls, or other suitable materials prior to the beginning of construction. - The site must be kept clean to minimize the visual impact of the site. Manage solid waste according to the following preference hierarchy: reuse, recycling and disposal to designated areas;				
B. Biological Characteristics						
Biodiversity	Activities being located in the built-up area of Kushtia pourashava.	- Check if tree-cutting will be required during detailed design stage. No trees, shrubs, or groundcover may be	Construction Contractor	- PMU and PIU to report in writing the number of trees cut and planted if tree-cutting will be	- Inspection by PIU and supervision consultants on monthly basis, or more frequently as	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
	There are no protected areas in or around subproject sites, and no known areas of ecological interest. Based on preliminary design there are no trees at the site that need to be removed (to be reassessed during detailed design stage).	removed or vegetation stripped without the prior permission of the environment management specialist. - If during detailed design cutting of trees will be required, compensatory plantation for trees lost at a rate of 10 trees for every tree cut, in addition to tree plantation as specified in the design, will be implemented by the contractor, who will also maintain the saplings for the duration of his contract. - All efforts shall be made to preserve trees by evaluation of minor design adjustments/ alternatives (as applicable) to save trees. - Special attention shall be given for protecting giant trees and locally-important trees (with religious importance) during implementation. - Prevent workers or any other person from removing and damaging any flora (plant/vegetation) and fauna (animal) including fishing in any water body in the subproject vicinity. - Prohibit employees from poaching wildlife and cutting of trees for firewood.		required (to be determined during detailed design stage) - Number of complaints from sensitive receptors on disturbance of vegetation, poaching, fishing, etc.	the need arises.	

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
C. Socioeconomic Characteristics						
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. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Prepare and implement a Traffic Management Plan (Appendix 4) - Plan transportation routes so that heavy vehicles do not use narrow local roads, except in the immediate vicinity of delivery sites. - Maintain safe passage for vehicles and pedestrians throughout the construction period. - Schedule truck deliveries of construction materials during periods of low traffic volume. - Erect and maintain barricades, including signs, markings, flags and flagmen informing diversions and alternative routes when required. - Notify affected sensitive receptors by providing sign boards informing nature and duration of construction activities and contact numbers for concerns/complaints. - Leave spaces for access between mounds of soil. - Provide walkways and metal sheets where required to maintain access across for people and vehicles. - Increase workforce in front of critical areas such as institutions, place of worship,	Construction Contractor	- Traffic route during construction works including number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (Appendix 4); - Number of complaints from sensitive receptors; - Number of signages placed at project location - Number of walkways, signages, and metal sheets placed at project location	- Inspection by PIU and supervision consultants on monthly basis, or more frequently as the need arises. - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		business establishment, hospitals, and schools. - Consult businesses and institutions regarding operating hours and factoring this in work schedules. Ensure there is provision of alternate access to businesses and institutions during construction activities, so that there is no closure of these shops or any loss of clientage. - Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Socio-economic status	There is no requirement for land acquisition or any resettlements. Manpower will be required during the XXX-months construction stage. This can result to generation of contractual employment and increase in local revenue. Thus potential impact is positive and long-term.	- Employ at least 50% of labor force from communities in the vicinity of the site. This will have the added benefit of avoiding social problems that sometimes occur when workers are imported into host communities, and avoiding environmental and social problems from workers housed in poorly serviced camp accommodation. - Secure construction materials from local market.	Construction Contractor	- Employment records; - Records of sources of materials - Records of compliance to Bangladesh Labor Law of 2006 and other applicable standards	- Inspection by PIU and supervision consultants on monthly basis, or more frequently as the need arises. - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.
Other existing amenities for community	Although construction of subproject	- Obtain details from pourashava nature and location of all existing	Construction Contractor	- Utilities Contingency Plan - Number of	- Inspection by PIU and supervision consultants on	Cost for implementation of mitigation measures

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
welfare	components involves quite simple techniques of civil work, the invasive nature of excavation and the subproject sites being in built-up areas of Kushtia pourashava where there are a variety of human activities, will result to impacts to the sensitive receptors such as residents, businesses, and the community in general. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	infrastructure, and plan excavation carefully to avoid any such sites to maximum extent possible; - Integrate construction of the various infrastructure subprojects to be conducted in Kushtia (roads, water supply, etc.) so that different infrastructure is located on opposite sides of the road where feasible and roads and inhabitants are not subjected to repeated disturbance by construction in the same area at different times for different purposes. - Consult with local community to inform them of the nature, duration and likely effects of the construction work, and to identify any local concerns so that these can be addressed. - Existing infrastructure (such as water distribution pipes, electricity pylons, etc.) shall be relocated before construction starts at the subproject sites. - Prior permission shall be obtained from respective local authority for use of water for construction. Use of water for construction works shall not disturb local water		complaints from sensitive receptors	monthly basis, or more frequently as the need arises. - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		users. - If construction work is expected to disrupt users of community water bodies, notice to the affected community shall be served 7 days in advance and again 1 day prior to start of construction. - Ensure any damage to properties and utilities will be restored or compensated to pre-work conditions.				
Community health and safety	Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Contractor's activities and movement of staff will be restricted to designated construction areas. - Locations of hot-mix plants, batching plants and crushers (if these establishments are being set up exclusively for the subproject) shall be shall be located at least 100 m away from the nearest dwelling preferably in the downwind direction. - Consult with Kushtia local authority on the designated areas for stockpiling of, soils, gravel, and other construction materials. - If the contractor chooses to locate the work camp/storage area on private land, he must get prior permission from the environment management specialist	Construction Contractor	- Number of permanent signages, barricades and flagmen on worksite as per Traffic Management Plan (Appendix 4); - Number of complaints from sensitive receptors; - Number of walkways, signages, and metal sheets placed at project location - Agreement between landowner and contractors in case of using private lands as work camps, storage areas, etc.	- Inspection by PIU and supervision consultants on monthly basis, or more frequently as the need arises. - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		and landowner. - Use small mechanical excavators to attain faster progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.a - Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. - Recycling and the provision of separate waste receptacles for different types of waste shall be encouraged. - A general regard for the social and ecological well-being of the site and adjacent areas is expected of the site staff. Workers need to be made aware of the following general rules: (i) no alcohol/drugs on site; (ii) prevent excessive noise; (iii) construction staff are to make use of the facilities provided for them, as opposed to ad hoc alternatives (e.g. fires for cooking, the use of surrounding bushes as a toilet facility); (iv) no fires permitted on site except if needed for the construction works; (v) trespassing on				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		private/commercial properties adjoining the site is forbidden; (vi) other than pre-approved security staff, no workers shall be permitted to live on the construction site; and (vii) no worker may be forced to do work that is potentially dangerous or that he/she is not trained to do. - Interested and affected parties need to be made aware of the existence of the complaints book and the methods of communication available to them. The contractor must address queries and complaints by: (i) documenting details of such communications; (ii) submitting these for inclusion in complaints register; (iii) bringing issues to the environment management specialist's attention immediately; and (iv) taking remedial action as per environment management specialist's instruction. - The contractor shall immediately take the necessary remedial action on any complaint/grievance received by him and forward the details of the grievance along with the				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		action taken to the environment management specialist within 48 hours of receipt of such complaint/grievance.				
Workers health and safety	There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in urban areas. Workers need to be mindful of the occupational hazards which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.	- Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. - Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. - Produce and implement a site health and safety (H&S) plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing (H&S) training[b] for all site personnel; (iv) documenting procedures	Construction Contractor	- Site-specific H&S Plan - Equipped first-aid stations - Medical insurance coverage for workers - Number of accidents - Records of supply of uncontaminated water - Condition of eating areas of workers - Record of H&S orientation trainings - Use of personal protective equipment - % of moving equipment outfitted with audible back-up alarms - Permanent sign boards for hazardous areas - Signages for storage and disposal areas - Condition of sanitation facilities for workers	- Daily inspection by contractors supervisor - Inspection by PIU and supervision consultants on monthly basis, or as the need arises. - Frequency and sampling sites to be finalized during detailed design stage and final location of subproject components	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		to be followed for all site activities; and (v) maintaining accident reports and records. - Arrange for readily available first aid unit including an adequate supply of sterilized dressing materials and appliances - Maintain necessary living accommodation and ancillary facilities in functional and hygienic manner in work camps. Ensure (i) uncontaminated water for drinking, cooking and washing, (ii) clean eating areas where workers are not exposed to hazardous or noxious substances; and (iii) sanitation facilities are available at all times. - Provide medical insurance coverage for workers; - Provide H&S orientation training to all new workers to ensure that they are apprised of the basic site rules of work at the site, personal protective protection, and preventing injuring to fellow workers; - Provide visitor orientation if visitors to the site can gain access to areas where hazardous conditions or substances may be				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		present. Ensure also that visitor/s do not enter hazard areas unescorted; - Ensure the visibility of workers through their use of high visibility vests when working in or walking through heavy equipment operating areas; - Ensure moving equipment is outfitted with audible back-up alarms; - Mark and provide sign boards for hazardous areas such as energized electrical devices and lines, service rooms housing high voltage equipment, and areas for storage and disposal. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate; and - Disallow worker exposure to noise level greater than 85 dBA for duration of more than 8 hours per day without hearing protection. The use of hearing protection shall be enforced actively.				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
D. Historical, Cultural, and Archaeological Characteristics						
Physical and cultural heritage	Construction works will be in built-up areas of Kushtia thus risk for chance finds is low.	- All fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest discovered on the site shall be the property of the government. - Prevent workers or any other persons from removing and damaging any fossils, coins, articles of value of antiquity, structures and other remains of archaeological interest. - Stop work immediately to allow further investigation if any finds are suspected.	Construction Contractor	- Records of chance finds	- Inspection by PIU and supervision consultants on monthly basis	Cost for implementation of mitigation measures responsibility of contractor.
E. Others						
Submission of EMP implementation report	Unsatisfactory compliance to EMP	(i) Appointment of supervisor to ensure EMP implementation (ii) Timely submission of monitoring reports including pictures	Construction contractor	- Availability and competency of appointed supervisor - Monthly report	- Monthly monitoring report to be submitted by PIU to PMU - PMU to submit semi-annual monitoring report to ADB	Cost for implementation of mitigation measures responsibility of contractor.
3. Post-construction Activities						
Post-construction clean-up	Damage due to debris, spoils, excess construction materials	(i) Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; and (ii) All excavated roads shall be reinstated to original condition. (iii) All disrupted utilities	Construction Contractor	PMU 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	- Prior to turn-over of completed works to pourashava	Cost for implementation of mitigation measures responsibility of contractor.

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		restored (iv) All affected structures rehabilitated/compensated (v) The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc. and these shall be cleaned up. (vi) All hardened surfaces within the construction camp area shall be ripped, all imported materials removed, and the area shall be topsoiled and regrassed using the guidelines set out in the revegetation specification that forms part of this document. (vii) The contractor must arrange the cancellation of all temporary services. (viii) Request PMU/CSS to report in writing that worksites and camps have been vacated and restored to pre-project conditions before acceptance of work.		(iv) worksite clean-up is satisfactory.		

[a] These products come in powder forms, and once mixed with water (being the catalyst) simply expand, and crack the rock from hole to hole. This product is environmentally friendly and can be washed away after it has been used.

[b] Some of the key areas that may be covered during training as they relate to the primary causes of accidents include (i) slips, trips and falls; (ii) personal protective equipment; (iii) ergonomics, repetitive motion, and manual handling; (iv) workplace transport; and (v) legislation and responsibilities. Training can provide the foundations of competence but it does not necessarily result in a competent worker. Therefore, it is essential to assess staff competence to ensure that the training provided is relevant and effective. Supervision and monitoring arrangements shall be in place to ensure that training has been effective and the worker is competent at their job. The level of supervision and monitoring required is a management decision that shall be based on the risks associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.

Table 20: Program of Actions – O&M Phase

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
A. Physical Characteristics						
Inadequate cleaning and maintenance of public toilet	Nuisance and disease spreading risk	Provide sufficient water supply for regular cleaning; train the concerned staff for proper maintenance	Kushtia pourashava	Visual observation	To be determined during detailed design	Included in O&M cost
Inefficient emptying pit latrines	Nuisance and disease spreading risk	Pit latrines must be emptied frequently, solids that accumulate in septic systems (septage) must also be removed periodically, usually every 2 to 5 years depending on design and usage to maintain proper function and prevent plugging, overflows, and the resulting release of septic tank associated with the job, the level of competence required, the experience of the individual and whether the worker works as part of a team or is a lone worker.	Kushtia Pourashava	Regulations must be followed regarding specific requirements for monitoring sites receiving sludge.	To be determined during detailed design	Included in O&M cost
Overflow and flooding	Nuisance and environmental pollution risk	Latrine should place in higher ground to avoid flooding	Kushtia Pourashava	Visual observation	To be determined during detailed design	Included in O&M cost
Improper land application of biosolids from septic tank and pit latrine	Nuisance and disease spreading risk	A properly managed land application program achieves beneficial reuse of waste organic matter and nutrients without adversely affecting public health. In many cases, septage is stabilized before application to land to reduce levels of pathogenic organisms, lower the potential for	Kushtia Pourashava	Regulations must be followed regarding specific requirements for monitoring sites receiving sludge.	To be determined during detailed design	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		putrefaction, and reduce odors. The simplest and most economical technique for stabilization of septage is the addition of lime or other alkaline material which is added to liquid septage in quantities sufficient to increase the pH of the septage to at least 12.0 for 30 minutes. As fecal sludge management is a separate sub-project, it is strictly necessary to follow the handling of biosolids produced from septic tank and pit latrine under fecal sludge management practice described under SWM and fecal sludge management subproject.				
Sludge from twin pit latrines	Ground water contamination risk	- Re-use sludge from twin pits - Use adequate water for flushing to prevent clogging - Further treatment of sludge if sludge is not fully digested - Temporary stockpiles of biosolids to be covered with lime mud (high pH) that acts as an odor control measure until material is reused	Kushtia pourashava	Regulations must be followed regarding specific requirements for monitoring sites receiving sludge.	To be determined during detailed design	Included in O&M cost
Septage from septic tanks	Water contamination	- Secondary treatment for sludge required - Temporary stockpiles of biosolids to be covered with lime mud (high	Kushtia pourashava	Regulations must be followed regarding specific requirements for monitoring sites	To be determined during detailed design	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		pH) that acts as an odor control measure until material is reused - Construct roofed facilities to prevent water or precipitation from contacting biosolids, and provide additional water management as needed.		receiving septage.		
Odor	Nuisance to community	- Ensure that only properly treated biosolids. Unless biosolids will be stored for limited periods (60 days) and/or during cool weather months, vector attraction reduction should be met prior to storage. Reduce the potential for unacceptable off-site odors by minimizing storage time. - Develop written odor control and response plans. - Operator training can increase sensitivity of personnel to odor concerns and ensure proper implementation of the odor control plan. - Regular inspections and odor monitoring, coupled with appropriate corrective action and recordkeeping, will help site and facility	Kushtia pourashava	Regulations must be followed regarding specific requirements for monitoring sites receiving septage.	To be determined during detailed design	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		managers maintain good neighbor status and public acceptance of the project. - Conduct loading/unloading and spreading operations as quickly and efficiently as possible to minimize the time that odors may be emitted - Observe good housekeeping practices during facility loading and unloading. Clean trucks and equipment regularly to prevent biosolids build-up that may give rise to odors. If biosolids spills occur, clean up promptly. - If significant odor should develop during handling operations, the following remedial measures can be taken: (i) immediately correct any poor housekeeping problems (such as dirty equipment); (ii) immediately treat any accumulated water that has turned septic with lime, chlorine, potassium permanganate or other odor control product; remove the water as quickly as possible to a suitable land				

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		application site; or (iii) cover biosolids with compost or sawdust.				
Acoustic environment	Temporary increase in noise level and vibrations. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	- Plan activities in consultation with Kushtia local authority so that activities with the greatest potential to generate noise are conducted during periods of the day which will result in least disturbance. - Identify any buildings at risk from vibration damage and avoiding any use of pneumatic drills or heavy vehicles in the vicinity. Complete work in these areas quickly.	Kushtia pourashava	Regulations must be followed regarding specific requirements for monitoring sites receiving septage.	Kushtia pourashava	Included in O&M cost
Collection and conveyance		- Regular check of desludging pump and attending the wear and tear - Regular check of desludging equipment and attending the wear and tear - Regular chemical coating of the collection tank - Prevent biosolids from being tracked onto public roadways - Desludging equipment should be inspected for cleanliness before leaving the site - Use mud flaps on the back of desludgers to preclude biosolids	Kushtia pourashava	Regulations must be followed regarding specific requirements for monitoring sites receiving septage.	Kushtia pourashava	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		getting on tires or undercarriage during unloading operations - Public roadways accessing the site should be inspected each day during operational periods, and cleaned promptly (shovel and sweep).				
Treatment and disposal		- Cleaning of intermediate sewer pipes once in 15 days - Ensuring the regular desludging of biogas digester as per the detention time - Desludging of anaerobic modules once in two to three years depending on the desludging period adopted for the designs - Cleaning of filter media in the planted gravel filter once in two to three years - Regular emptying of sludge drying beds (once in 10 days) and storing the dried compost for its use - If planted drain provided then cleaning of filter media once in two to three years - Ensure biosolids are stabilized before land application	Kushtia pourashava	Monitoring may include sampling and analysis of septage, soil, groundwater, and plant tissue. National and local regulations must be followed regarding specific requirements for monitoring sites receiving septage.	Monitoring requirements for land application programs may vary widely with respect to sampling points, sampling frequency, and analytical parameters. To be determined during detailed design stage	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
B. Socioeconomic Characteristics						
Workers health and safety	Workers need to be mindful of the occupational hazards. Potential impacts are negative and long-term but reversible by mitigation measures.	- Comply with requirements of Government of Bangladesh Labor Law of 2006 and all applicable laws and standards on workers H&S. - Ensure that all site personnel have a basic level of H&S training. - Mark and provide sign boards. Signage shall be in accordance with international standards and be well known to, and easily understood by workers, visitors, and the general public as appropriate. - Always wash hands after contact with biosolids. - Avoid touching face, mouth, eyes, nose, or genitalia before washing hands. - Eat in designated areas away from biosolids handling activities. - Do not smoke or chew tobacco or gum while working in direct contact with biosolids - Use gloves, when applicable. - Keep wounds covered with clean, dry bandages. - Change into clean work clothing on a daily basis.	Kushtia pourashava	- No complaints from sensitive receptors - No complaints from workers related to O&M activities - Zero accident	At least monthly for health conditions and one annual physical and health check-up	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		- If contact occurs, wash contact area thoroughly with soap and water. Use antiseptic solutions on wounds, and bandage with a clean, dry dressing. For contact with eyes, flush thoroughly but gently. - Consult a doctor regarding direct exposure to an open wound or mouth.				
Hazard potentials	Accumulated methane and hydrogen sulfide in enclosed containers that can cause fire (methane) and foul odor (hydrogen sulfide)	- Extinguish flames/fires caused by methane accumulation with dry chemical, water spray or foam. - Avoid use of open flames in confined areas and around sealed transport containers. - Vent confined areas and transport containers if biosolids have been stored for any significant length of time.	Kushtia pourashava	Monitoring may include sampling and analysis gases. National and local regulations must be followed regarding specific requirements for monitoring.	Monitoring requirements may vary widely with respect to sampling points, sampling frequency, and analytical parameters. To be determined during detailed design stage	Included in O&M cost
Community health and safety	Non-acceptance of the sanitation facilities and pilot projects by the community ; complaints from community	- Operator staff should politely receive citizen questions or complaints, collect the individual's name and phone number, conduct a prompt investigation, undertake control measures, if necessary, follow-up with the person who	Kushtia pourashava	- No complaints from sensitive receptors	As the need arises	Included in O&M cost

Field	Impacts	Mitigation Measures	Responsible for Implementation	Monitoring Indicators	Frequency of Monitoring	Cost and Source of Funds
		filed the complaint, and document the event and actions.				

C. Institutional Capacity Development Program

128. The MDSC national and regional environmental specialists will be responsible for trainings on environmental awareness and management in accordance with both ADB and government requirements. Specific modules customized for the available skill set will be devised after assessing the capabilities of the target participants and the requirements of the project. Typical modules would be as follows: (i) sensitization; (ii) introduction to environment and environmental considerations in sanitation; (iii) review of IEEs and integration into the project detailed design; (iv) improved coordination within nodal departments; and (v) monitoring and reporting system. The contractors will be required to conduct environmental awareness and orientation of workers prior to deployment to work sites. The proposed training project along with the frequency of sessions is presented in Table 21.

Table 21: Training Program for Environmental Management

Items	**Pre-construction/prior to construction**	**Construction**	
Training Title	Orientation workshop	Orientation program/ workshop for contractors and supervisory staffs	Experiences and best practices sharing
Purpose	To aware the participants of the environmental safeguard requirements of ADB and GOB and how the project will meet these requirements	To build the capacity of the staffs for effective implementation of the designed EMPs aimed at meeting the environmental safeguard compliance of ADB and GOB	To share the experiences and best practices aimed at learning lessons and improving implementation of EMP
Contents	**Module 1: Orientation** • ADB Safeguards Policy Statement • Government of Bangladesh Environmental Laws and Regulations **Module 2: Environmental Assessment Process** • ADB environmental process, identification of impacts and mitigation measures, formulation of an environmental management plan (EMP), implementation, and monitoring requirements • Review of environmental assessment report to comply with ADB requirements • Incorporation of EMP into the project design and contracts	• Roles and responsibilities of officials/contractors/consultants towards protection of environment • Environmental issues during construction • Implementation of EMP • Monitoring of EMP implementation • Reporting requirements	Experiences on EMP implementation – issues and challenges Best practices followed
Duration	1 day	1 day	1 day on a regular period to be determined by PMU, PIUs, and MDSC
Participants	LGED, DPHE, PMU, and PMU staffs (technical and environmental) involved in the project implementation	PMU PIUs Contractors	PMU PIUs Contractors

D. Staffing Requirement and Budget

129. Costs required for implementing the EMP will cover the following activities:

(i) Updating IEE, preparing and submitting reports and public consultation and disclosure;
(ii) Application for environmental clearances; and
(iii) Implementation of EMP, environmental monitoring program and long-term surveys.

130. The infrastructure involved in each scheme is generally straightforward and will take between three and nine months to build. Environmental monitoring during construction will also be straightforward and will involve periodic site observations and interviews with workers and others, plus checks of reports and other documents. This will be conducted by MDSC environmental management specialist assisted by the PMU environment officer. The environmental management specialist will use the IEE as necessary and perform tasks as specified in the TOR. Therefore no separate budget required for MDSC environment management specialist.

131. The cost of mitigation measures and surveys during construction stage will be incorporated into the contractor's costs, which will be binding on him for implementation. The surveys will be conducted by the contractors.

132. The operation phase mitigation measures are again of good operating practices, which will be the responsibility of Kushtia pourashava. All monitoring during the operation and maintenance phase will be conducted by LGED and DPHE, therefore, there are no additional costs.

133. The indicative costs to implement the EMP are shown in Tables 22-23 (by source of funds).

Table 22: Cost Estimates to Implement the EMP

	Particulars	Stages	Sub-project/ Package	Total number	Rate (BDT)	Cost (BDT)	Costs covered by
A. Mitigation Measures							
1.	Environmental mitigation / enhancement measures integrated into the designs and costs included as part of civil works	Construction				Covered under BoQ of Construction Document (CCD)	Civil Works Contract
2	Compensatory plantation measures	Construction	Per tree	50	1,500	75,000	Civil works contract
1.	Noise level	Before construction	Per contract package	5	5,000	25,000	Civil works contractor
2.	Water Quality monitoring (Ground water)	Before construction	Per contract package	1	20,000	20,000	Civil works contractor
C. Monitoring parameter during construction							
1.	Noise level	Construction	Per contract package	5	5,000	25,000	Civil work contractor
2.	Water Quality monitoring (ground water)	Construction	Per contract package	2	20,000	40,000	Civil work Contractor
3.	Survival Rate of Plantation and	Post construction	Per contract package,	2	5,000	10,000	Civil work Contractor

	Particulars	Stages	Sub-project/ Package	Total number	Rate (BDT)	Cost (BDT)	Costs covered by
	landscaping						
D. Monitoring Parameter during operation							
1.	Odor	Operation	Per subproject per year	2	10,000	20,000	Kushtia Pourashava
2	Survival Rate of Plantation and landscaping	Operation	Per subproject per year	2	5,000	10,000	Kushtia Pourashava
E. Capacity Building							
1.	i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring equirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of implementation;	Module 1 – immediately upon engagement of the MDSC environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 3.5 years) Module 3 – prior to start of Phase 3 and upon completion of the project	lump sum 1 times 7 times 1 times (Combined for all subprojects)		Module 1 –50,000 Module 2 –50,000 Module 2 –50,000	450,000	Covered under MDSC
3.	Experiences and best practices sharing	Construction (before phase 2)	Cumulative for all subprojects	LS		100,000	Covered under MDSC
D	Public Consultation	During detailed design (For update of IEE/EIA) and preconstruction		LS		500,000	Covered under MDSC
E	GRM implementation	During construction	As per requirement			As per PMU budget	Covered under PMU & PIUs

	Particulars	Stages	Sub-project/ Package	Total number	Rate (BDT)	Cost (BDT)	Costs covered by
F	**Consultant cost**						
	MDSC national environmental specialist (1 person)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	36 person months	320,000 per person month	11,520,000	Remuneration and budget for travel covered in the MDSC contract
	MDSC regional environmental specialists (2 persons)	Responsible for environmental safeguards of the project	person months (spread over entire project implementation period)	36+17 each = 53 person-months	320,000 per person-month	16,960,000	Remuneration and budget for travel covered in the MDSC contract
G	**Administrative cost**						
	Legislation, permits, and agreements	During construction Permit for excavation, tree-cutting permits, etc	Per package	LS		50,000	These consents are to be obtained by contractor at his own expense.
	Environmental assessment and environmental clearances as per ECA and ECR requirements	Before construction ECC for red and Orange subproject	Per subproject (where applicable)	LS		500,000	LGED cost for municipal infrastructure
H	**Other costs**						
	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		LS		Contractors' liability	Can be covered through contractor's insurance

Table 23: Cost Estimates to Implement the EMP (by source funding)

	Particulars	Stages	Sub-project/ Package	Total number	Rate (BDT)	Cost (BDT)	Costs covered by
A. Contractor							
1.	Environmental mitigation / enhancement measures integrated into the designs and costs included as part of civil works	Construction				Covered under BoQ of Construction Document (CCD)	Civil Works Contract
2	Compensatory plantation measures	Construction	Per tree	50	1,500	75,000	Civil works contract
3.	Noise level	Before construction	Per contract package	5	5,000	25,000	Civil works contractor
4.	Water Quality monitoring (Ground water)	Before construction	Per contract package	1	20,000	20,000	Civil works contractor

	Particulars	Stages	Sub-project/ Package	Total number	Rate (BDT)	Cost (BDT)	Costs covered by
5.	Noise level	Construction	Per contract package	5	5,000	25,000	Civil work contractor
6.	Water Quality monitoring Ground water)	Construction	Per contract package	2	20,000	40,000	Civil work Contractor
6.	Survival Rate of Plantation and landscaping	Post construction	Per contract package,	2	5,000	10,000	Civil work Contractor
7.	Any unanticipated impact due to project implementation	Mitigation of any unanticipated impact arising during construction phase and defect liability period		LS		Contractors' liability	Can be covered through contractor's insurance
B. PIU/Pourashava							
1.	Odor	Operation	Per subproject per year	2	10,000	20,000	Kushtia Pourashava
2	Survival Rate of Plantation and landscaping	Operation	Per subproject per year	2	5,000	10,000	Kushtia Pourashava
C. MDSC							
1.	i) Orientation workshop for officials involved in the project implementation on ADB Safeguards Policy Statement, Government of Bangladesh environmental laws and regulations, and environmental assessment process; (ii) induction course contractors, preparing them on EMP implementation and environmental monitoring requirements related to mitigation measures; and taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found	Module 1 – immediately upon engagement of the MDSC environmental specialists Module 2 – prior to award of civil works contracts (twice a year for 3.5 years) Module 3 – prior to start of Phase 3 and upon completion of the project	lump sum 1 times 7 times 1 times (Combined for all subprojects)		Module 1 – 50,000 Module 2 – 50,000 Module 2 – 50,000	450,000	Covered under MDSC

	Particulars	Stages	Sub-project/ Package	Total number	Rate (BDT)	Cost (BDT)	Costs covered by
	during the course of implementation;						
2	Experiences and best practices sharing	Construction (before phase 2)	Cumulative for all subprojects	LS		100,000	Covered under MDSC
3	Public Consultation	During detailed design (For update of IEE/EIA) and preconstructio n		LS		500,000	Covered under MDSC
4	MDSC national environmental specialist (1 person)	Responsible for environmental safeguards of the project	person months (spread over entire project implementati on period)	36 person months	320,000 per person month	11,520,000	Remuneration and budget for travel covered in the MDSC contract
5	MDSC regional environmental specialists (2 persons)	Responsible for environmental safeguards of the project	person months (spread over entire project implementati on period)	36+17 each = 53 person-months	320,000 per person-month	16,960,000	Remuneration and budget for travel covered in the MDSC contract
D. PMU							
1	GRM implementation	During construction	As per requirement			As per PMU budget	Covered under PMU & PIUs
2	Legislation, permits, and agreements	During construction Permit for excavation, tree- cutting permits, etc	Per package	LS		50,000	These consents are to be obtained by contractor at his own expense.
3	Environmental assessment and environmental clearances as per ECA and ECR requirements	Before construction ECC for red and Orange subproject	Per subproject (where applicable)	LS		500,000	LGED cost for municipal infrastructure

IX. MONITORING AND REPORTING

134. PMU will monitor and measure the progress of EMP implementation. The monitoring activities will correspond with the project's risks and impacts, and will be identified in the IEEs for the projects. In addition to recording information on the work and deviation of work components from original scope PMU, PIUs, and MDSC will undertake site inspections and document review to verify compliance with the EMP and progress toward the final outcome. Corrective actions to be taken quickly and reported in monitoring reports.

135. MDSC will submit monthly monitoring and implementation reports to PMU, who will take follow-up actions, if necessary. PMU will submit semi-annual monitoring reports to ADB. The

suggested monitoring report format is in Appendix 7. Subproject budgets will reflect the costs of monitoring and reporting requirements. Monitoring reports will be posted in a location accessible to the public.

136. LGED and DPHE will document monitoring results, identify the necessary corrective actions, reflect them in a corrective action plan, and for each quarter, will study the compliance with the action plan developed in the previous quarter. Compliance with loan covenants will be screened by ADB.

137. ADB will review project performance against the commitments as agreed in the legal documents. The extent of ADB's monitoring and supervision activities will be commensurate with the project's risks and impacts. Monitoring and supervising of social and environmental safeguards will be integrated into the project performance management system. ADB will monitor projects on an ongoing basis until a project completion report is issued. ADB will carry out the following monitoring actions to supervise project implementation:

(i) conduct periodic site visits for projects with adverse environmental or social impacts;
(ii) conduct supervision missions with detailed review by ADB's safeguard specialists/officers or consultants for projects with significant adverse social or environmental impacts;
(iii) review the periodic monitoring reports submitted by EAs to ensure that adverse impacts and risks are mitigated, as planned and as agreed with ADB;
(iv) work with EAs to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and
(v) (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.

X. CONCLUSION AND RECOMMENDATIONS

138. The process described in this document has assessed the environmental impacts of all elements of Kushtia sanitation subproject. All potential impacts were identified in relation to design and location, construction, and operation phases.

139. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible; thus, environmental impacts as being due to the project design or location were not significant.

140. Mitigation measures have been developed to reduce all negative impacts to acceptable levels. Mitigation will be assured by a program of environmental monitoring to ensure that all measures are implemented, and will determine whether the environment is protected as intended. It will include observations on- and off-site, document checks, and interviews with workers and beneficiaries. Any requirements for corrective action will be reported to the ADB.

141. The stakeholders were involved in developing the IEE through discussions on-site and public consultation, after which views expressed were incorporated into the IEE and in the planning and development of the subproject. The IEE will be made available at public locations in the city and will be disclosed to a wider audience via the ADB, LGED, and DPHE websites. The consultation process will be continued and expanded during project implementation to

ensure that stakeholders are fully engaged in the project and have the opportunity to participate in its development and implementation. A grievance redress mechanism is described within the IEE to ensure any public grievances are addressed quickly.

142. The PMU and MDSC will be responsible for monitoring. The MDSC will submit monthly monitoring reports to PMU, and the PMU will send semi-annual monitoring reports to ADB. ADB will post the environmental monitoring reports on its website.

143. The EMP will assist the PMU, MDSC, and contractors in mitigating the environmental impacts, and guide them in the environmentally sound execution of the proposed project. The EMP will also ensure efficient lines of communication between the implementing agency, Project Management Office, and contractors. A copy of the EMP shall be kept on-site during the construction period at all times. The EMP shall be made binding on all contractors operating on the site, and will be included in the contractual clauses. Non-compliance with, or any deviation from, the conditions set out in this document shall constitute a failure in compliance.

144. The citizens of Kushtia will be the major beneficiaries of this subproject. The benefits of improved sanitation translate into improved health, an increase in productivity, fewer days absent from school for children, and improved quality of life. In addition to improved environmental conditions, the subproject will reduce exposure to climate extremes. On-site/decentralised systems of waste management will improve community health and hygiene, particularly in socially deprived groups, and reduce financial burden of Kushtia *pourashava*. People would spend less on healthcare and lose fewer working days due to illness, so their economic status should also improve, as well as their overall health. Therefore the proposed subproject is unlikely to cause significant adverse impacts and net environmental and health benefits to citizens of Kushtia will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures.

145. Therefore the proposed subproject is unlikely to cause significant adverse impacts and net environmental benefits to citizens of Kushtia will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through proper engineering design and the incorporation or application of recommended mitigation measures and procedures. Based on the findings of the IEE, there are no significant impacts and the classification of the subproject as Category “B” is confirmed. No further special study or detailed environmental impact assessment (EIA) needs to be undertaken to comply with ADB SPS (2009).

146. Per Government of Bangladesh Environment Conservation Act, 1995 (ECA, 1995) and Environment Conservation Rules (ECR, 1997), the subproject is categorized as “Orange B” and LCC and ECC must be obtained from the DoE prior to award of civil works contracts.

APPENDIX-1: RAPID ENVIRONMENTAL ASSESSMENT (REA) CHECKLIST

Country/Project Title: Bangladesh: Third Urban Governance and Infrastructure Improvement (Sector) Project (UGIIP-3) – Additional Financing

Sanitation Infrastructure Rapid Environmental Assessment (REA) Checklist

Town: Kushtia
Subproject Title: Construction of Community Toilet for 5- 10 families:75 nos. (ii) Construction of New Public Toilets at different locations: 20 nos (iii) Installation of Twin pit Latrines for 3 ~ 5 poor families: 1290 sets and associated development for sanitation infrastructure along with awareness campaign.

Screening Questions	Yes	No	Remarks
A. Project Siting Is the project area…			
• Densely populated?	✓		Kushtia has a population of about 226,316 (BBS, 2011) living in an area of 42.79 sq.km, giving a population density of 5,289 persons per sq. km. The subproject activities will extend to the entire towns including the densely populated areas. However, there are no major negative impacts envisaged because the components will be located in unused government lands alongside the existing roads and can be constructed without causing disturbance to houses and commercial establishments. In narrow streets, disruption to road users is likely, and measure like best activity scheduling, alternative routes, prior information to road users, houses and shops will minimize the impacts.
• Heavy with development activities?		✓	The area is predominantly residential.
• Adjacent to or within any environmentally sensitive areas?			
• Cultural heritage site		✓	
• Protected area		✓	
• Wetland		✓	
• Mangrove		✓	
• Estuarine		✓	
• Buffer zone of protected area		✓	
• Special area for protecting biodiversity		✓	
• Bay		✓	
B. Potential Environmental Impacts Will the Project cause…			
• impairment of historical/cultural monuments/areas and loss/damage to these sites?		✓	Not anticipated. The subproject will improve/prevent degradation of cultural property, loss of cultural heritage and tourism revenue.
• interference with other utilities and blocking of access to buildings; nuisance to neighboring areas due to noise, smell, and influx of insects, rodents, etc.?		✓	Not anticipated.
• dislocation or involuntary resettlement of people?		✓	No displacement of communities is required in this subproject.
• disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		✓	Not applicable.
• impairment of downstream water quality due to inadequate sewage treatment or release of		✓	Not anticipated.

Screening Questions	Yes	No	Remarks
untreated sewage?			
• overflows and flooding of neighbouring properties with raw sewage?		✓	The subproject will improve current situation of discharging sewage to open drains.
• environmental pollution due to inadequate sludge disposal or industrial waste discharges illegally disposed in sewers?		✓	The EMP ensures measures are included to manage septic sludge.
• noise and vibration due to blasting and other civil works?	✓		Anticipated during construction activities. The impacts are negative but temporary, short-term, site-specific and not significant within a relatively small area and reversible through mitigation measures specified in the EMP.
• risks and vulnerabilities related to occupational health and safety due to physical, chemical, and biological hazards during project construction and operation?		✓	Not anticipated. The EMP ensures occupational health and safety measures are included. Chemicals will not be used during construction and operation activities.
• discharge of hazardous materials into sewers, resulting in damage to sewer system and danger to workers?		✓	Not anticipated. The subproject sites are predominantly residential areas. Thus discharge of hazardous materials into sewers are unlikely.
• inadequate buffer zone around pumping and treatment plants to alleviate noise and other possible nuisances, and protect facilities?		✓	Not applicable.
• road blocking and temporary flooding due to land excavation during the rainy season?		✓	Not anticipated. Construction activities will be conducted during non-monsoon season.
• noise and dust from construction activities?	✓		Anticipated during construction activities. The impacts are negative but temporary, short-term, site-specific and not significant within a relatively small area and reversible through mitigation measures specified in the EMP.
• traffic disturbances due to construction material transport and wastes?	✓		Anticipated during construction activities. The impacts are negative but temporary, short-term, site-specific and not significant within a relatively small area and reversible through mitigation measures specified in the EMP. Construction contractors will be required to coordinate with the local traffic police and they will prepare Traffic Management Plan
• temporary silt runoff due to construction?	✓		Run-off during construction will be more. Anticipated during construction activities. The impacts are negative but temporary, short-term, site-specific and not significant within a relatively small area and reversible through mitigation measures specified in the EMP. Construction contractors will be prohibited from stockpiling loose materials along drain channels and will be required to immediately dispose any waste materials.
• hazards to public health due to overflow flooding, and groundwater pollution due to failure of sewerage system?		✓	Not anticipated.
• deterioration of water quality due to inadequate sludge disposal or direct discharge of untreated sewage water?		✓	Not anticipated.
• contamination of surface and ground waters due to sludge disposal on land?		✓	Not anticipated. The EMP ensures measures are included to manage sludge.
• health and safety hazards to workers from toxic gases and hazardous materials which may be contained in confined areas, sewage flow and exposure to pathogens in untreated sewage and unstabilized sludge?		✓	Not anticipated. The EMP ensures measures are included to mitigate the impacts.
• large population increase during project construction and operation that causes increased burden on social infrastructure		✓	Priority in employment will be given to local residents. Construction contractors will be required to provide workers camp with water supply and sanitation. ULB

Screening Questions	Yes	No	Remarks
(such as sanitation system)?			will provide manpower to operate the improved system.
• social conflicts between construction workers from other areas and community workers?		✓	Priority in employment will be given to local residents.
• 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?		✓	Not applicable. Construction will not involve use of explosives and chemicals. Trenching will be done manually.
• community safety risks due to both accidental and natural hazards, especially where the structural elements or components of the project 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?		✓	Operational area will be clearly demarcated and access will be controlled. Only worker and project concerned members will be allowed to visit the operational sites.

A Checklist for Preliminary Climate Risk Screening

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	During high Floods site may inundated
	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.)?	0	
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	During inundated condition damage may occur to lining
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?	1	During inundated condition damage to site may increase maintenance
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?	0	

[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 risk

Subproject Classification as per ADB SPS 2009
The impacts are minor, local and mostly construction related. No significant irreversible impacts are envisioned on human populations or environmentally sensitive areas including wetlands, forests, grasslands, and other natural habitats. Impacts can be mitigated under the scope of IEE.
Classification: Category B

Subproject Categorization as per DOE (ECR 1997)
Classification: Orange B

Environmental Assessment Requirements: IEE as per ADB SPS and EIA as per DOE
Other Toilet sub-projects are similar environmental impacted in nature and hence, similar classification and Environmental assessment requirement.

Prepared by: TA 8913 consultant team for project preparation of UGIIP-3 additional financing
Designation: International Environmental Safeguard Specialist and National Environmental Safeguard Specialist

Date: August-October 2016

APPENDIX 2: APPLICATION FEES FOR ECC

[This table (APPENDIX-2) Not Required as these rates are not updated]

[1]"SCHEDULE – 13

Fees for Environmental Clearance Certificate or Renewal

[See Rules 7(5), 8(2) and 14]

1. Industrial unit or project

Investment (in Taka)	Fees for Environmental Clearance Certificate (in Taka)	Certificate Renewal Fee
(1)	(2)	(3)
(a) Between Tk. 100,000 and 5,00,000	Tk. 1,500	One-fourth of the fees in Column (2).
(b) Between Tk. 5,00,000 and 10,00,000	Tk. 3,000	-Do-
(c) Between Tk. 10,00,000 and 50,00,000	Tk. 5,000	-Do-
(d) Between Tk. 50,00,000 and 10,000,000	Tk. 10,000	-Do-

[1] *Schedule-13 was substituted by Notification S.R.O. No. 234-Law/2002 dated 24/08/2002 and came into force on 26/08/2002 being the date of publication in Bangladesh Gazette extraordinary issue.*

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(1)	(2)	(3)
(e) Between Tk. 10,000,000 and 2,00,000,000	Tk. 25,000	One-fourth of the fees in Column (2).
(f) Between Tk. 2,00,000,000 and 5,00,000,000	Tk. 50,000	-Do-
(g) Above Tk. 5,00,000,000	Tk. 1,00,000	-Do-

APPENDIX 3: SAMPLE OUTLINE SPOILS MANAGEMENT PLAN

I. Spoils information

   A. Materials type
   B. Potential contamination
   C. Expected volume and sources
   D. Spoil classification

II. Spoils management

   A. Transportation of spoil
   B. Storage of spoil
   C. Contaminated spoil
   D. Approved reuse and/or disposal sites

III. Records of reuse and/or disposal

APPENDIX 4: SAMPLE OUTLINE TRAFFIC MANAGEMENT PLAN

A. Principles

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

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

B. Operating Policies for TMP

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

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

3. **Figure A4.2 to Figure A4.12** illustrates the operating policy for TMP for the construction of water pipes and the sewers along various types of roads.

C. Analyze the impact due to street closure

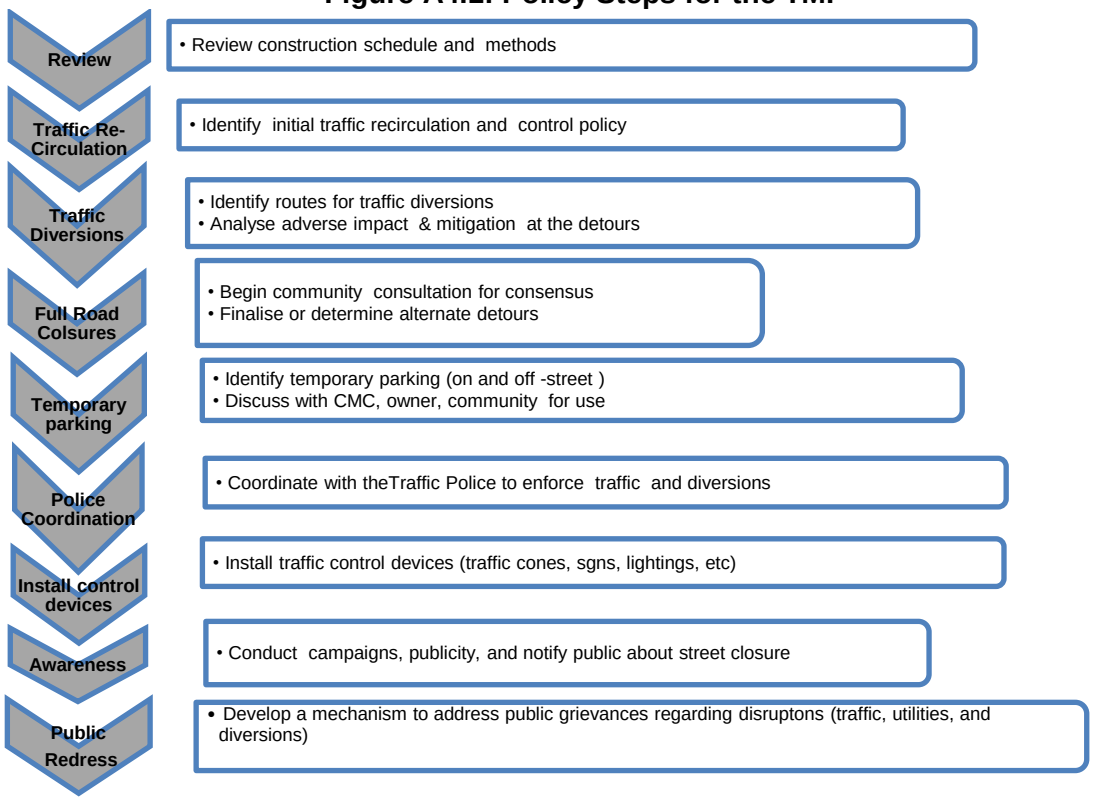
4. Apart from the capacity analysis, a final decision to close a particular street and divert the traffic should involve the following steps:

(i) approval from the ULB/CMC/Public Works Department (PWD) to use the local streets as detours;
(ii) consultation with businesses, community members, traffic police, PWD, etc, regarding the mitigation measures necessary at the detours where the road is diverted during the construction;
(iii) determining of the maximum number of days allowed for road closure, and incorporation of such provisions into the contract documents;

(iv) determining if additional traffic control or temporary improvements are needed along the detour route;
(v) considering how access will be provided to the worksite;
(vi) contacting emergency service, school officials, and transit authorities to determine if there are impacts to their operations; and
(vii) developing a notification program to the public so that the closure is not a surprise. As part of this program, the public should be advised of alternate routes that commuters can take or will have to take as result of the traffic diversion.

5. If full road-closure of certain streets within the area is not feasible due to inadequate capacity of the detour street or public opposition, the full closure can be restricted to weekends with the construction commencing on Saturday night and ending on Monday morning prior to the morning peak period.

Figure A4.1: Policy Steps for the TMP



D. Public awareness and notifications

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

7. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the

time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.

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

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

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

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

(i) explain why the brochure was prepared, along with a brief description of the project;
(ii) advise the public to expect the unexpected;
(iii) educate the public about the various traffic control devices and safety measures adopted at the work zones;
(iv) educate the public about the safe road user behavior to emulate at the work zones;
(v) tell the public how to stay informed or where to inquire about road safety issues at the work zones (name, telephone, mobile number of the contact person; and
(vi) indicate the office hours of relevant offices.

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

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

(i) Signs
(ii) Pavement Markings
(iii) Channelizing Devices
(iv) Arrow Panels
(v) Warning Lights

12. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic;

internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

13**.** **Figure A4.2 to Figure A4.12** illustrates a typical set-up for installing traffic control devices at the work zone of the area, depending on the location of work on the road way, and road geometrics:

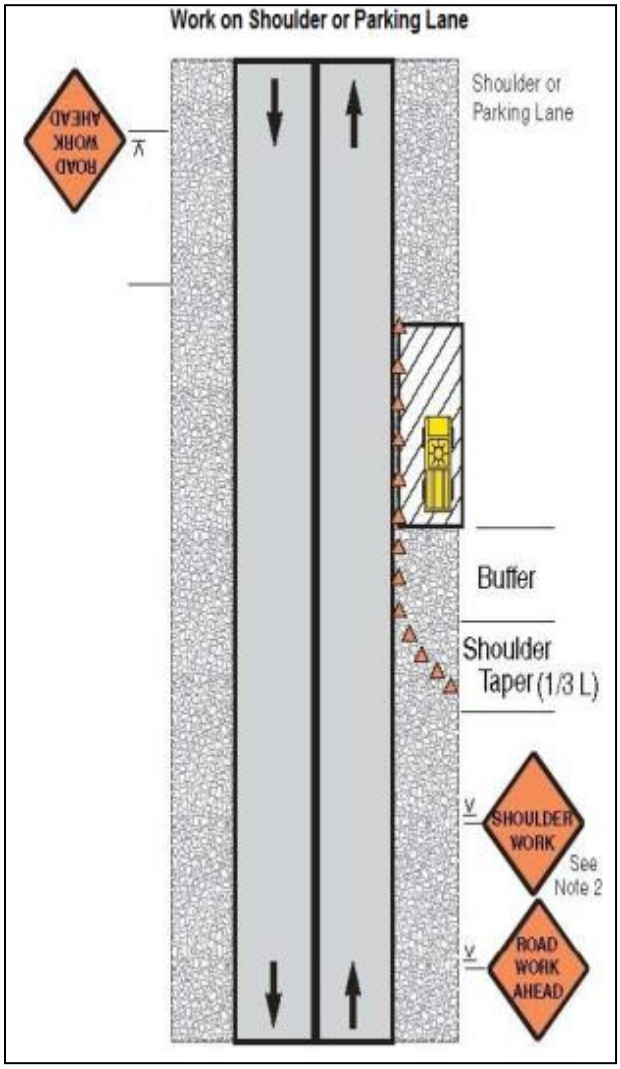
(i) Work on shoulder or parking lane
(ii) Shoulder or parking lane closed on divided road
(iii) Work in Travel lane
(iv) Lane closure on road with low volume
(v) Lane closure on a two-line road with low volume (with yield sign)
(vi) Lane closure on a two-line road with low volume (one flagger operation)
(vii) Lane closure on a two lane road (two flagger operation)
(viii) Lane closure on a four lane undivided Road
(ix) Lane closure on divided roadway
(x) Half road closure on multi-lane roadway
(xi) Street closure with detour

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

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

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

Figure A4.2 & A4.3: Work on shoulder or parking lane and shoulder or parking lane closed on divided road



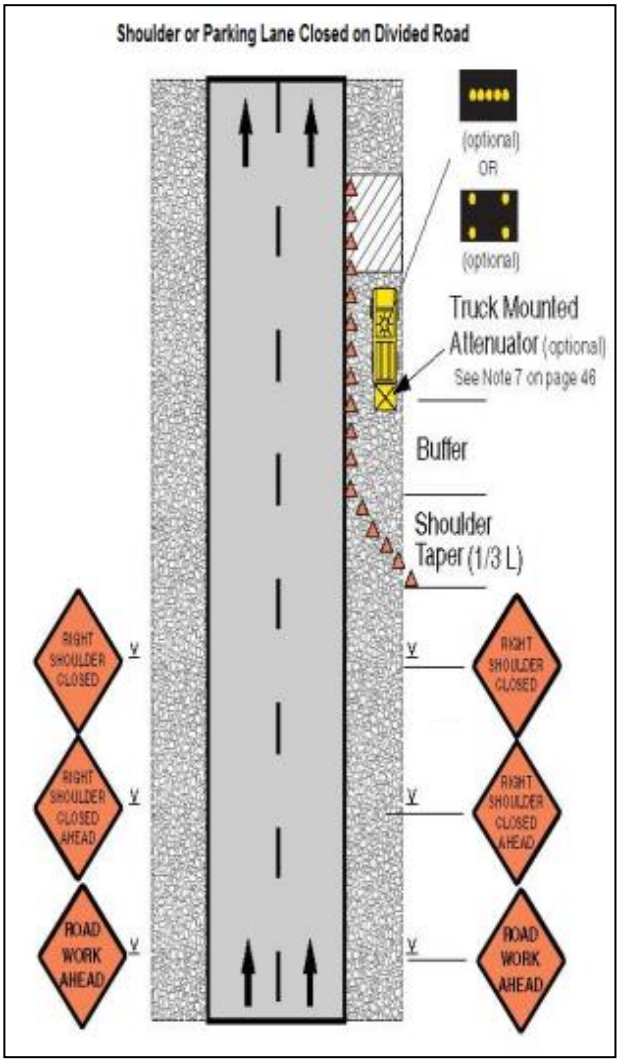


Figure A4.4 & A4.5: Work in Travel lane & Lane closure on road with low volume

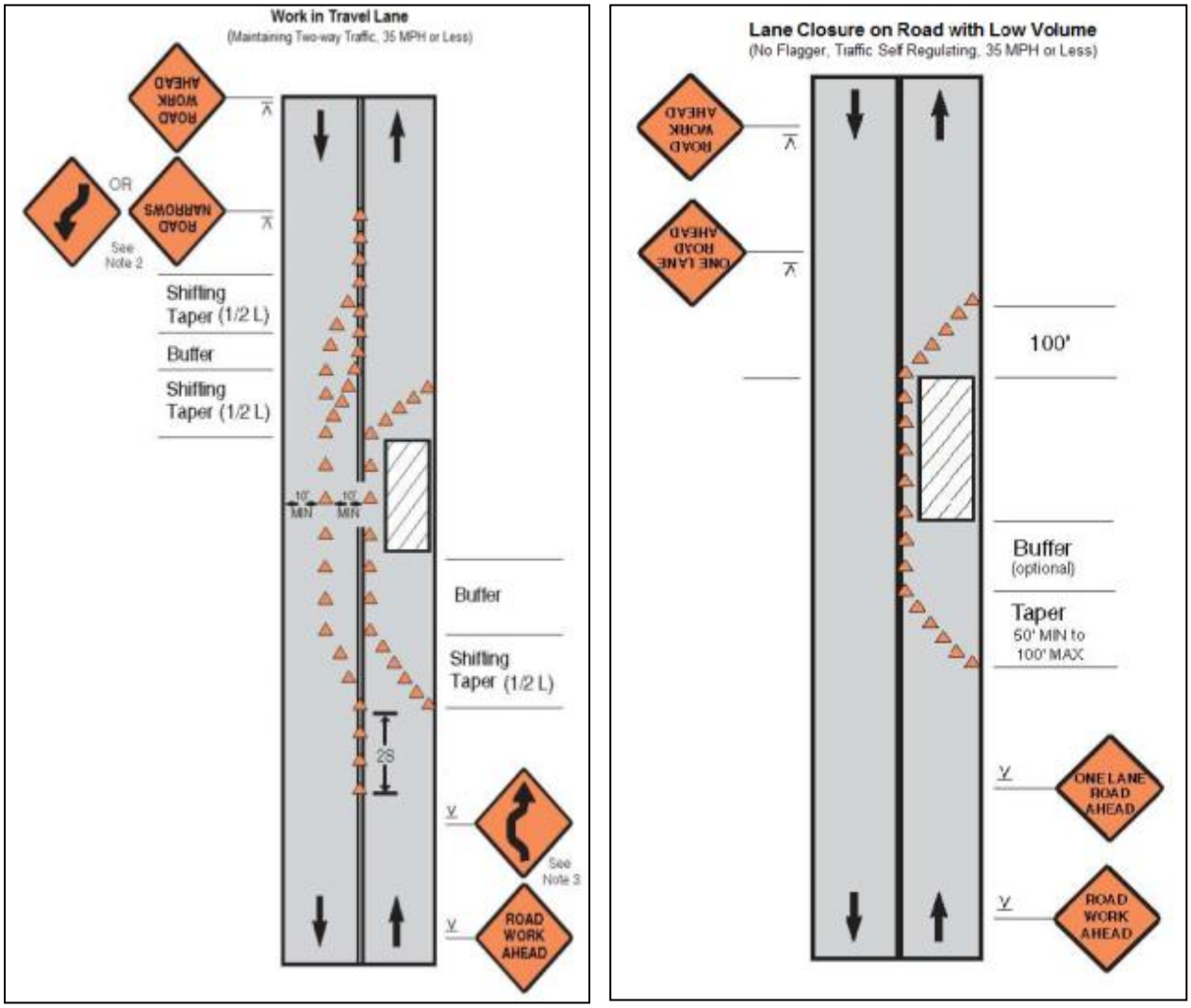
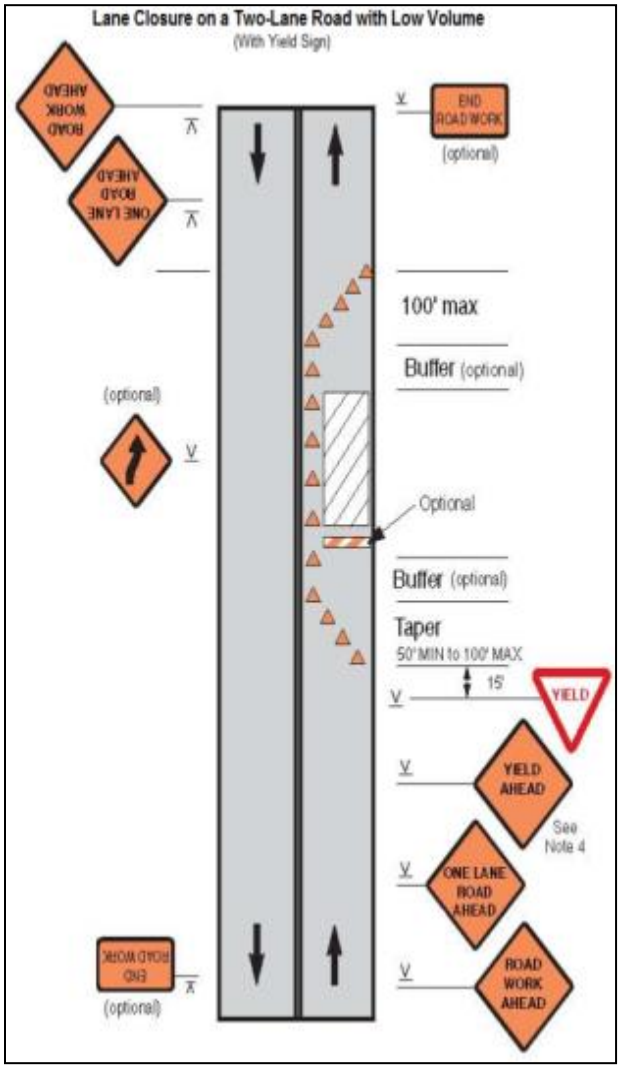


Figure A6 & A7: Lane closure on a two-line road with low volume (with yield sign) & Lane closure on a two-line road with low volume (one flagger operation)



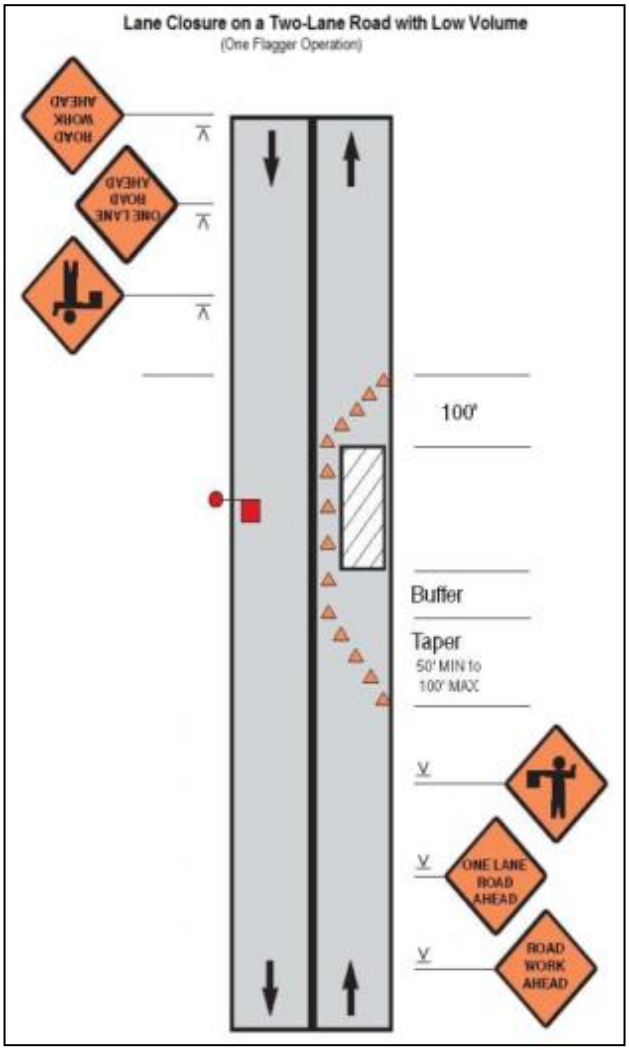


Figure A4.8 & A4.9: Lane Closure on a Two-Lane Road (Two Flagger Operation) & Lane Closure on a Four-Lane Undivided Road

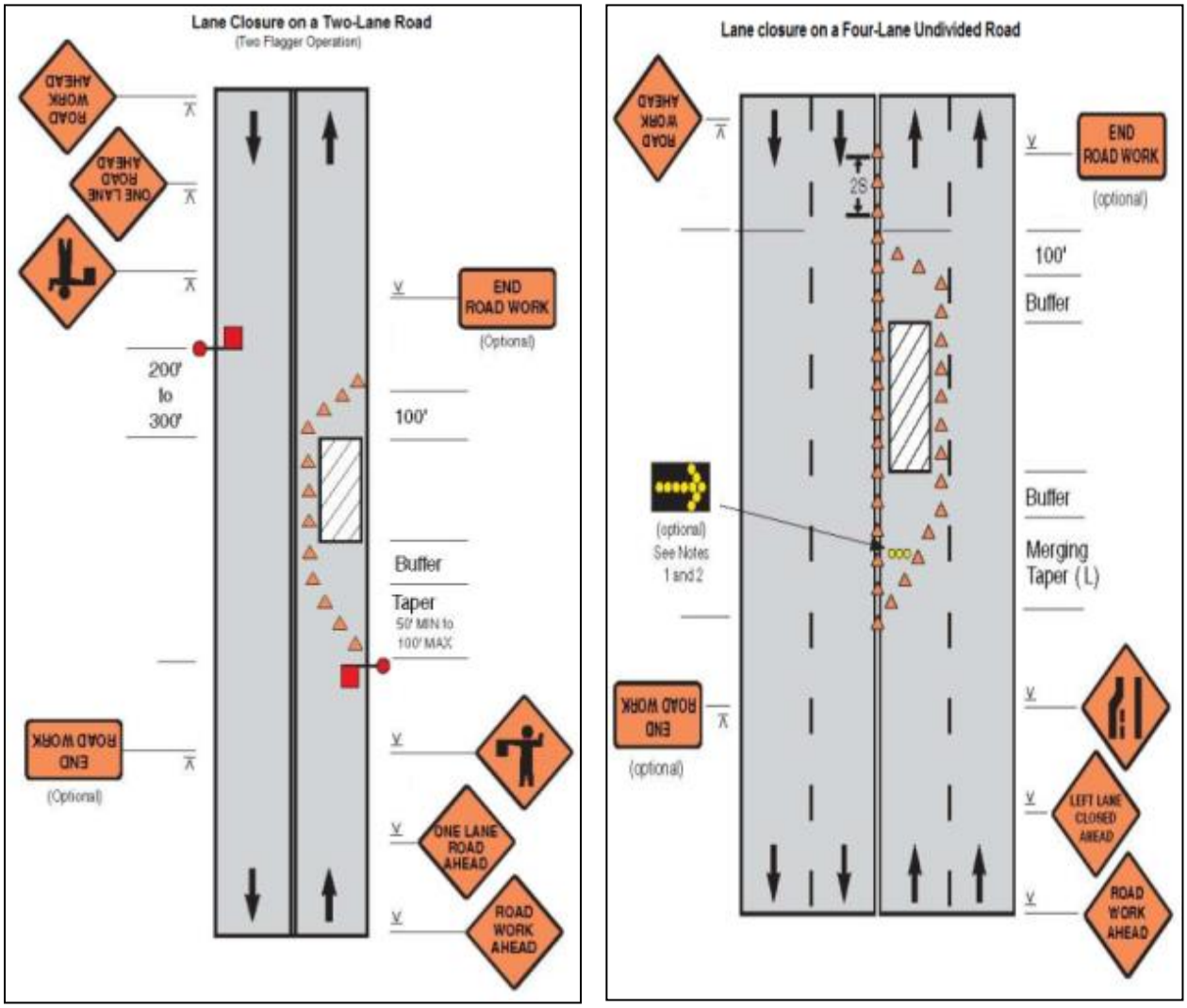
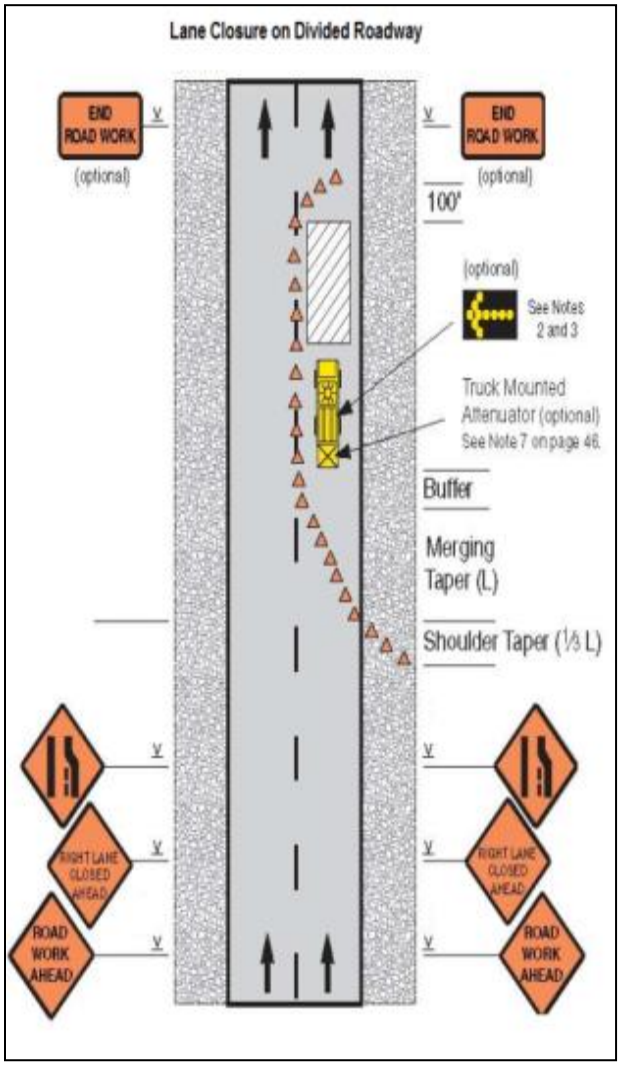


Figure A4.10 & A4.11: Lane Closure nn Divided Roadway & Half Road Closure On Multi-Lane Roadway



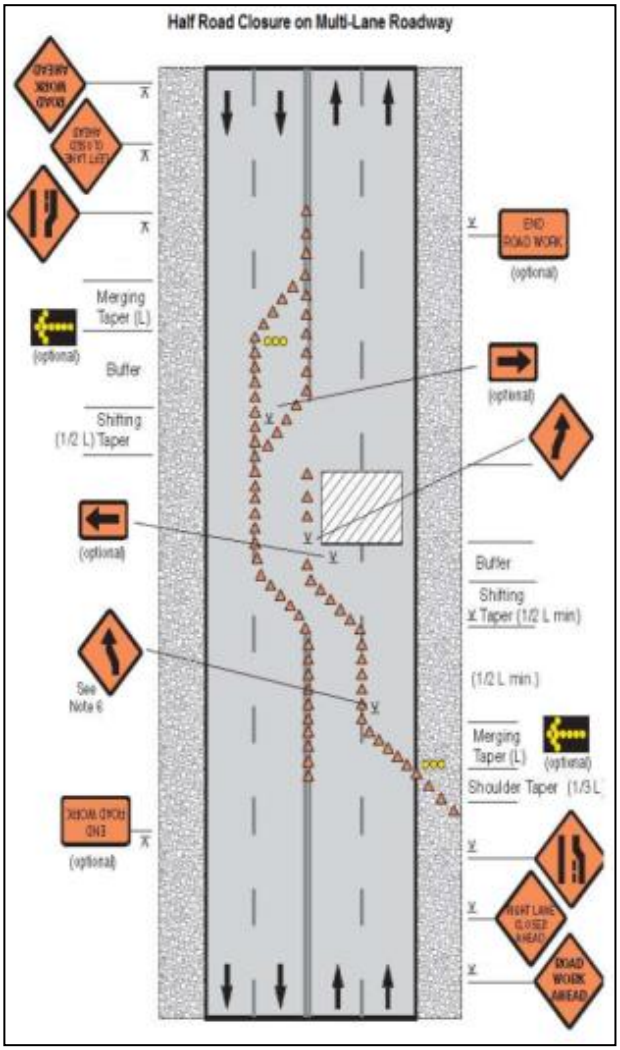
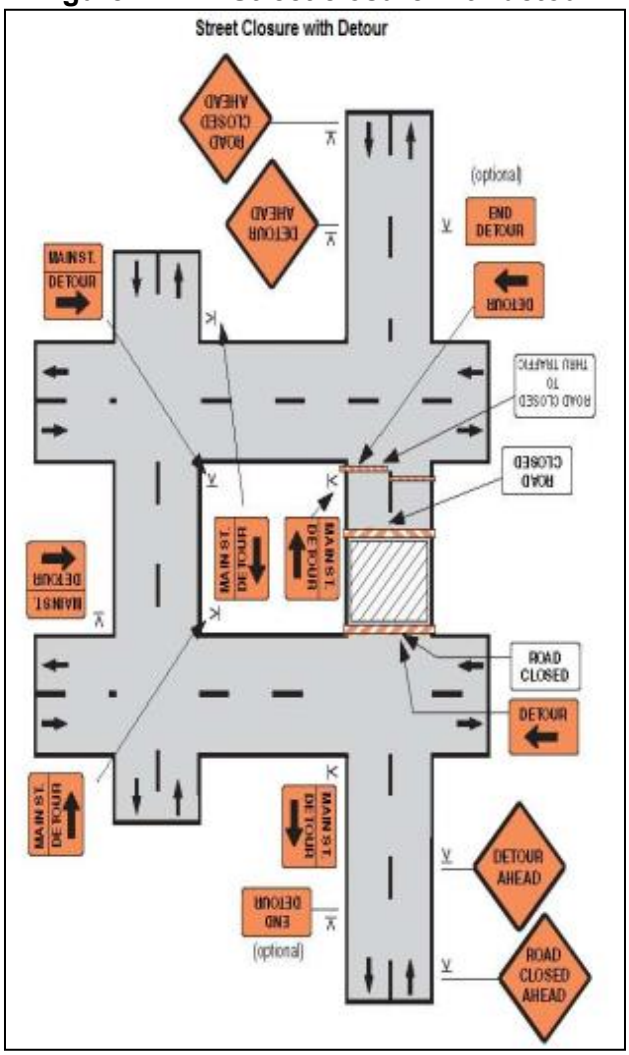


Figure A4.12: Street closure with detour



APPENDIX 5: RECORDS OF PUBLIC CONSULTATIONS AND FOCUS GROUP DISCUSSIONS

Khustia Town

Meeting Place: In front of Masque, Ward-2

Date: 22-08-16

Time: 10.00 am

Sl. No.	Name of the Participant	Sex	Occupation	Cell Number
1	Khondakar Shazedul Haque	Male	Counselor	01711-067610
2	Khodakar Raziul Haque	Male	Business	01710-452033
3	Md. Rafiqul Islam	Male	Business	01716-443103
4	Sattarul	Male		01920-979558
5	Md. Tanzilur Rahman	Male	Business	
6	Ahmed Ali	Male	Business	01711-482981
7	Md. Shamshur Rahman	Male	Retired Service	01714-631463
8	Ashraful	Male	Service	01918-597161
9	Rafiqul Islam	Male	Service	01846-154340
10	Mir. Uzzal	Male	Service	01710-116879
11	Abdus Salam	Male	Business	01842-258186
12	Md. Anwarul Islam	Male	Khadem of Mosque	
13	Md. Mirazul Islam	Male	Imam of Masque	01752-108500
14	Md. Rafiqul Islam (Babu)	Male	Student	01711-942810
15	Abu Sadequr Rahman	Male	Service	01930-672321

APPENDIX 6: SAMPLE GRIEVANCE REGISTRATION FORM

(To be available in Bangla and English)

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					
Place					
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 use 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 Officials Reviewing Grievance)	
Action Taken:	
Whether Action Taken Disclosed:	Yes No
Means of Disclosure:	

APPENDIX 7: SAMPLE SEMI-ANNUAL ENVIRONMENTAL MONITORING REPORT TEMPLATE

This template must be included as an appendix in the EIA/IEE that will be prepared for the project. It can be adapted to the specific project as necessary.

I. INTRODUCTION

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

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

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

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

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

II. COMPLIANCE STATUS WITH NATIONAL/ STATE/ LOCAL STATUTORY ENVIRONMENTAL REQUIREMENTS

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

[a] Specify (environmental clearance? Permit/consent to establish? Forest clearance? Etc.)
[b] Specify if obtained, submitted and awaiting approval, application not yet submitted
[c] *Example: Environmental Clearance requires ambient air quality monitoring, Forest Clearance/Tree-cutting Permit requires 2 trees for every tree, etc.*

III. COMPLIANCE STATUS WITH ENVIRONMENTAL LOAN COVENANTS

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

IV. COMPLIANCE STATUS WITH THE ENVIRONMENTAL MANAGEMENT AND MONITORING PLAN

- 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

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.	Sub-Project Name	EMP / CEMP Part of Contract Documents (Y/N)	CEMP / EMP Being Implemented (Y/N)	Status of Implementation (Excellent/ Satisfactory/ Partially Satisfactory/ Below Satisfactory)	Action Proposed and Additional Measures Required

V. APPROACH AND METHODOLOGY FOR ENVIRONMENTAL MONITORING OF THE PROJECT

- Briefly describe the approach and methodology used for environmental monitoring of each sub-project

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

(i) 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.

(ii) Brief discussion on the basis for monitoring
(iii) Indicate type and location of environmental parameters to be monitored
(iv) Indicate the method of monitoring and equipment to be used
(v) 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

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

Noise Quality Results

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

VII. 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).

VIII. 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).

IX. 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
- Environmental site inspection report
- All supporting documents including signed monthly environmental site inspection reports prepared by consultants and/or contractors
- Others

APPENDIX 8: ENVIRONMENTAL STANDARDS

SCHEDULE-2
Standards for Air

Density in microgram per cusec meter

Sl. No.	Categories of Area	Suspended Particulate Maters (SPM)	Sulphur-dioxide	Carbon Monoxide	Oxides Nitrogen
a.	Industrial and mixed	500	120	5000	100
b.	Commercial and mixed	400	100	5000	100
c.	Residential and rural	200	80	2000	80
d.	Sensitive	100	30	1000	30

Notes:

(i) At national level, sensitive area includes monuments, health center, hospital, archeological site, educational institution, and government designated areas (if any).

(ii) Industrial units located in areas not designated as industrial areas shall not discharge pollutants which may contribute to exceeding the standard for air surrounding the areas specified at Sl. nos. c and d above.

(iii) Suspended Particulate Matter means airborne particles of a diameter of 10 micron or less.

SCHEDULE -3
Standards for Water

A. Standards for inland surface water

Best Practice based classification Parameter		Parameter			
		pH	**BOD mg/l**	**DO mg/l**	**Total Coliform number/100**
a.	Source of drinking water for supply only after disinfecting:	6.5-8.5	2 or less	6 or above	50 or less
b.	Water usable for recreational activity :	6.5 - 8.5	3 or less	5 of more	200 or less
c.	Source of drinking water for supply after conventional treatment :	6.5 - 8.5	6 of less	6 or more	5000 or less
d.	Water usable by fisheries:	6.5 - 8.5	6 of less	5 or more	---
e.	Water usable by various process and cooling industries :	6.5 - 8.5	10 or less	5 or more	5000 or less
f.	Water usable for irrigation:	6.5 - 8.5	10 or less	5 or more	1000 or less

Notes:

(i) In water used for pisiculture, maximum limit of presence of ammonia as Nitrogen is 1.2 mg/l.

(ii) Electrical conductivity for irrigation water - 2250 µmhoms/cm (at a temperature of 25°C); Sodium less than 26%; boron less than 0.2%.

Standards for drinking water

Sl. No	Parameter	Unit	Standards
1	2	3	4
	Aluminum	mg/l	0.2
	Ammonia (NH3)	"	0.5
	Arsenic	"	0.05
	Balium	"	0.01
6.	BOD5 20°C	"	0.2
7.	Boron	"	1.0
8.	Cadmium	"	0.005
9.	Calcium	"	75
10.	Chloride	"	150 - 600*
11.	Chlorinated alkanes carbontetrachloride	"	0.01
	1.1 dichloroethylene	"	0.001
	1.2 dichloroethylene	"	0.03
	tetrachloroethylene	"	0.03
	trichloroethylene	"	0.09
12.	Chlorinated phenols - pentachlorophenol	mg/l	0.03
	- 2.4.6 trichlorophenol	"	0.03
13.	Chlorine (residual)	"	0.2
14.	Chloroform	"	0.09
15.	Chromium (hexavalent)	"	0.05
16.	Chromium (total)	"	0.05
17.	COD	"	4
18.	Coliform (fecal)	"	0
19.	Coliform (total)	"	0
20.	Color	"	15
21.	Copper	"	1
22.	Cyanide	"	0.1
23.	Detergents	"	0.2
24.	DO	"	6
25.	Fluoride	"	1
26.	Hardness (as CaCO3)	"	200 - 500
27.	Iron	"	0.3 - 1.0
28.	Kjeldhl Nitrogen (total)	"	1
29.	Lead	"	0.05
30.	Magnesium	"	30 - 35
31.	Manganese	"	0.1
32.	Mercury	"	0.001
33.	Nickel	"	0.1
34.	Nitrate	"	10
35.	Nitrite	"	<1
36.	Odor	"	Odorless
37.	Oil and grease	"	0.01
38.	pH	"	6.5 - 8.5
39.	Phenolic compounds	"	0.002
40.	Phosphate	"	6
41.	Phosphorus	"	0
42.	Potassium	"	12
43.	Radioactive materials (gross alpha activity)	Bq/l	0.01
44.	Radioactive materials (gross beta activity)	Bq/l	0.1
45.	Selenium	mg/l	0.01
46.	Silver	"	0.02

Sl. No	Parameter	Unit	Standards
1	2	3	4
47.	Sodium	"	200
48.	Suspended particulate matters	"	10
49.	Sufide	"	0
50.	Sulfate	"	400
51.	Total dissolved solids	"	1000
52.	Temperature	°C	20-30
53.	Tin	mg/l	2
54.	Turbidity	JTU	10
55.	Zinc	mg/l	5

SCHEDULE - 4
Standards for Sound

Sl. No.	Category of areas	Standards determined at dBa unit	
		Day	Night
a.	Silent zone	45	35
b.	Residential area	50	40
c.	Mixed area (mainly residential area, and also simultaneously used for commercial and industrial purposes)	60	50
d.	Commercial area	70	60
e.	Industrial area	75	70

Notes:

(i) The time from 6 a.m. to 9 p.m. is counted as daytime.

(ii) The time from 9 p.m. to 6 a.m. is counted as night time.

(iii) Area up to a radius of 100 meters around hospitals or educational institutions or special institutions/ establishments identified/to be identified by the Government is designated as Silent Zones where use of horns of vehicles or other audio signals, and loudspeakers are prohibited.

SCHEDULE – 5
Standards for Sound originating from Motor Vehicles or Mechanized Vessels

Category of Vehicles	Unit	Standards	Remarks
*Motor Vehicles (all types)	dBa	85	As measured at a distance of 7.5 meters from exhaust pipe.
		100	As measured at a distance of 0.5 meter from exhaust pipe
Mechanized Vessels	dBa	85	As measured at a distance of 7.5 meters from the vessel which is not in motion, not loaded and is at two thirds of its maximum rotating speed.
		100	As measured at a distance of 0.5 meter from the vessel which is in the same condition as above.

Notes:

(i) At the time of taking measurement, the motor vehicle shall not be in motion and its engine conditions shall be as follows:-

(ii) Diesel engine - maximum rotating speed.

(iii) Gasoline engine -at two thirds of its maximum rotating speed and without any load.

(iv) Motorcycle - If maximum rotating speed is above 5000 rpm; two- thirds of the speed, and if maximum rotating speed is less than 5000 rpm, three-fourth of the speed.

SCHEDUET - 6
Standards for Emission from Motor Vehicles

Parameter	Unit	Standard Limit
Black Smoke	Hartridge Smoke Unit	65
	(HSU)	
Carbon Monoxide	gm/k.m.	24
	percent area	04
Hydrocarbon	gm/k.m.	02
	ppm	180
Oxides of Nitrogen	gm/k.m.	02
	ppm	600

As measured at two thirds of maximum rotating speed.

SCHEDULE- 7
Standards for Emission from Mechanized Vessels

Parameter	Unit	Standard Limit
Black Smoke*	Hartridge Smoke Unit (HSU)	65

As measured at two thirds of maximum rotating speed.

SCHEDULE - 8
Standards for Odor

Parameter	Unit	Standard Limit
Acetaldehyde	ppm	0.5 - 5
Ammonia	"	1 - 5
Hydrogen Sulfide	"	0.02-0.2
Methyl Disulfide	"	0.009 - 0.1
Methyl Sulfide	"	0.01 - 0.2
Styrene	"	0.4 - 2.0
Trim ethylamine	"	0.005 - 0.07

Notes:

(i) Following regulatory limit shall be generally applicable to emission/exhaust outlet pipe f above 5 meter height:

Q = $0.108 \times He^2Cm$ (Where Q = Gas Emission rate Nm^3/hour)

He = Height of exhaust outlet pipe (m)

Cm = Above mentioned limit (ppm)

(ii) In case where a special parameter has been mentioned, the lower limit shall be applicable for warning purpose, and the higher limit shall be applicable for prosecution purpose or punitive measure.

SCHEDULE – 9
Standards for Sewage Discharge

Parameter	Unit	Standard Limit
BOD	miligram/l	40
Nitrate	“	250
Phosphate	“	35
Suspended Solids (SS)	“	100
Temperature	Degree Centigrade	30
Coliform	number per 100 ml	1000

Notes:

(i) This limit shall be applicable to discharges into surface and inland waters bodies.

(ii) Sewage shall be chlorinated before final discharge.