

## **INITIAL ENVIRONMENTAL EXAMINATION (IEE)**

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Contract Package No.: **e-GP/CTEIP/2014-15/AMT/RD/02**

**April 2015**

### **Coastal Towns Environmental Infrastructure Project (CTEIP)**

(ADB Loan No. ID. L3133-BAN (SF)/L8284-BAN (SCF)/G0394-BAN (SCF)

#### **Batch 1: Stage I CTEIP Programme**

**Construction/ improvement of 04 nos. road, totaling 4.531 kms, and 02 nos. road side drain, totaling 0.217 kms in Amtali Pourashava, District: Barguna**

## CURRENCY EQUIVALENTS

(as of 31 December 2017)

Currency unit	–	taka (Tk)
Tk1.00	=	\$0.01209
\$1.00	=	Tk82.650

## NOTES

- (i) The fiscal year (FY) of the Government of Bangladesh ends on 30 June. FY before a calendar year denotes the year in which the fiscal year ends, e.g., FY2017 ends on June 2017.
- (ii) In this report, "\$" refers to US dollars.

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## APPENDIX E

### Coastal Towns Environmental Infrastructure Project (CTEIP)

(ADB Loan No. ID. L3133-BAN (SF)/L8284-BAN (SCF)/G0394-BAN (SCF)

Local Government Engineering Department  
(Ministry of Local Government, Rural Development and Cooperatives)

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April 2015

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**ABBREVIATIONS**

ADB	-	Asian Development Bank
AIDS	-	Acquired Immunodeficiency Syndrome
AP	-	Affected Persons
BAN	-	Bangladesh
BFIDC	-	Bangladesh Forest Industries Development Corporation
BFRI	-	Bangladesh Forest Research Institute
BNH	-	Bangladesh National Herbarium
BOQ	-	Bill of Quantities
BPL	-	Below Poverty Line
BRM	-	Bangladesh Resident Mission
CDTA	-	Capacity Development Technical Assistance
CIF	-	Climate Investment Fund
CO	-	Carbon Monoxide
CRO	-	Complaint Receiving Officer
CTEIP	-	Coastal Towns Environmental Infrastructure Project
DDS	-	Detailed Design services
DoE	-	Department of Environment
DO	-	Dissolved Oxygen
DoI	-	Department of Irrigation
DPHE	-	Department of Public Health Engineering
DSC	-	Design and Supervision Consultant
ECA	-	Environmental Conservation Act
ECC	-	Environmental Clearance Certificate
ECR	-	Environmental Conservation Rules
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
EO	-	Environmental Officer
FGD	-	Focus Group Discussion
FHH	-	Female House Hold
GAP	-	Gender Action Plan
GoB	-	Government of Bangladesh
GRM	-	Grievances Redress Mechanism
HFL	-	High Flood Level
HIV	-	Human Immunodeficiency Virus Infection
HH	-	House Hold
HTL	-	High Tide Level
ICB	-	International Competitive Bidding
ICCCD	-	Institutional Capacity and Communication Development Consultant
IEE	-	Initial Environmental Examination
ILO	-	International Labor Organization
ISA	-	Initial Social Assessment
IWTP	-	Inland Water Transport Policy
LAO	-	Land Acquisition Officer
LGED	-	Local Government Engineering Department
LCC	-	Location Clearance Certificate
MAT	-	Amtali
MoEF	-	Ministry of Environment and Forest
MCM	-	Million Cubic Meters
mld	-	Million Liters Per Day
MoEF	-	Ministry of Environment and Forest
MS	-	Mild Steel
NEP	-	National Environmental Policy
NFP	-	National Forest Policy
NGO	-	Non-Governmental Organization
NLTP	-	National Land Transport Policy
NOx	-	Nitrogen Oxides
NWP	-	National Water Policy
O&M	-	Operations and Maintenance

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OBC	-	Other Backward Classes
PAF	-	Project Affected Family
PAM	-	Project Administrative Management
PAP	-	Project Affected Person
PD	-	Project Director
PIU	-	Project Implementation Unit
PLO	-	Project Liaison Officer
PMSC	-	Project Management Supervision Consultant
PMU	-	Project Management Unit
POL		Petrol, Oil and Diesel
PSC	-	Project Steering Committee
PWD	-	Public Works Department
PPCR	-	Pilot Programme for Climate Change
PPTA	-	Project Preparatory Technical Assistance
RD	-	Roads
RP	-	Resettlement Plan
REA	-	Rapid Environmental Assessment
SCF	-	Strategic Climate Fund
SIA	-	Social Impact Assessment
SOx	-	Sulfur dioxides
SPCR	-	Strategic Programme for Climate Resilience
TA	-	Technical Assistance
TLCC	-	Town Level Co-ordination Committee
SPM	-	Suspended Particulate Matter
STD	-	Sexually Transmitted Disease
SPS	-	Safeguard Policy Statement
TDS	-	Total Dissolved Solids
TSS	-	Total Suspended Solids
ULB	-	Urban Local Body
UNEP	-	United Nations Environmental Programme
VEC	-	Valued Eco-system Components
WLCC	-	Ward Level Co-ordination Committee
WTP	-	Water Treatment Plant

**WEIGHTS AND MEASURES**

°C	-	Degree Celsius
ha	-	Hectare
km	-	Kilometer
m	-	Meter
mm	-	Millimeter
Tk	-	Taka
%	-	Percentage
km <sup>2</sup>	-	Square Kilometre (10 <sup>6</sup> m <sup>2</sup> )
mm/hour	-	Millimetre per hour
Mm <sup>3</sup>	-	Million Cubic Meter (10 <sup>6</sup> m <sup>3</sup> )
m <sup>3</sup> /d	-	Cubic metre per day
ug/m <sup>3</sup>	-	Microgram per Cubic metre
ppm	-	Parts per million
dB (A)	-	Decibels
No	-	Number
m <sup>3</sup>	-	Cubic meter
m <sup>2</sup>	-	Square meter
cm	-	Centimetre
mm	-	Millimetre



### **Executive Summary**

i) Coastal region of Bangladesh mostly comprises low lying areas and is exposed to sea level rise, storm surges and frequent and intense storm events leading to widespread disastrous consequences. Uncontrolled urbanization, coupled with existing inadequate capacities of the Pourashavas to manage requisite infrastructure, makes this region still more vulnerable to adverse impacts of severe and highly variable climatic conditions. Such adverse conditions, along with the burden of increased urban growth, prevailing regional poverty, exacerbated by weak urban governance, have resulted in undue pressure on basic urban services and infrastructure, which has severely impaired economic growth. As a result of these natural disasters the population in the coastal region remains poor and development significantly lags behind the rest of the country even though there is a lot of potential for further development. However, the number, intensity and the regularity of such disasters appear to be increasing and this trend is restricting further development of the coastal region.

ii) The Coastal Towns Environmental Infrastructure Project (CTEIP) is a key infrastructure initiative of the Government of Bangladesh. The intervention is planned to develop climate resilient structures, including Cyclone Shelters; roads and bridges; water supply; sanitation; drainage; solid waste management; municipal facilities and flood protection infrastructural works. The proposed subproject is for construction/ improvement of **4 roads of 4.531 km** which is flexible pavement of **2.50 m~3.00 m~3.70 m width** and **2 road side RCC drains of 0.217 km with top slab** including **RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter** and **12 road crossing uPVC pipes** within the Amtali Pourashava area under Barguna district. It is also proposed to have shoulders and footpath on side of road, side drains to drain road runoff and surrounding areas, tree plantation for soil erosion control and side protection.

iii) The challenge for the project is that the roads and drains are implemented in the most economically feasible, and environmentally and socially sensitive, manner. The PPTA feasibility study, completed in October 2013, has provided a comprehensive set of recommendations for the planning, design and implementation of the Project. Based on the recommendations of this study, the DDS Consultant has completed the detailed engineering design for the construction/improvement of the Amtali roads and road side drains.

iv) The proposed locations for 4 (four) roads and 2 road side drains for construction/improvement in Amtali Pourashava area under the package **e-GP/CTEIP/2014-15/AMT/RD/02** were selected based on the recommendations of the PPTA report and subsequent site verification by the DDS Consultant, which is assessed to have minimum environmental impacts. The selected sites are well suited for their intended purpose, and have the advantages of immediate accessibility from the immediate local vicinity catchment areas within Amtali Pourashava area.

v) Categorization. An environmental assessment using ADB's Rapid Environmental Assessment (REA) checklist for urban development (**Annexure I**) was conducted and results of the assessment show that the subproject is unlikely to cause significant adverse impacts on environment and society. Amtali roads and road side drains subproject is classified as environmental category **Orange B** as per Bangladesh ECR 1997 and environmental **category B** as per the ADB's Safeguard Policy Statement (SPS) 2009 as no significant impacts are envisioned. This initial environmental examination (IEE), hence, has been prepared in accordance with the requirements of Bangladesh ECR 1997 and ADB SPS 2009 for, respectively, environment category **Orange B** and environmental **category B** projects and provides mitigation and monitoring measures to ensure no significant impacts as a result of the subproject.

vi) Implementation Arrangements. Local Government Engineering Department (LGED) is the executing agency (EA). LGED is responsible for providing support and guidance to Pourashavas concerning performance criteria and Pourashava development planning. Implementation activities will be overseen by a separate program management unit (PMU). The participating Pourashavas are the implementing agencies (IA), with a project implementation unit (PIU) within the Pourashava structure. Local LGED offices will be involved in the functioning of the PIUs to provide technical support. Consultant teams are responsible for (a) detailed engineering design, contract documents preparation and safeguards facilitation; (b) project management and administration support; (c) assistance in supervising construction; (d) strengthening of local governance, conducting

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studies/surveys on flood inundation and climate change impacts, facilitating disaster risk management capacity building and community level adaptation through locally managed climate resilience funds; and (e) community-based climate adaptation and disaster preparedness, awareness raising on behavioural change activities and facilitating resettlement procedures.

vii) Initial Environmental Examination of construction/improvement of the 4 nos. Amtali roads with total length of 4.531 km and 2 road side drains with total length of 0.217 km under package **e-GP/CTEIP/2014-15/AMT/RD/02** has followed and fulfilled the requirements of the Environmental Assessment Review Framework (EARF) Subproject Selection Criteria enumerated in the PPTA document.

viii) There is no resettlement or land acquisition requirement in this subproject. The adverse environmental impacts (e.g., soil pollution, increase in water demand, impairment of air and noise qualities, health and safety risks of workers and community, etc.) due to the subproject are anticipated during the construction period, and will be of a relatively short duration. Adequate provisions have been incorporated into the planning and design of the roads and drains to minimize or mitigate these unavoidable environmental impacts that are a result of the works.

ix) The environmental mitigation cost is estimated as TK 779,860 out of which environmental monitoring cost is TK 384,000 and environmental management cost is TK 395,860. This **Appendix E: IEE** is to be read in conjunction with the attached **Appendix F: EMP**, which gives a detailed breakdown of the costs for the Environmental Management and Monitoring, which are also referred in the attached Bill of Quantities.

x) The adverse environmental impacts will occur during the construction period and will be of a relatively short duration. Adequate provisions have been incorporated into the planning and design of the roads and drains to minimize or mitigate these unavoidable environmental impacts that are a result of the works.

xi) The major **positive achievements** of roads and road side drains are:

- Development of roads and drains will serve not only the influence area but also the surrounding area in the town.
- Establishment of roads and drains development will stimulate ancillary projects which will improve economic status of the local population;
- More employment of people during construction phases;
- Will be potential socio-economic enhancement of rural economy by connecting people to semi-urban areas;
- Reduction in travel time and road safety;
- Reduction in fuel consumption, exhaust emission and green house gases;
- Skill transfer, capacity development and training.

xii) The major **negative impacts**, to be limited within and around the areas of construction sites, will be changes in land use, soil loss in terms of soil erosion from RoWs, borrow-pits, quarries, etc., soil pollution, disruption in drainage patterns, water pollution, air pollution, noise pollution, etc.

xiii) 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.

xiv) The subproject's potential **cumulative impacts** were considered with respect to valued components in environmental and socio-economic categories. There are no foreseeable projects that will overlap with the subproject.

xv) Tree plantation is proposed along roadsides as protection against negative attributes of climate change phenomena and toward improving the quality of environment. This will keep the ecological function in circulation. The noise impact at source will be mitigated by job rotation and use of ear plug and other measures suggested in EMP.

xvi) The environmental mitigation measures as stipulated in EMP and in the obtained environmental permit shall be monitored during implementation of the road and road side drain sub-project. In order to perform monitoring of EMP, the contractor shall engage experienced laboratory and third party services in complying the required environmental testing of listed parameters.

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xvii) The labour camps shall be established with the septic tank and soak pit for treatment and disposal of sewage and sullage water to avoid pollution of water bodies. Contractor shall submit the EMP for construction camp site for approval of engineer in charge. In addition, contractor shall arrange water of required quality for the camp and construction activities.

xviii) The environmental monitoring will be required before the start of the construction and during the construction phase. The parameters of Water Quality, Air Quality, Noise quality, and Soils shall be monitored; as specified in EMP. During the whole project period, total frequency of monitoring has been estimated for four proposed roads including road side drain is 16.

xix) 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.

xx) During public consultation recommendations were drawn including: a) involve local communities in all stages of project planning and development, b) establish permanent communication between project initiators and local authorities, c) setup grievance redress mechanism which will publicized through Pourashava level co-ordination committee and monitoring register and d) during construction, local people including women shall be given first priority in the employment of skilled and unskilled labour.

xxi) LGED will disclose this Environmental Management Framework by making copies available at its head office and in District/Pourashava where the Project is situated. The copies shall also be made available to the Local Government's Agencies, the Environmental and Social Group and other stakeholders. The Government of Bangladesh will also authorize the Asian Development Bank to disclose this IEE and EMP electronically through its Info Shop.

xxii) Monitoring and Reporting. The PMU and project management and supervision consultants (PMSC) will be responsible for monitoring. The PMSC 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 upon receipts.

xxiii) Conclusions and Recommendations. The citizens of Amtali will be the major beneficiaries of this subproject. Therefore, the proposed subproject is unlikely to cause significant adverse impacts and net environmental benefits to citizens of Amtali will be positive. The potential impacts that are associated with design, construction and operation can be mitigated to standard levels without difficulty through the application of recommended mitigation measures and procedures.

xxiv) 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).

xxv) In view of above, it is concluded that the Project will bring benefit to the people of the area. The negative impacts occurring during implementation are within the manageable limits and shall be mitigated with the proposed Environmental Management Plan and hence project may be implemented.

## **1. NEED OF THE PROJECT**

### **1.1 BACKGROUND**

1. Coastal region of Bangladesh mostly comprises low lying areas and is exposed to sea level rise, storm surges and frequent and intense storm events leading to widespread disastrous consequences. Uncontrolled urbanization, coupled with existing inadequate capacities of the Pourashavas to manage requisite infrastructure, makes this region still more vulnerable to adverse impacts of severe and highly variable climatic conditions. Such adverse conditions, along with the burden of increased urban growth, prevailing regional poverty, exacerbated by weak urban governance, have resulted in undue pressure on basic urban services and infrastructure, which has severely impaired economic growth. As a result of these natural disasters the population in the coastal region remains poor and development significantly lags behind the rest of the country even though there is a lot of potential for further development. However, the number, intensity and the regularity of such disasters, many of which are related to climate change, appear to be increasing and this trend is restricting further development of the coastal region.

2. The Coastal Towns Environmental Infrastructure Project (CTEIP) is a key infrastructure initiative of the Government of Bangladesh. The Project was prioritized in the Government's 2010 Strategic Programme for Climate Resilience (SPCR), prepared under the Pilot Program for Climate Resilience (PPCR), whereby the CTEIP is eligible for financing from the Strategic Climate Fund (SCF) within the multi-donor coordinated Climate Investment Funds (CIF) as a pilot project for demonstrating ways to mainstream climate resilience into development. Intervention is planned to develop climate resilient structures, including Cyclone Shelters; roads and bridges; water supply; sanitation; drainage; solid waste management; municipal facilities and flood protection infrastructural works.

3. The project consists of three components a) improved climate-resilient infrastructure b) strengthening institutional capacity, governance, and awareness, c) project management and administrative support. The outcome of the project will be improved access to climate disaster resilience municipal services including; a) municipal infrastructure such as drainage, cyclone shelters, urban roads, bridges, culverts, solid waste management, bus terminals, slum improvement, boat landing and markets; b) water supply and c) sanitation. In accordance with ADB's Safeguard Policy Statements (SPS 2009), the project requires the preparation of environmental assessment and review framework. The report is on initial environmental examination (IEE) assessment and preparation of review framework for roads including road side drain at Amtali Pourashava.

4. The **4 roads of 4.531 km and 2 road side RCC drains of 0.217 km** including **RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter and 12 road crossing uPVC pipes** within Amtali Pourashava area proposed for construction/improvement through this project are mostly within urban and semi urban areas of Amtali District. The roads and drains are designed to meet all weather requirements.

5. This Initial Environmental Examination (IEE) has been conducted by EPTISA Services de Ingenieria S.L., the Detailed Design Services (DDS) Consultant under the CTEIP, in accordance with the ADB's requirements and guidelines. The IEE is based upon a study of available reports and documents, including the Project Preparatory Technical Assistance (PPTA), under TA 8128 BAN; relevant sections of the Capacity Development Technical Assistance (CDTA) Report; discussions with related stakeholders and PIU/Pourashava authorities. Read this IEE in conjunction with the following documents, attached to this Bid Document:

- Environmental Management Plan (**EMP**) attached hereto as **Appendix F**;
- Resettlement Plan (RP): (Due Diligence Report) attached hereto as **Appendix G**;
- Gender Action Plan (**GAP**) attached hereto as **Appendix H**.

### **1.2 PURPOSE OF IEE**

6. The initial environmental examination aims to provide guidance on safeguard screening, assessment, institutional arrangement and process to be followed for components of the project, where design takes place after Boards approval. This IEE (i) describes the project and its components; (ii) explains the general anticipated environmental impacts and mitigation measures for the subprojects; (iii) specifies the requirements that will be followed in relation to screening and categorization, assessment, and planning, including arrangements for meaningful consultation with

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affected people and other stakeholders and information disclosure requirements; (iv) assesses the capability of the project proponents to implement national laws and ADB's requirements, and identifies needs for capacity building; (v) specifies implementation procedures, institutional arrangements, and capacity development requirements; and (vi) specifies monitoring and reporting requirements. Moreover, this IEE is to ensure, in line with ADB EARF, that the road project, in the entirety of its project cycle, will not deteriorate or interfere with the environmental sensitivity of the project area, but rather improve environmental quality.

**1.3 SCOPE OF SERVICES**

7. The scope of the project includes nine infrastructure categories: (i) roads, bridges and culverts, (ii) solid waste management, (iii) cyclone shelters, (iv) boat landing stations, (v) markets, (vi) bus terminals, (vii) drainage and flood control, (viii) water supply, and (ix) sanitation.

8. The major components to be taken up in Amtali under this project are described in **Table 1**. This report is on IEE of Amtali roads including road side drain in Amtali Pourashava area, District: Amtali and the package is designated as **e-GP/CTEIP/2014-15/AMT/RD/02**.

Table 1: Amtali Scope of Work (CTEIP Batch 1, Stage 1)

Sl. No.	PPTA road sl. no.	PPTA road length(m)	Name of scheme	Type of work	Length (m)	Box Culvert /Cross Drain (nos.)	Protection work length (m)
1	Road No.1	1000	Sabujbag Selim,s house to R&H road via TNT & College Mosque (Ward no.05,06)	Road (BC)	550		
				RCC "U" drain	93		
				250 mm dia uPVC road cross pipe		2	
				Cross Drain (along drain) (1.00x1.00x 7.0)		1	
				Pre cast CC Block pro. Work			118.20
			RCC pre cast protection work				73.00
2	Road No.2	1100	Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (Ward no.08)	Road (BC)	2870		
				250 mm dia uPVC road cross pipe		3	
				RCC Pipe Culvert (600 mm dia x 7.2)		2	
				RCC Box Culvert (1.00x1.5x7.0)		7	
				RCC Box Culvert (2.00x2.5x6.2)		2	
				RCC Box Culvert (3.0x3.5x6.2)		1	
				Pre cast CC Block pro. Work			30.20
			RCC pre cast protection work				15.00
3	Road No.5	430	Zilla Parisad road to Muktizodda School via Mofij Taluker house (Ward no.06,05)	Road (BC)	550		
				RCC "U" drain	124		
				250 mm dia uPVC road cross pipe		6	
				Cross Drain (1.00x1.0x 7.0)		1	
				Box Culvert (1.00x1.5x 7.0)		2	
			Pre cast CC Block pro. Work				142.20
4	Road No.6	1000	Mazar road to ATO Kashem Mia house via Lakerpar (Ward no.03)	Road (BC)	561		
				250 mm dia uPVC road cross pipe		1	
				RCC pre cast protection work			

**1.3.1 Scope of Work**

9. The **scope of work** includes ensuring that construction and/ or improvement of the roads including road side drain will be in an environmentally sustainable manner and in full compliance with Bangladesh's and the Asian Development Bank's environmental safeguard policies and regulations. The scope of services in brief is as follows:

- Document baseline data for various environmental attributes on physical, water, ecological pollution and physical cultural resources and socio-economic profile;
- Assess positive and negative environmental impacts of the proposed roads including road side drain;
- Prepare environmental mitigation measures and management plans to effectively address the impacts;
- Prepare Initial Environmental Examination (IEE) so that these are acceptable to Department of Environment (DoE), Bangladesh and the Asian Development Bank;
- Prepare post-project monitoring programs, institutional arrangement to implement the environmental plans; and
- Prepare cost estimates for the environmental management and monitoring programs.

#### **1.4 APPROACH AND METHODOLOGY**

10. The package **e-GP/CTEIP/2014-15/AMT/RD/02** has followed the Environmental Assessment Review Framework (EARF) subproject selection criteria as enumerated in PPTA document. The **approach** in preparation of IEE has been to follow the sequence of steps adopted in an EIA study in relation to EARF. Apart from following standard environmental impact assessment practices and procedures, **methodologies** have deployed advanced technologies, techniques and tools to the extent these are applicable and relevant to this project. The approach and methodology flow chart is presented in **Figure-1**.

11. Toward ascertaining **baseline** conditions and assessing the impacts during construction and operation of the project, the consultants have taken into account the various parameters of the environment – topography, physiography, soils, hydrology and drainage, meteorology, qualities of ambient air and noise, surface water, groundwater, biodiversity, socio-economic aspects including gender issues, land/property, physical and cultural resources. The baseline data for environmental attributes were collected from primary and secondary sources. The primary sources include site visits and visual inspection. The secondary sources include the reports, books, maps and documents from various government and non-government organizations on subject matter. The impacts are assessed for various phases of project cycle namely:

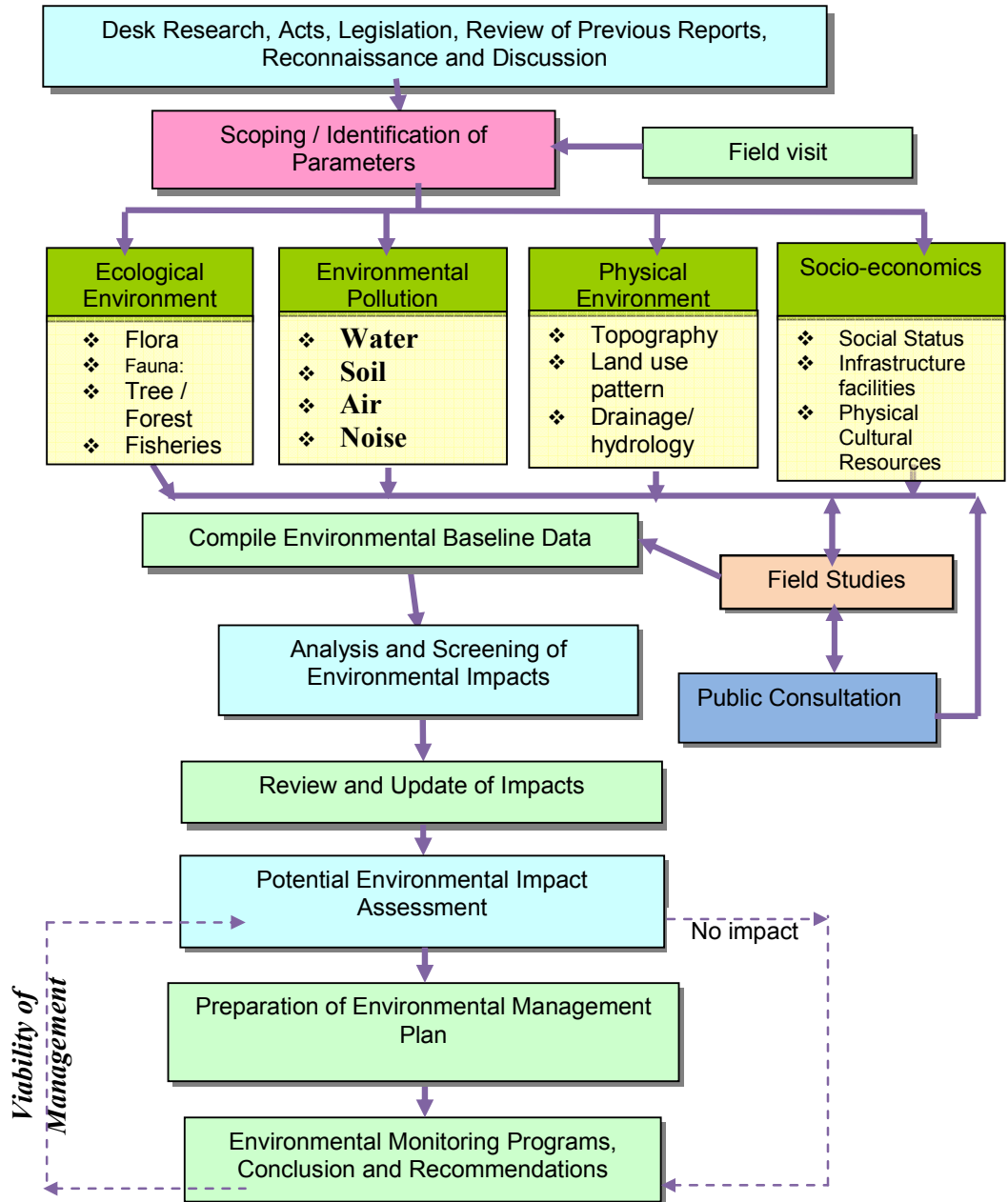
- Impacts due to project location and design,
- Impacts due to project construction, and
- Impacts due to project operation.

12. The **impacts** are categorized as negative and positive. The standard methodology for the review, field visit data collection, impact assessment and formulation of management plans is adopted. The Bangladesh National Acts, Legislation and Laws were consulted with a view to ensuring compliance with various requirements. The environmental attributes were compiled from both primary and secondary sources.

13. The **management plans** are essential to ensure that stress/ loads on the systems are within carrying capacity. The management plan aims at maintaining the environmental quality of project area at-least in pre-project stage. An environmental management plans were developed to mitigate the adverse impacts. Efforts are made to enhance the quality of environmental attributes.

14. It is necessary to **monitor** any changes of the quality of environmental parameters during construction and operation. Monitoring would indicate any environmental problems, which have reviewed. This will facilitate to assess the effectiveness of management and/or mitigation measures.

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**Figure 1: IEE Approach and Methodology Resulting to EMP**

## **1.5 FORMAT OF THE REPORT**

15. This report has been prepared taking into consideration the IEE mechanisms, procedures and contents spelt out in Environmental Conservation Act of 1995 and its subsequent amendments in 2000, 2002 and 2010<sup>1</sup> of Bangladesh and ADB Environmental Assessment Guidelines (2003) and Safeguard policy statement (2009). The main findings are reported in conclusions and recommendations for disclosure locally and the ADB web site. The report has an Executive Summary in the beginning.

**Chapter 1** provides a general introduction to the project along with the project background, objectives and scope of the study and an outline on the approach and methodology adopted for the study.

**Chapter 2** is a concise document on the policy and strategies; legal instruments, and institutional arrangement under which the project will be developed.

**Chapter 3** is on the Project Description which highlights the need for the development. The project Construction Schedules material requirements and cost of project are also summarized.

**Chapter 4** is on the baseline environmental and social conditions in pre-construction phase in sufficient detail to enable an adequate assessment of the potential environmental and social impacts.

**Chapter 5** is on Screening of Potential Environmental Impacts and describes the environmental impacts that could occur as a result of the proposed project.

**Chapter 6** is on Grievance Redress Mechanism;

**Chapter 7** is on public consultation;

**Chapter 8** is on Conclusion and Recommendations.

The literature, books, reports and maps referred are presented as foot notes in the main body of the report. At the end, the report has Annexure which are reported in the main body of the report.

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<sup>1</sup> *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 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; earth-fill or change the status of any water body/wetland/lakes/natural canals, etc., even in national interest; the aforementioned activities can be done only after getting clearance from respective the departments/agencies/authorities.



## **2. POLICY, LEGAL FRAMEWORK AND INSTITUTIONAL CAPACITY**

### **2.1 NATIONAL RELEVANT POLICIES AND STRATEGY**

16. This Section describes the relevant policies and strategies, legal instruments, institutional arrangement and framework applicable to CTEIP-related rehabilitation and /or construction activities in various Pourashava areas in the Bangladesh coastal region. It summarizes the National Laws and describes the procedure for obtaining environmental permits to allow project implementation. Over the years the Government of Bangladesh has enacted environmental acts, rules, policies and regulation toward imposing restrictions facilitating minimization / mitigation of likely impacts due to development projects. The most important Act is Environmental Conservation Act, 1995 (ECA, 1995) and Environmental Conservation Rules (ECR, 1997).

#### **2.1.1 National Environmental Policy**

17. The National Environmental Policy was adopted in 1992 and is now under revision. It embraces different sectors related to agriculture, forest, power, health, transport, housing etc. The central theme of policy is to ensure protection and improvement in environment. The policy gives a thrust to sustainable development and long term use of natural resources. The National Environment Policy contains policy statements and strategic options with regard to population and land-use management, management and utilization of natural resources and other socio-economic sectors, as well as the necessary arrangements for the implementation of the policy. The policy enables:

- the country to strike a dynamic balance between population and resources while complying with the balance of ecosystems;
- to contribute to sustainable and harmonious socio-economic development such that, both in rural and urban areas, and well-being in a sound and enjoyable environment; and
- to protect, conserve and develop natural environment.

#### **2.1.2 National Water Policy (NWP)**

18. The National Water Policy, 2004 (NWP) aims for sustainable management of water. This policy is relevant as some of the activities such as water supply to shelters will be from existing sources/ systems. Policy also integrates the environmental impact assessment for water development projects. The policy stresses on issues related to climate change such as:

- Augmentation of dry season flows;
- Awareness raising in consumptive use of surface and ground water;
- Structural and non-structural mitigation measures (early warning systems).

#### **2.1.3 National Forest Policy**

19. National Forest Policy (NFP) was established in 1994. Under this policy it is proposed to increase the forest cover and to promote and oversee forestry activities. The policy fixed the target of forest cover at least 20% of geographic area by the year 2015. Tree plantation on the courtyards of rural organization such as Union Parishad, school, eidgah, mosque-moktob, temple, club, orphanage home, madrassah etc. and other fallow lands around can be initiated. The government will encourage this type of initiative and extend technical and other supports.

#### **2.1.4 Bangladesh Climate Change Strategy and Action Plan**

20. The Bangladesh climate change strategy and action plan was approved in 2009. The climate change plan is built on six pillars namely i) food security, social protection and health; ii) Comprehensive Disaster Management; iii) infrastructure; iv) research and knowledge management; v) Mitigation and low carbon development; and vi) capacity building and institutional. The strategy and action plan emphasizes on ensuring existing assets (e.g., coastal and river embankments) are well maintained and fit for purpose and that urgently needed infrastructures (cyclone shelters and urban drainage) 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.

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**2.2 Legal Instruments**

21. The environmental policies are prepared by the Ministry of Environment and Forests (MoEF). MoEF also has formulated regulation toward clearance of projects from environmental angles based on environmental impact assessment report. The Department of Environment is responsible for environmental issues while forest issues are looked after Department of Forests. Over the years the MoEF has adopted number of legal instrument in the form Acts for the protection and conservation of the environment. **Table 2** summarizes the Environmental Legislation applicable to the sub-project.

**Table 2: Applicable GoB Environmental Legislations**

Sl.No	Legislation	Requirement for the Project	Relevance
1	Environmental Conservation Act of 1995 and amendments in 2000, 2002 and 2010 <sup>2</sup>	<ul style="list-style-type: none"> <li>Restriction on operation and process, which can be continued or cannot be initiated in the ecologically critical areas</li> <li>Regulation on vehicles emitting smoke harmful to the environment</li> <li>Remedial measures for injuries to ecosystems</li> <li>Standards for quality of air, water, noise and soil for different areas and limits for discharging and emitting waste</li> <li>Environmental guidelines</li> </ul>	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 <ul style="list-style-type: none"> <li>Compliance to environmental quality standards</li> </ul>	The subproject is categorized as Orange-B and requires LCC and ECC. All requisite clearances from DoE shall be obtained prior to commencement of civil works.
3	Forest Act 1927 & amendments (2000)	<ul style="list-style-type: none"> <li>Clearance for any felling, extraction, and transport of forest produce</li> </ul>	Refer Baseline and EMP
4	Bangladesh Climate Change Strategy and Action Plan of 2009	<ul style="list-style-type: none"> <li>Ensure existing assets (e.g., coastal and river embankments) are well maintained and fit for purpose and that urgently needed infrastructures (cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.</li> <li>enhance the capacity government ministries, civil society and private sector to meet the challenge of climate change</li> </ul>	Considered in project design components
5	Bangladesh Labour Law of 2006	<ul style="list-style-type: none"> <li>Compliance to the provisions on employment standards, occupational safety and health, welfare and social protection, labour relations and social dialogue, and enforcement</li> <li>Prohibition of employment of children and adolescent</li> </ul>	The provisions of the act apply to the entire subproject in the construction and O&M phases. Provides for occupational health and safety of workers and community during construction phase.
6.	The Building Construction Act, 1952 (amended & gazetted in 2008)		Act is in English and rules currently available in Bangla: Pourashava to develop the conditions under this Act but have yet to utilize.
7.	The Town Improvement Act 1953		Only applicable for RAJUK and therefore not relevant.
8.	Building Construction Rules 2008		Building Construction Rules 2008 version appropriate to Dhaka City. Pourashava utilizing 1996 version.

<sup>2</sup> *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 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 raise any hill or hillock; earth-fill or change the status any water body/wetland/lake/natural canal, etc., even in national interest; the aforementioned activities can be done only after getting clearance from respective departments.

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Sl.No	Legislation	Requirement for the Project	Relevance
9.	Bangladesh National Building Code (BNBC) 2006		Bangladesh National Building Code (BNBC) 2006 currently not gazetted by the GoB. Approved copy 1993 referred for which the relevant clauses have been closely followed and incorporated within IEE.

Source: TA 8128 Coastal Towns Infrastructure Improvement Project Volume 6

### 2.3 INSTITUTIONAL ARRANGEMENTS / FRAMEWORK

22 The main Ministry, Department, Institutions and Boards responsible for development of policy, framing regulation, developing projects, monitoring and approval of issues related to environment protection and conservation are presented in this section.

23 The **Department of the Environment** In 1977, Environment Pollution Control Board with 16 members headed by a Member of the Planning Commission and Environment Pollution Control Cell headed by a Director with staff complement of 26 was established. This was followed in 1977 by the establishment of the Environment Pollution Control Project, in 1985 by the establishment of the Department Pollution Control and finally, in 1989 by the restructured and renamed the Department of Environment (the Department) the activities of which are overseen by a Director General. The Department discharges its responsibilities through a head office and six Divisional offices located in Dhaka, Chittagong, Khulna, Bogra, Barisal and Sylhet. Of late, the Government has established 21 new offices at district level with the creation of 468 new positions.

24 **DOEs activities** affect every socio-economic sector and direct and influence all activities wherever they might take place in Bangladesh. The department was created in 1989 to ensure sustainable development and to conserve and manage the environment of Bangladesh. Over the last decades the major activities performed by the department had undergone significant metamorphosis- from a limited scope of performing merely regulatory and routine function scope of performing merely regulatory and routine function to a wider and broader horizon comprising more action-intensive and research oriented endeavours of investigating, identifying, conserving and nurturing as well as enhancing the qualities of the various ecosystems encompassing the overall environment of country.

25 The basic philosophy behind the establishment of the DOE was environment conservation, pollution control and management of environment in its totality. So we can easily measure the major functions of the DOE through analyzing the following points of activities:

- Environmental quality monitoring
- Awarding environmental clearance to industries/development project
- Compliance & Enforcement
- Ecologically Critical Areas and Natural Resource Management
- Planning & Development and Research
- Environmental awareness and partnership building
- Human Resource Development
- Compliance to regional and international conventions, treaties and protocols
- Information, Library and Documentation

26 The Ministry of Environment & Forests is the nodal agency in the administrative structure of the Central Government, for the planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. MoEF oversees all environmental matters in the country and is a permanent member of the Executive Committee of the National Economic Council. The Ministry also plays a pivotal role as a participant of United Nations Environment Programme (UNEP).

27. The principal activities undertaken by Ministry of Environment & Forests consist of conservation & survey of flora, fauna, forests and wildlife, prevention & control of pollution, forestation & regeneration of degraded areas and protection of environment, in the framework of legislations. The main tools utilized for this include surveys, impact assessment, control of pollution, regeneration programmes, support to organizations, research to solve solutions and training to augment the requisite manpower, collection and dissemination of environmental information and creation of environmental awareness among all sectors of the country's population. The organizational structure of the ministry covers a number of divisions, directorate, board, subordinate offices, autonomous

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institutions and public sector undertakings. In short, Ministry of Environment & Forest (MoEF) has the following major functions:

- Management of environment and ecology.
- Matters relating to environment pollution control.
- Conservation of forests and development of forest resources (government and private), forest inventory, grading and quality control of forest products.
- Forestation and regeneration of forest extraction of forest produce.
- Plantation of exotic cinchona and rubber.
- Botanical gardens and botanical surveys.
- Tree plantation.
- Planning cell is responsible for preparation of schemes and coordination in respect of forest.
- Research and training in forestry.
- Mechanized forestry operations.
- Protection of wild birds and animals and establishment of sanctuaries.
- Matters relating to marketing of forest produce.
- Liaison with international organizations and matters relating to treaties and agreements with other countries and world bodies relating to subjects allotted to this Ministry.

### 2.3.1 LGED and Amtali Pourashava

28. The Local Government Engineering Department (LGED) is the executing agency. LGED has constituted a Project Management Unit (PMU) and Project Implementation Unit (PIU). The PMU is headed by Project Director (PD). In order to put the project to logical conclusion the PD is assisted by three consultant team to assist and support the PMU and PIU (Project Implementation Unit). The consultant teams are: i) Detailed Design Services (DDS); ii) Project Management and Supervision Consultant (PMSC), and Institutional Capacity and Community Development consultant (ICCDC). The Amtali Pourashava will be the implementing agency and will be assisted by PIU. The facility created during the sub-project will be operated and maintained by Amtali Pourashava.

## 2.4 ENVIRONMENTAL CLEARANCE PROCEDURE

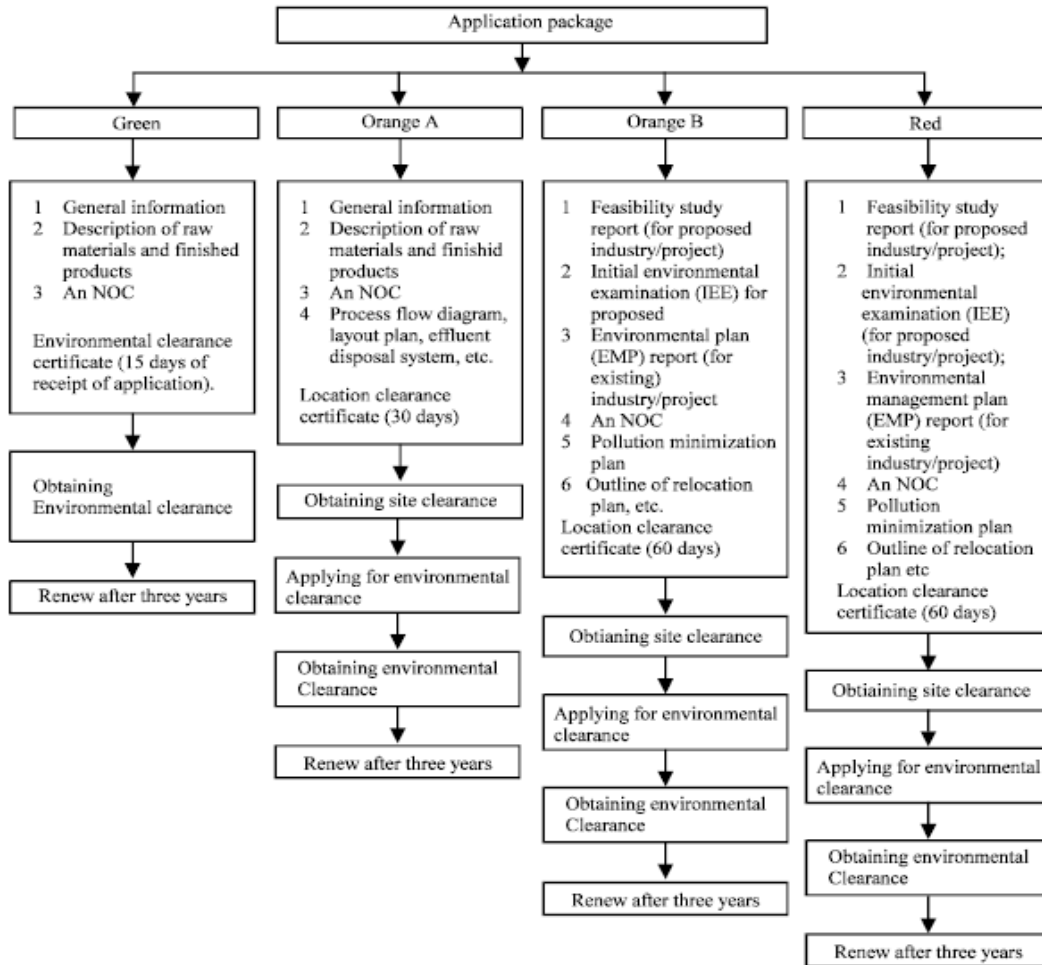
29. Under ECR 1997 industrial units and projects are classified into four categories according to “their site and impact on the environment”, and each category (Green, Orange-A, Orange-B and Red) requires a different level of environmental assessment as a prerequisite for granting the ECC that allows project to proceed. The Environmental Clearance Certification Process is shown in **Figure 2**.

30. Rule 7 of the ECR 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:

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

31. Under the ECR, DoE has 30 days to respond to receipt of the ECC application for an Orange-B category project.

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**Figure 2: Environmental Clearance Process in Bangladesh**

**2.4.1 Environmental Category: Bangladesh**

32. For the purpose of issuance of Environmental Clearance Certificate, the industrial units and projects shall, in consideration of their site and impact on the environment, be classified into the following four categories:- (a) Green; (b) Orange – A; (c) Orange – B; and (d) Red. The Industries and projects included in the various categories are specified in sub-rule (1) have been described in Schedule-1. The ECA indicates that all industrial units or projects must obtain a Location Clearance Certificate (LCC) and Environmental Clearance Certificate (ECC) from the Department of Environment (DoE). No industrial unit or project shall be established or undertaken without obtaining environmental clearance from DoE in the manner prescribed by the rules. The environmental category of projects is listed in Schedule-1 of ECR and the road sub-project in Amtali falls in **Orange-B**. **Table 3** describes DoE classification for roads.

**Table 3: DoE Classification of Roads**

Sl. No	Components	Items in Schedule-1 of ECR	DOE Classification
1	Feeder road and Local Roads (Sl. No. 63 of ECR)	Construction, Re-construction and Extension of Roads	Orange-B

**2.4.2 Environmental Category: ADB**

33. Asian Development Bank (ADB) requires the consideration of environmental issues in all aspects of ADB’s operations, and the requirements for environmental assessment are described in

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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.

34. **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:

- **Category A.** Projects could have significant adverse environmental impacts. An EIA is required to address significant impacts.
- **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.
- **Category C.** Projects are unlikely to have adverse environmental impacts. No EIA or IEE is required, although environmental implications are reviewed.
- **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.

As per above ADB environmental classification, the road and road side drain sub-project in Amtali falls in **Category B**.

**2.4.3 Bangladesh Environmental Standards**

35. The Ministry of Environment and Forest has developed standards from time to time for water and air quality for discharge in the ambient air. The relevant standards are summarized in **Table 4**.

Table 4: Relevant Environmental Quality Standards

Standards	ECR 1997 Rule	Details of Specification
Air Quality	Schedule 2	Standards for Air parameters: Suspended Particulate Matters (SPM); Sulphur dioxide; Carbon; Monoxide Oxides; Nitrogen For the categories: a) Industrial and mixed; b) Commercial and mixed; c) Residential and rural; d) Sensitive.
A) Inland Surface Waters	Schedule 3	Standards for water parameters: pH; BOD (mg/l); DO (mg/l); Total Coliform (number/100) For the Classifications: a) Source of drinking water for supply only after disinfecting; b) Water usable for recreational activity; c) Source of drinking water for supply after conventional treatment; d) Water usable by fisheries; e) Water usable by various process and cooling industries f) Water usable for irrigation.
B) Drinking Water	Schedule 3	Standards for the given parameters
Sound	Schedule 4	Standards for Sound (determined for Day (dBa unit); and Night (dBa unit) For the categories: a) Silent Zone; b) Residential Area; c) Mixed Area; d) Commercial Area; e) Industrial Area:
Sound originating from Motor Vehicles	Schedule 5	Standards of sound of Motor Vehicles (all types) (dBa) As measured: at a distance of 7.5 meters from exhaust pipe; at a distance of 0.5 meter from exhaust pipe.
Emissions from Motor Vehicles	Schedule 6	Standard Limits for Emission of Motor Vehicles for the parameters of Black Smoke (Hartridge Smoke Unit (HSU)); Carbon Monoxide (gm/km percent area); Hydrocarbon (gm/km ppm); Oxides of Nitrogen (gm/km ppm)
Odour	Schedule 8	Standards for odour (ppm) for the parameters of Acetaldehyde; Ammonia; Hydrogen Sulfide; Methyl Disulfide; Methyl Sulfide; Styrene; Trim ethylamine.
Sewage Discharge	Schedule 9	Standards for Sewage Discharge for the Parameters of BOD (miligram/l); Nitrate

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Standards	ECR 1997 Rule	Details of Specification
		(miligram/l); Phosphate (miligram/l); Suspended Solids (SS) (miligram/l); Temperature (Degree Centigrade); Coliform (number per 100 ml).
Waste water from Industrial Units or Projects Waste	Schedule 10	Standards for Waste water from Industrial Units or Projects Waste for the given parameters for the Places of Determination of Standards: Inland Surface Water; Public Sewerage system connected to treatment at second stage; Irrigated Land.

Source: Environment Conservation Rules (ERC) 1997

**2.4.4 Institutional Capacity**

36. The Ministry of Environment and Forests has the capacity to formulate policy, legislation, standards and review the environmental impact assessment (EIA) of the development projects. The project is cleared by two committees. The Pourashava gives the site clearance by location clearance committee (LCC). The project is submitted to DoE for environmental clearance committee (ECC). The projects are implemented at local or Pourashava level and executed at central level. Local Government Engineering Department (LGED) executes the projects on water supply, sewerage, solid waste management, etc. The environmental impact assessment is conducted by the consulting agencies by outsourcing including the DDC and PMSC Consultants. The sphere of LGED activities is for a better environment and health. Most of the engineers involved with design and construction activities are familiar with the environmental issues. LGED has also appointed an Executive level officer to look into the critical issues. The LGED is assisted by consultants for monitoring of environmental attributes and training. LGED has established a quality control lab where parameters related to water, waste water and soils can be monitored. However there is a scope to train engineers at each level for conducting environmental impact assessment and preparation of management plans. Further, to avoid adverse negative environmental impacts of a proposed shelter, no contract tender should be launched before specific IEE/EIA based on final design is prepared. The EMP with the management measures is approved by DoE.

### **3. PROJECT DESCRIPTION**

#### **3.1. OVERVIEW**

37. The Coastal Towns Environmental Infrastructure Project (CTEIP) is a key infrastructure initiative of the Government of Bangladesh. The project consists of four components (i) improved climate- resilient municipal infrastructure, (ii) strengthened governance and institutional capacity, (iii) enhanced public awareness, behavior change, and community-based climate adaptation, and (iv) project management support. The outcome of the project will be improved access to climate-disaster resilient municipal services, including (i) municipal infrastructure such as roads and bridges, drainage, cyclone shelters, solid waste management, bus terminals, slum improvements, boat landings, and markets, (ii) water supply, and (iii) sanitation.

38. CTEIP finances basic urban services improvements and aims to increase climate resiliency that are vulnerable to the effects of climate change. The location of the eight Pourashavas, included under CTEIP is shown in **Figure 1.1 of Subsection 5**, which shall receive investments in two stages: (i) Stage 1 focuses on infrastructure crucial for climate resilience (e.g., roads, cyclone shelters, solid waste, drainage, water supply, and sanitation); and (ii) Stage 2 includes other infrastructure that contributes to general economic development (e.g., additional roads, markets, boat landings and bus terminals). The total project amount for the eight Pourashavas is estimated to be \$117.1 million, and the implementation period is five years.

#### **3.2 LOCATION AND SELECTION OF ROADS**

39. The locations of all proposed components under the subproject are at Amtali Pourashava. Amtali Pourashava was established on 23 August 1998 and classified as a Class-C Pourashava. Later it was upgraded to a Class-B Pourashava. The Pourashava is divided into 9 wards. It is located in Barguna District of Barisal Division. Amtali Upazila ranks first among the five Upazilas, in respect of both population and area. Geographic location is between latitude 21°51' and 22°18' north and between longitude 90°00' and 90°23' east. The Upazila is bounded on the north by Chaora Union and Patuakhali Sadar Upazila, on the east by Chaora Union and Galachipa and Kalapara Upazilas of Patuakhali District, on the south by the Bay of Bengal on the west by Barguna Sadar Upazila and Mirzaganj Upazila of Patuakhali District. Amtali Pourashava is bordered in the north and the east by Chaora Union, in the west by Payera River and in the south by Amtali Union. Amtali Pourashava is the only urban area of the Upazila and occupies an area of 8.75 km<sup>2</sup>, with a population of 17,311 as per BBS 2011.

40. Site reconnaissance visits were made during March 2014 to April 2014. Under the subproject, **4 roads of 4.531 km** which is flexible pavement of **2.50 m~3.00 m~3.70 m width** and **2 road side RCC drains of 0.217 km with top slab** including **RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter** and **12 road crossing uPVC pipes** have been planned for construction and/or improvement. These roads were identified and finalized during PPTA through the workshop organized in Pourashava in the presence of the Mayor, Councilors, Engineers and invited officials from relevant organizations. Particular attention has been paid to the data and recommendations contained in the PPTA reports, which have been further reviewed and site verified in advance of progressing with the detailed design and IEE study. The subproject components are located in Amtali urban area or in its immediate surroundings which were converted into urban use for years ago, and there is no natural habitat left at these sites. The components will be located on government lands and will be laid on existing right of ways (ROWs). There are no forest areas within or near Amtali.

#### **3.3 ENVIRONMENTAL CATEGORIZATION**

41. As part of the project preparatory technical assistance (PPTA 8128-BAN), environmental assessment for the Batch 1 stage I Pourashavas of Amtoli, Galachipa, Amtali and Amtali was conducted and six sample initial environmental examination reports (IEEs) with Environmental Management Plans (EMP) were prepared in accordance with requirements of the ADB Safeguard Policy Statement (SPS). As per DoE classification mentioned in Para 29, construction/improvement of **4 roads of 4.531 km** which is flexible pavement of **2.50 m~3.00 m~3.70 m width** and **2 road side RCC drains of 0.217 km with top slab** including **RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter** and **12 road crossing uPVC pipes** fall in environmental category



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**Orange-B.** The environmental issues related to construction are anticipated during construction phase. In order to follow ECA, Bangladesh and ADB SPS the IEE has been conducted. The potential adverse environmental impacts are mainly related to the construction period, which can be minimized by the mitigating measures and by adopting environmentally sound engineering and construction practices as referred in the Environmental Management Plan (EMP). No Category A type of works (with significant impacts) is considered.

**3.4 PROJECT DETAILS**

42. The proposed sites for the roads under Amtali Pourashava, District: Amtali are located within the Pourashava area, which are mostly within urban and semi urban areas. Selection of roads, on the basis of volume- 4 of PPTA and Appendix 1 of PAM table 1 on scoring matrices have been followed for prioritization. Four (04) roads (road no. 1, 2, 5 & 6) including two (02) road side drains have been designed under the package **e-GP/CTEIP/2014-15/AMT/RD/02**. The total designed length of the roads is 4.531 km and road side drain length is 0.217 km, whether in PPTA report total proposed road length is 3.530 km. In PPTA Report, altogether 09 (eight) roads were proposed out of which the other 04 (four) roads (road no. 3, 4, 8 & 9) had been finalized and included in the previous package: **e-GP/CTEIP/2014-15/AMT/RD/01** through completion of the detail design work and resettlement issues.

43. Total length of designed road is **4.531 km** with flexible pavement i.e. bituminous carpeting. Designed flexible pavement width is **2.50 m~3.00 m~3.70 m**. Package No. **e-GP/CTEIP/2014-15/AMT/RD/02** has been designed without major resettlement issues and land acquisition.

44. To mitigate the water logging problem, design has been done for 0.217 km road side RCC drain with top slab along with 02 Cross drains, 02 RCC pipe cross drains and 12 road crossing uPVC pipes to easy dispose house hold kitchens, bathrooms waste water for improve the urban facilities. Also RCC pre-cast protection wall and pre-cast CC block work have been designed to protect the erosion from canal tidal wave and road shoulder sliding. Besides, it is proposed to have shoulders and footpath on side of road, side drains to drain road runoff and surrounding areas, tree plantation for soil erosion control and side protection.

**3.4.1 Objective of the Project**

45. The prime objective of the project is to improve transport infrastructure with a view to supporting project area's social economic and climate resilient development. The project development will facilitate the economic growth, the improved transportation of goods and services. Specifically, the major purpose of the proposed upgrading project is to construct/ improve road network including road side drain in Amtali Pourashava in order to meet the following objectives:

- To promote socio economic development of the project area by linking it within Pourashava; and
- To increase climate reliance in infrastructure; and improved feeder networks will enhance the commercial activities of urban and rural households, access to services and will reduce poverty.

**3.4.2 Existing Condition of Amtali Roads**

46. Existing condition of the roads within Amtali pourashava area proposed for development/ rehabilitation through the subproject is depicted below in **Table 5**.

**Table 5: Existing Condition of Amtali Roads**

Sl. No.	PPTA Proposed Road Length (m)	Chainage (m)	Existing Pavement Width (m) and Condition	Available RoW (m)
<b>1.</b>	<b>Road no-1: Sabujbag Selim's house to R&amp;H road via TNT &amp; College Mosque (Ward no-05,06)</b>			
	1000	Ch.0+000 to Ch.0+172	2.40~2.50, Damaged WBM/BC pavement	4.50
		Ch.0+172 to Ch.0+250	2.40~2.50, Damaged WBM/BC pavement	4.50
		Ch.0+250 to Ch.0+265	5.0 m Damaged Katcha Pavement	5.00
		Ch.0+265 to Ch.0+350	5.0 m Damaged Katcha Pavement	5.00
		Ch.0+350 to Ch.0+360	5.0 m Damaged Katcha Pavement	5.00
		Ch.0+360 to Ch.0+635	4.0 m Damaged Katcha Pavement	5.00
<b>2.</b>	<b>Road No-2: Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (Ward no-08)</b>			
	600	Ch.0+000 to Ch.0+015	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+015 to Ch.0+075	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+075 to Ch.0+490	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+490 to Ch.0+520	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+520 to Ch.0+715	1.90~2.00, Damaged CC pavement	4.50~7.00

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Sl. No.	PPTA Proposed Road Length (m)	Chainage (m)	Existing Pavement Width (m) and Condition	Available RoW (m)
		Ch.0+715 to Ch.0+730	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+730 to Ch.0+750	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+750 to Ch.0+870	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.0+870 to Ch.1+000	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.1+000 to Ch.2+125	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.2+125 to Ch.2+313	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.2+313 to Ch.2+850	1.90~2.00, Damaged CC pavement	4.50~7.00
		Ch.2+850 to Ch.2+870	1.90~2.00, Damaged CC pavement	4.50~7.00
<b>3.</b>	<b>Road no-5: Zilla parisad road to Muktizodda school via Mofij Talukder house (Ward no- 06, 05)</b>			
	430	Ch.0+000 to Ch.0+020	2.30~2.50, Damaged WBM pavement	7.00~6.00
		Ch.0+020 to Ch.0+234	2.30~2.50, Damaged WBM pavement	6.00~5.00
		Ch.0+234 to Ch.0+300	2.40, Damaged WBM pavement	6.00~5.00
		Ch. 0+300 to Ch.0+325	2.40, Damaged WBM pavement	4.50~5.00
		Ch. 0+325 to Ch.0+345	2.30~2.40, Damaged WBM pavement	4.50~5.00
		Ch. 0+345 to Ch.0+362	2.30~2.40, Damaged WBM pavement	4.50~5.00
		Ch. 0+362 to Ch.0+390	2.30~2.40, Damaged WBM pavement	4.50~5.00
		Ch. 0+390 to Ch.0+486	2.30~2.40, Damaged WBM pavement	4.50~5.00
		Ch. 0+486 to Ch.0+521	2.30~2.40, Damaged WBM pavement	4.50~5.00
		Ch. 0+521 to Ch.0+546	2.30~2.40, Damaged WBM pavement	4.50~5.00
<b>4.</b>	<b>Road no-6: Mazar road to ATO kashem Mia house via Lakerpar (Ward no- 05, 06)</b>			
	1000	Ch.0+000 to Ch.0+012	1.50, Damaged CC pavement	4.00~4.50
		Ch.0+012 to Ch.0+110	1.50, Damaged CC pavement	4.00~4.50
		Ch.0+110 to Ch.0+125	1.50, Damaged CC pavement	4.00~4.50
		Ch.0+125 to Ch.0+137	1.50, Damaged CC pavement	4.00~4.50
		Ch.0+137 to Ch.0+375	1.50, Damaged CC pavement	4.00~4.50
		Ch.0+000 to Ch.0+176 (Mosque Connecting Road)	3.00, Earthen pavement	3.50~4.00
		Ch.0+176 to Ch.0+186	3.00, Earthen pavement	3.50~4.00

Source: PPTA, DDS Consultant Computation and Field Studies

### 3.4.3 Brief Description of the Roads

47. The PPTA consultant for the project has prepared feasibility report for **4 roads of 4.531 km** which is flexible pavement of **2.50 m~3.00 m~3.70 m width** and **2 road side RCC drains of 0.217 km with top slab** including **RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter** and **12 road crossing uPVC pipes** for Amtali Pourashava under Barguna District. Based on technical, economical, financial, social and environmental factors, the roads have been assigned the priority. Based on priority, all the four roads of 4.531 km and two road side RCC drains of 0.217 km have been selected for environmental impact assessment. The road length, width and present and projected traffic is summarized in **Table 6. Table 7** provides the details on existing and proposed cross drainage and road side drainage works. Besides, **Table 8** provides details on proposed box culverts. The project traffic is for the year 2034 with a growth rate of 7.5% per year.

48. The cross sections of BC roads are shown in **Subsection 5**. A brief description of these roads is presented below along with road number:

#### **1) Road No. 1: Construction/Improvement of road from Sabujbag Selim's house to R&H road via TNT & College Mosque (ward 05 & 06)**

49. The road starts from Sabujbag Selim,s house at road no. 05 and ends at Barguna-Patuakhali RHD road via food godown. Here it is mentionable that chainage 0+265 to 0+350 is included in road no.04 under package no CTEIP/AMT/RD/01 as road alignment passes from zilla parisad road to ferry ghat road. Existing road formation level is satisfactory in part- 1 from Ch 0+000 to Ch.0+265 and existing road formation level is low from Ch.0+350 to Ch.0+635 m in part -2. Existing pavement is severely damaged BC/WBM pavement from Ch.0+000 to Ch 0+265 in part -1 and from Ch.0+350 to Ch 0+635 in part-2 existing pavement is CC which is severely damaged. Existing masonry drain at food godown areas severely damaged. This drain needs to be reconstructed to protect the new BC pavement and expedite the easy surface runoff through the drain. Heavy loaded traffics are playing over the road due to food godown. Food godown side drain also to be designed with consideration the heavy loaded traffics. A big pond is situated at part-2 on both left and right side. Road shoulder

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protection work is essential to protect the pavement and shoulder. A damaged masonry guide wall at part -2 from Ch.0+575 to Ch 0+635 (L/S), it should be repaired with additional earth work beside the pond. Existing BC/CC pavement is severely damaged where width is (RoW) 4.00m ~5.00m. Few cross drains are to be required for easy drainage facilities adjacent the road areas. Heavy loaded traffics also will play in part-2 after construction of the road.

50. The proposed road is new construction of flexible pavement with developed road raising at part-2. Road side drain in part -1 on existing damaged masonry drain and protection work in part-2 with cross drainage structures have been considered due to adjacent the road side conditions. The pavement designed length in part-1 is 0.265 km and in part-2 is 0.285 km i.e. total length is 0.265 km + 0.285 km = 0.550 km. Pavement designed width is 3.00 m and designed formation level is 2.65 m (PWD). The proposed road is situated beside the ditch and low lying areas and road embankment has natural ground slope for drainage. Few length of drainage proposed on food godown areas for easy drainage. Earlier road side drain was designed with road no.04. So, major road side drainage work is not necessary. It has considered the thickness of pavement for raising from existing formation level to designed formation level according to the HFL/ HTWL under consideration of the climate change adaptation measure as per PPTA recommendations. This pavement thickness has been raised with additional earth work to cope up the designed formation level to mitigate the climate change considerations. Minor resettlement issue may be raised during construction period. Along road embankment side few trees should be fallen during construction time which is situated on pourashava land. Existing Pavement Right of way (RoW) width is the pourashava land and pourea people planted the trees adjacent the pavement edging side. There is no adverse environmental effect for this development of road. Tree Plantations have been proposed on both side of the pavement with considerations Climate Change Adaptation measures.

**2) Road No. 2: Construction/Improvement of Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (ward 08)**

51. The road starts from Wapda BC road near Ferry ghat sluice gate areas and ends at road no. 9 near Hawlader Bari Jame mosque. The existing pavement is CC pavement which is severely damaged where width is 1.90 m. From Ch.0+925 to 2+525 existing pavement is earthen where there is no proper shape of the earthen pavement. Huge volume of carted earth will be required to develop the designed pavement. Remaining portion of the road up to Ch.2+870 existing pavement is brick flat soling road and width is only 1.00 ~1.20m. Road embankment should be developed with carted earth before the designed pavement work. Existing road formation level is not satisfactory. The existing road formation level should be raised comply climate change adaptation measures. There are no cross drainage structures at road alignment but actual field needs RCC box culverts at various locations. Pipe drains will be required due for easy drainage network development at the road adjacent areas. At present, light traffic is playing over the road. After construction of the road, interconnecting linkage will be developed with road no.02, 09 and 08. Lot of traffics will play over the road after construction of road. A big canal/ low lying paddy field is situated at the road side. There is no existing road side drain. Road side drain is not necessary because of road side canal and low lying paddy field. Existing pavement is severely damaged CC pavement where width is 1.90 m from Ch.0+000 to 0+925. Earthen pavement at Ch.0+925 to 2+525 is not of proper shape of earthen embankment road. And for the remaining portion from Ch.2+525 to 2+870, existing pavement is of brick flat soling and width is 1.0m ~1.20m. Total right of way (RoW) is 4.50 ~7.00m. Protection work will be required along the ditch/canal areas. Few cross drains/box culverts are to be required for easy drainage facilities adjacent to the road areas.

52. The road proposed for reconstruction/construction work with flexible pavement which starts from Wapda BC road near Ferry ghat sluice areas and ends at road no.09 at Ch.2+870. Total pavement designed length is 2.870 km, pavement designed width is 2.50 m and designed formation level is 2.50 m (PWD) from Ch.0+000 to Ch.1+000 due to developed residential areas and remaining length formation level proposed is 2.65 m (PWD) due to fringe areas, open paddy field areas and will be connected to road no. 09 where designed formation level is 2.65m (PWD). The proposed road is situated beside the canal; road embankment has the natural ground slope for drainage. So, road side drainage work is not necessary. It has considered the thickness of pavement for raising from existing formation level to designed formation level according to the HFL/ HTWL under consideration of the climate change adaptation measure as per PPTA recommendations. This pavement thickness has been raised with additional earth work to cope up the designed formation level to mitigate the climate

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change considerations. Minor resettlement issue may be raised during construction period. Road embankment side few trees should be fallen during construction time which is situated on pourashava land. Existing Pavement Right of way (RoW) width is the pourashavas land and poura people planted the trees adjacent the pavement edging side. There is no adverse environmental effect for this development of road. Tree Plantations have been proposed on both side of the pavement with considerations Climate Change Adaptation measures.

**3) Road No. 5: Construction/Improvement of Zilla Parisad road to Muktizodda School via Mofij Talukder house (ward 06 & 05)**

53. This road is situated at Amtali Upazila Parisad office areas and Mofij Talukder school areas. The road starts from Zilla Parisad BC road near Upazila office and ends at BWDB embankment Ferry Ghat road via sabujbag selim's house at road no. 01. Existing Pavement is severely damaged CC pavement where width is 3.00 m~ 2.30 m ~2.50 m. Existing road formation level is satisfactory which close to designed formation level. There are three cross drainage structures at road alignment which need to be reconstructed. At present light traffic and low volume of traffic is playing over the road due to severely damaged road. Loaded truck will play over the road after construction. A big Ditch is situated at left side of road from Ch.0 +000 to Ch.0+350 and from Ch.0 +300 to Ch.0+400 at right side of the road. A Pre-cast CC block drain designed at left side of the road from Ch.0 +000 to Ch.0+350 under drainage package. Protection work will be needed at right side of the road from Ch.0 +300 to Ch.0+400 beside the ditch areas at right side of the road. The road passes through the main urban areas. Water logging problem will not arise beside the road because of a pre cast CC block drain designed in drainage package.

54. The proposed road is new construction of flexible pavement and partial portion of overly sub base, WBM on existing damaged WBM surface with widening work as new construction of flexible road. For the road starting point, RCC box culvert designed which is included in drainage package and remaining three cross drains/ box culverts has been designed for this road package. The total pavement designed length is 0.546 km. Pavement designed width is 3.70 m from Ch0+000 to Ch.0+325 and from Ch.0+325 to Ch.0+546, pavement designed width is 2.50 m. The proposed road is situated at urban core areas. Road embankment has the natural ground slope for drainage. Road left side drain designed in drainage package. Few length of surface drain with cover slab proposed in densely populated areas. Large size of road side drain is not necessary in road package. It has considered the thickness of pavement for raising from existing formation level to designed formation level according to the HFL/ HTWL under consideration under the climate change adaptation measure as per PPTA recommendations. This pavement thickness has been raised with sand, sub base, base course to cope up the designed formation level to mitigate the climate change considerations. No resettlement issue raise during the construction period. Road embankment side few trees should be fallen during construction time which is situated on pourashava land. Existing Pavement Right of way (RoW) width is the pourashavas land and poura people planted the trees adjacent the pavement edging side. There is no adverse environmental effect for this development of road. Tree Plantations have been proposed on both side of the pavement with considerations of Climate Change Adaptation measures.

**4) Road No. 6: Construction/Improvement of Mazar road to ATO Kashem Mia house via Lakerpar (ward 03)**

55. The road starts from Mazar road near Sobhan Hawlader shop and ends at BC road near ATO house. Mosque connecting road starts from main road at Ch.0+187 near mosque and ends at Kuakata Patuakhali RHD road. Existing pavement is CC which is severely damaged from Ch.0+000 to Ch.0+ 375 where width is 1.50 m and mosque connecting road is katcha whose width is 3.00~3.50 m. Total Right of Way (RoW) is 4.00m ~4.50m. Existing road formation level is not satisfactory. Road formation level needs to be raised as per climate change consideration. There is existing damaged pipe cross drain at Ch.0+200. This pipe drain should be reconstructed. Existing earthen shoulder is severely damaged. More earth filling will be required during construction period to protect the road shoulder. At present light traffic and low volume of traffic is playing over the road due to severely damaged road. More traffic will play over the road after the construction of road and connect from Mazar road to Kuakata Patuakhali RHD road. There are big ponds situated at both side of the road from Ch.0+005 to Ch.0+012, Ch.0+110 to Ch.0+125 at right side, and from Ch.0+000 and Ch.0+137 at left side. Protection work will be needed beside the pond areas. This road passes through the fringe urban areas but rapid urbanization is developing. Water logging problem will not arise beside the road

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due to huge low lying paddy land adjacent the road areas and a big lake is situated beside the left side of the road.

56. The proposed roads as new construction of flexible pavement with develop the road raising from existing formation level. Main road from Mazar BC road to ATO house BC road where length is 375 m and mosque connecting road to RHD road whose length is 186 m. The main road pavement designed length is 0.375 km of 2.50 m width, and mosque connecting road to RHD road is of 0.186 km length and 2.50 m width i.e. total length is 0.375 km + 0.186 km = 0.561 km. Pavement designed width is 2.50 m and designed formation level is 2.42 m (PWD). The proposed road is situated at urban fringe areas. Road embankment has the natural ground slope for drainage. So, road side drainage work is not necessary. It has considered the thickness of pavement for raising from existing formation level to designed formation level according to the HFL/ HTWL under consideration under the climate change adaptation measure as per PPTA recommendations. This pavement thickness has been raised with sand, sub base, base course to cope up the designed formation level to mitigate the climate change considerations. No resettlement issue raise during the construction period. Road embankment side few trees should be fallen during construction time which is situated on pourashava land. Existing Pavement Right of way (RoW) width is the pourashavas land and poura people planted the trees adjacent the pavement edging side. There is no adverse environmental effect for this development of road. Tree Plantations have been proposed on both side of the pavement with considerations Climate Change Adaptation measures.

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**Table-6: Road Length, Width and Present and Projected Traffic on Roads**

PPTA Road Si. No.	Road Description	Length of Road (m)	Pavement Width (m)	Type of Pavement	Motorized Traffic (Nos./day)	
					2014	2034
1	Road from Sabujbag Selim's house to R&H road via TNT & College Mosque (ward 05 & 06)	550	3.00	BC	23	130
2	Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (ward 08)	2870	2.50~5.00	BC	19	110
5	Zilla Parisad road to Muktizodda School via Mofij Taluker house (ward 06 & 05)	550	2.50~6.00	BC	23	130
6	Mazar road to ATO Kashem Mia house via Lakerpar (ward 03)	561	2.50~5.00	BC	19	106
<b>Total Length</b>		<b>4531</b>				

Source: PPTA, DDS Consultant Computation and Field Studies

**Table 7: Cross Drainage and Road Side Drains**

PPTA Road Si. No.	Road Description	Existing Drainage				Proposed Drainage			
		Cross Drainage		Road Side Drains (katcha/designed)		Cross Drainage		Road Side Drain	
		Cross Drains (No)	Location (Chainage)	Length (m)	Location (Chainage)	Cross Drains (No)	Location (Chainage)	Length (m)	Shape
1	Road from Sabujbag Selim's house to R&H road via TNT & College Mosque (ward 05 & 06)	-	-	-	-	3	Ch. 0+145, 0+380 & 0+460	93	Drain with Cover Slab
2	Wapda road to Kamal Sangbadik house via Mostafa Commissioner & Firoj house (ward 08)	-	-	-	-	5	Ch.0+563, Ch.0+640, Ch.0+705, Ch 0+805, & Ch.0+955,	-	-
5	Zilla Parisad road to Muktizodda School via Mofij Taluker house (ward 06 & 05)	-	-	-	-	5	Ch 0+052, Ch 0+115, Ch.0+202, Ch 0+428, & Ch.0+470,	124	Drain with Cover Slab
6	Mazar road to ATO Kashem Mia house via Lakerpar (ward 03)	-	-	-	-	1	Ch 0+200	-	-

Source: PPTA, DDS Consultant Computation and Field Studies

**Table 8: Proposed RCC Box Culverts**

PPTA Road Si. No.	Name of Road	No. Box Culvert	Proposed Designed Span Length (m)	Carriage width of Culvert (m)	Proposed type of Culvert
1	Road from Sabujbag Selim's house to R&H road via TNT & College Mosque (ward 05 & 06)	-	-	-	-
2	Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (ward 08)	07	1.0	7.00	Single vent RCC Box Culvert
		02	2.0	6.20	
		01	3.0	6.20	
5	Zilla Parisad road to Muktizodda School via Mofij Taluker house (ward 06 & 05)	-	-	-	-
6	Mazar road to ATO Kashem Mia house via Lakerpar (ward 03)	-	-	-	-
<b>Total</b>		<b>10</b>			

Source: PPTA, DDS Consultant Computation and Field Studies

### 3.5 ANALYSIS OF ALTERNATIVES

57. During the IEE stage of the proposed road and road side drain construction/improvement project, options were explored and these options were weighed from all considerations such as cost, environment, and ease of implementation and maximum utilization of available infrastructure. The aim of alternative analysis is to arrive at a development option, which maximizes the benefits while minimizing the adverse impacts. The two alternatives were considered “No Project Scenario” and “With Project Scenario”. More alternatives are presented along with environmental management plan.

#### 3.5.1 Without Project Alternative

58. The No Project option in respect to the proposed project implies that the status quo is maintained. This option may be suitable alternative from an environmental perspective as it ensures non-interference with the existing environmental conditions. This option will however, involve several losses on socioeconomic condition both to the local population and the nation as a whole. The local farmers/population will continue to face the constraints they are currently experiencing due to inefficient transport network and system and the anticipated economic development aimed at fulfilling the infrastructure gap remain unattainable. The No Project Option is the least preferred from the socio-economic and partly environmental perspective due to the following factors:

- The socio economic status of the Amtali residents would remain unchanged. Reduced interaction both at local and national levels;
- The local skills would remain under-utilized as no employment opportunities will be created for local population who would have otherwise worked at the project area;
- Reduced business development due to current bad condition of the road and road side drain project;
- The current erosion rate in the feeder road due to lack of drainage system will remain; and
- No project scenario case will also avoid social impacts due to the implementation of the project.

#### 3.5.2 With Project Alternative

59. The implementation of the project will contribute to socioeconomic improvement and will have positive impacts on residents’ life quality. The ‘with’ project alternative have following advantages:

- There will be improved and assured transport facilities to the residents of the Pourashava/District.
- Transport development will stimulate socioeconomic development of the area. The proposed roads and road side drain are a major deterrent for commercial growth in the area, the project scenario will catalyse commercial growth in different centres and there will be better business opportunities for locals.
- The road development will also be savings in the vehicle operation cost (fuel, operation and maintenance) due to better road condition.
- Less emission from road vehicles due to better roads and hence better environmental condition. This alternative will have negative impact on land use, forest/trees, noise and air pollution during construction and operation phases.

### 3.6 QUANTITY OF CONSTRUCTION MATERIAL

60. Bidding process shall not be launched for road and road side drain until ECC is obtained. The design report summarizes the quantities of construction material<sup>3</sup>. These have been further utilized in assessing the environmental impact due to development of roads and road side drains. Quantity of material is summarized in **Table 9**.

**Table 9: Quantity of Construction Material**

S. No.	Description	Unit	Quantity
<b>1</b>	<b>Earthworks</b>		
i)	Excavation in earth; Removal of heap, embankment from borrow pits and purge soils	m <sup>3</sup>	2,280
<b>2</b>	<b>Roadway</b>		
i)	Wearing Course and Capping Layer	m <sup>2</sup>	12,243
<b>3</b>	<b>Drainage</b>		

<sup>3</sup> Source: Detailed Engineering Design of 4 roads of 3.741km in Mathbaria Pourashava; District- Amtali, April 2014; LGED

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i)	Top	m <sup>3</sup>	69
ii)	Bottom	m <sup>3</sup>	107
iii)	Wall	m <sup>3</sup>	228

Source: DDS Computation Based on Designs

### 3.7 CONSTRUCTION SCHEDULE

61. The construction schedule of roads and road side drain depends on the methodology adopted for construction. In general the time period will also depend on the resources put in place by the contractor. Designs will be finalized by April 2015. The package for the construction of the Amtali Roads including road side drain is proposed to be implemented by post-qualified contractors under a single envelope single stage bidding process through National Competitive Bidding (NCB) procedures. The road and road side drain project will take 18 months for construction. A Typical Construction Schedule is shown in **Figure 3** including pre-construction and post construction activities. The post construction will also include defect liability period of 12 months.

### 3.8 COST OF ENVIRONMENTAL MITIGATION MEASURES & MONITORING

62. The project components are roads and 2 road side RCC drains including RCC pre-cast protection wall, pre-cast CC block, RCC Box culverts, Cross drains, RCC pipe cross drains, road crossing uPVC pipes, shoulders and footpath on side of road, side drains, and tree plantation. The contract is designated as **e-GP/CTEIP/2014-15/AMT/RD/02**. The environmental mitigation cost is estimated as TK 779,860 out of which environmental monitoring cost is TK 384,000 and environmental management cost is TK 395,860 (excluding those included in the cost of road, drain and culvert design). This **Appendix E: IEE** is to be read in conjunction with the attached **Appendix F: EMP**, which gives a detailed breakdown of the costs for the Environmental Management and Monitoring, which are also referred in the attached Bill of Quantities.



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**Figure 3: Typical Construction Schedule**

Activity	Duration in Months									
	Pre Construction			Construction						Post Construction
	0-2	3-4	5-6	7-9	10-12	13-15	16-18	19-21	22-24	25-36
Detail designs, Tender documents and BOQ	█									
Notice inviting Tender, Tender process evaluation & award	█	█								
Mobilization, Preliminary works (site office, site clearing, identification of material collection site)			█							
<b>1 Dis-mantling, Picking up existing Material, Earth work for Box cutting, and sand Filling (road, Culvert and Drainage Works)</b>				█	█	█				
Road from Sabujbag Selim's house to R&H road (ward 5 & 6)				█						
Wapda road to Kamal Sangbadik house (ward 8)				█	█					
Zilla Parisad road to Muktizodda School (ward 6 & 5)					█	█				
Mazar road to ATO Kashem Mia house (ward 3)					█	█				
<b>2 Constructing Sub Base for road ie BC/CC, Culvert and drainage works (bottom, vertical and top slabs)</b>				█	█	█				
Road from Sabujbag Selim's house to R&H road (ward 5 & 6)				█						
Wapda road to Kamal Sangbadik house (ward 8)				█	█					
Zilla Parisad road to Muktizodda School (ward 6 & 5)					█	█				
Mazar road to ATO Kashem Mia house (ward 3)					█	█				
<b>3 Base Course and footpath work with pre-cast CC block.</b>					█	█	█			
Road from Sabujbag Selim's house to R&H road (ward 5 & 6)					█					
Wapda road to Kamal Sangbadik house (ward 8)					█	█				
Zilla Parisad road to Muktizodda School (ward 6 & 5)						█	█			
Mazar road to ATO Kashem Mia house (ward 3)						█	█			
<b>4 Wearing Course (BC/CC)</b>						█	█	█		
Road from Sabujbag Selim's house to R&H road (ward 5 & 6)						█				
Wapda road to Kamal Sangbadik house (ward 8)						█	█			
Zilla Parisad road to Muktizodda School (ward 6 & 5)							█	█		
Mazar road to ATO Kashem Mia house (ward 3)							█	█		
<b>5 Tree Plantation, Turfing, Jute mat and Vertiver grass</b>							█	█	█	
Road from Sabujbag Selim's house to R&H road (ward 5 & 6)							█			
Wapda road to Kamal Sangbadik house (ward 8)							█	█		
Zilla Parisad road to Muktizodda School (ward 6 & 5)								█	█	
Mazar road to ATO Kashem Mia house (ward 3)								█	█	
<b>6 Testing, Commissioning, Monitoring and Evaluation and Defect liability Period</b>										█

Source: DDS Consultant Projection

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**4. ENVIRONMENTAL BASELINE DATA**

**4.1 GENERAL**

63. The objective of Initial Environmental Examination (IEE) is to ascertain the baseline environmental conditions and then assess the impacts as a result of the proposed road and road side drain subproject during various phases of the project cycle. The baseline environmental data was compiled for the area. The approach is to follow the sequence of steps adopted in EIA study. Identification of environmental parameters, data collection and impact predictions are the core of IEE process. A scoping matrix has been formulated to identify the attributes likely to be affected due to proposed project and presented as **Table 10**.

**Table 10: Environmental Baseline and Scoping Matrix for the Project**

Project Cycle Phase	Likely Impacts	Baseline Data
<b>A. LAND ENVIRONMENT</b>		
Planning and Design Phase	Change of Land Use	Present Land use
Construction Phase	Increase in Soil Erosion Pollution by Construction Spoils, Solid Waste and Muck Disposal Solid Waste and Sewage Disposal from Labour Camps	Soil Characteristics Rainfall Physiographic / Slopes Construction material / spoils Number of Employees during construction peak period
<b>B. WATER ENVIRONMENT</b>		
Planning and Design Phase	Erosion of soil/roads	Drainage Pattern Rainfall
Construction Phase	Water Pollution due to Disposal of Wastes from labour Colonies and Construction sites Water and Energy Demands Waste water treatment and disposal from labour camps.	Rainfall/Storms Water Courses/Drainage Water Quality Waste water treatment
Operation Phase	Water Pollution	Run off Drainage Problems
<b>C. AIR ENVIRONMENT</b>		
Construction Phase	Impacts due to emissions generated by Construction machinery Fugitive Emissions from Various Sources.	Ambient Air Quality
Operation Phase	Exhaust Emission due to Road Operation	Ambient Air Quality
<b>D. NOISE ENVIRONMENT</b>		
Construction Phase	Impacts due to construction machinery vehicle Noise	Ambient Noise Quality at different Locations
Operation Phase	Noise due to Road Operation	Ambient Noise Quality at different Locations
<b>E. ECOLOGICAL ENVIRONMENT</b>		
Planning and Design Phase	Loss of Forest/Trees	Forest area/ tree Numbers Wildlife Species and Conservation area
Construction Phase	Loss of Forest/Trees Migration of Fauna	Forest area/ tree Numbers Faunal Species
Operation Phase	Loss of Forest/Wild life/ Trees	Flora and Fauna
<b>F. PHYSICAL AND CULTURAL RESOURCES</b>		
Construction Phase	Relocation of Infrastructure Impact on Cultural Resources	Status of Infrastructure Status of Cultural Resources
Operation Phase	Impact on schools, hospitals etc.	Values of environmental attributes at sensitive locations
<b>G. Socio-Economic Environment</b>		
Construction Phase	Livelihood, job potential	Socio-economics
Operation Phase	Livelihood	Socio-economic status
<b>H. Loss of Infrastructure</b>		
Planning Phase	Removal of Water supply, Electric Pole facilities from Road side	Identification of Facilities on Road side likely to be effected
Construction Phase	Removal of Water supply, Electric Pole facilities from Road side	Identification of Facilities on Road side likely to be effected

## **4.2 AMTALI POURASHAVA AND ENVIRONMENT**

### **4.2.1 Topography, land forms, geology and soils**

64. The proposed subproject is for construction/improvement of **4 roads of 4.531 km** which is flexible pavement of **2.50 m~3.00 m~3.70 m width** and **2 road side RCC drains of 0.217 km with top slab** including **RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter** and **12 road crossing uPVC pipes** within the Amtali Pourashava area under Barguna district. It is also proposed to have shoulders and footpath on side of road, side drains to drain road runoff and surrounding areas, tree plantation for soil erosion control and side protection.

65. The Pourashava was established on 23 August 1998 and classified as a Class-C Pourashava. Later on it was upgraded to a Class-B. The Pourashava is divided into 9 wards. It is located in Barguna District of Barisal Division. Amtali Upazila ranks first among the five Upazilas, in respect of both population and area.

66. Geographic location is between latitude 21°51' and 22°18' north and between longitude 90°00' and 90°23' east. The Upazila is bounded on the north by Patuakhali Sadar Upazila, on the east by Galachipa and Kalapara Upazilas of Patuakhali District, on the south by the Bay of Bengal on the west by Barguna Sadar Upazila and Mirzaganj Upazila of Patuakhali District. Amtali Pourashava is bordered in the north and the east by Chaora Union, to the west by Payera River and to the south by Amtali Union. Amtali is only urban area of the Upazila and occupies an area of 8.75km<sup>2</sup> with a population of 17,311 (Source: BBS 2011).

67. The topography of pourashava is mostly flat with slightly higher land at its central part, minimum and maximum ground level varying between 1.5m and 4.2m and average elevation of about 2.43m. It is greatly influenced by the river network and canals. The sedimentary layers are mostly horizontal to sub-horizontal and are free from major tectonic deformation in the fore deep area covering the central part of the basin and this is expressed as river to delta plain topography of the land. A substantial part of the town (116 ha) is covered by water bodies like river, ponds, ditches and khals.

68. The southern areas of the country namely Barguna, Pirojpur, Bhola, the alluvial deposits are finely stratified to great depths as estuarine flood plain deposits. They are distinctively silty materials with only relatively shallow depth of soil formation. The tidal flood plain deposits, in a very limited term, occupy only the southern part. Clays are their main components with buried peat layers. Rigid pavement can be built on any soil condition even on sub grade strength of CBR 2% where as flexible pavement needs strong foundation soil.

### **4.2.2 Rainfall and Temperature**

69. Bangladesh is one of the worst affected countries to climate change. The main issues of climatic change are: increase in temperature, rainfall, and sea level rise. The annual average rainfall in Amtoli was 2,539.3 mm in year 1990; 2697.5 mm in 2000 and 2829.4 mm in 2010 against Bangladesh annual average rainfall of 2,286 mm. The decadal average increase in rainfall is about 5.56%. The seasonal distribution shows that most of the rainfall occurs in monsoon season amounting to 2,333.4 mm/year between May and September against Bangladesh monsoon rainfall of about 1,656 mm/year. This monsoon rainfall is 82.0% of annual rainfall. Rainfall exhibits increasing trend in all seasons<sup>4</sup>. Monsoon rainfall is increasing about 6.65% per decade. In view of past trends the rainfall is likely to increase about 16% from the 2010 level. The annual and monsoon projections for rainfall are 14.86 to 19 % and 22.3 to 24.7 % respectively for the year 2050 from the base year 2000.

70. Annual average temperature in Amtali is about 25 °C with monthly means varying between 18 °C in January and 29 °C in August. The country average minimum and maximum temperature shows that the minimum temperature has been increasing at the rate of 0.0094°C/year and maximum temperature 0.007°C/year. The minimum and maximum temperature at Amtali is also increasing by 0.07-0.15 and 0.07-0.38 °C/decade respectively. The increase in temperature in year 2010 is reported between 0.49~0.75°C in A2 scenario and between 0.51 ~ 0.92 °C in B1scenario with 2000 as the base year. This increase is anticipated between 2.10~ 3.41°C in A2 scenario and between 1.81 ~ 2.89 °C in B1 scenario in the year 2050. The average increase in temperature is anticipated between 1.98

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<sup>4</sup>TA 8128 BAN: Preparing Coastal Towns Infrastructure Project- Final report–Annex 4: Infrastructure, Water Resources; October 2013.

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~2.35°C in year 2050. Amtali is subject to devastating cyclones, originating over the Bay of Bengal, in the periods of April to May and September to November. Often accompanied by surging waves, these storms can cause great damage and loss of life.

### **4.2.3 Hydrology**

71. Hydrology of Amtali Pourashava area is due to the river Payra flowing along the north-south direction along the western end, lake Amtali, several canals and a number of ponds and ditches within the Pourashava area and influence its surface water hydrological state. Both the river and the canals are tidal in nature exhibiting semi-diurnal tidal fluctuations. Normal tide level in Amtali Pourashava area is 2.69 m PWD. The canals which run through the pourashava serve as drainage arteries. There are approximately 20 km of drains in the pourashava. The drainage system is not well planned because of being under-designed. And hence even with relatively little rainfall, the drains overflow. Minor flooding is observed during periods of heavy rain due to inadequate drainage. More severe flooding occurs when there is an extreme tide and water flows back up the drains.

### **4.2.4 Drainage and Flood Control**

72. Amtali Pourashava is protected from tidal flooding by a BWDB polder embankment on its west along the river Payra. The main drainage canal flows into the river Payra or Buriswar through a sluice gate at its outfall. The canal (called Amtali canal) flowing along the southern end of Ward 1 and draining to river Payra to the west through the sluice gate is blocked by sand-filling for Eidgah with resultant large area inundation and has been turned into Amtali Lake to the south. The southern section of the Amtali Lake drains to Suhandi canal that is regulated 15 km away at Suhandi. The residential areas suffer from extended periods of water logging due to lack of drains with most areas within the pourashava. Frequent localized flooding is reported. The khals inside the polder have been silted up or encroached at several locations.

### **4.2.5 Ambient Air Quality**

73. No major sources of air pollution are there in Amtali Pourashava area and, as such, air quality of the Pourashava areas is generally within acceptable limits. Currently there is no air quality monitoring stations within the Pourashava limit.

### **4.2.6 Ambient Noise**

74. The proposed sites of the subproject components are mostly in the built-up part of Amtali, with residential, commercial and institutional establishments. Volume of traffic passing through these sections is not significant and traffic jams are not frequent. However vehicular movement can be considered as major cause of noise pollution.

### **4.2.7 Groundwater Quality and Availability**

75. Hydro-geological investigation in Amtali Pourashava carried out under DPHE-DANIDA WSS Project shows availability of groundwater in sufficient quantity within the area. Aquifer is confined and fully protected by an impermeable layer.

### **4.2.8 Biological Environment**

76. Amtali Pourashava location is mainly devoid of vegetation other than nominal roadside trees, with some secondary growth trees and shrubs. There are no forests in and along the proposed route and sites of the proposed sub-project components. There are no national parks or sanctuaries or estuaries near the subproject sites. There are also no rare or endangered species reported. There is no evidence of wildlife of the higher species within the urban location. There are no sensitive habitats in the areas of the proposed sub-project component works.

### **4.2.9 Economic Development**

77. The Pourashava has insufficient capacity and resources and is finding it difficult to respond to the need for forward planning and investment in basic urban infrastructure and services. This undercuts sustainable local urban governance, makes local planning ineffective and undermines local economic development.

### **4.2.10 Socio-economic Characteristics**

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**a) Population**

78. As recorded in the 2011 census, Amtali pourashava had a population of 17,311 with 4,067 households giving an average household size of 4.3. Information on ward-wise population and number of households with population density and average household size of the Pourashava is presented in **Table 11**. Besides, Amtali is composed of Muslim 92.45%, Hindu 6.60%, Christian 0.05%, Buddhist 0.86% and others 0.04%.

**Table 11: Amtali Pourashava Population Data**

Administrative Unit	Area (km <sup>2</sup> )	Households (nos.)	Population			Average HH Size	Density (per km <sup>2</sup> )
			Total	Male	Female		
<b>Amtali Pourashava</b>	<b>8.75</b>	<b>4,067</b>	<b>17,311</b>	<b>8,701</b>	<b>8,610</b>	<b>8,610</b>	<b>4.3</b>
Ward No. 01	1.50	226	1011	532	479	479	4.5
Ward No. 02	0.96	412	1800	856	944	944	4.4
Ward No. 03	0.86	650	2,718	1,366	1,352	1,352	4.2
Ward No. 04	0.36	626	2,662	1,388	1,274	1,274	4.3
Ward No. 05	0.59	572	2,441	1,196	1,245	1,245	4.3
Ward No. 06	0.59	448	1,901	988	913	913	4.2
Ward No – 07	1.18	493	2,018	1,018	1,000	1,000	4.1
Ward No – 08	0.88	380	1,648	823	825	825	4.3
Ward No – 09	1.84	260	1,112	534	578	578	4.3

Source: PPTA, DDS Consultant Computation and Field Studies

**b) Land Use**

79. Land use profile of Amtali indicates dominance of agricultural lands (68%) followed by residential land (13%) and water bodies (13%). The pourashava land use pattern does not reveal much urbanized land use. According to Amtali Pourashava land use plan, the housing area comprises mixed residential, commercial, urban, semi-urban and rural homesteads, slums and squatters. Most of the housing areas have developed in spontaneous and unplanned which resulted to quality of housing underprivileged and substandard. About 89% of the households at Amtali Pourashava own their housing units.

**c) Socio-economic Status**

80. Average monthly income of 25% of the households is less than Tk. 6,000.00. The middle income group with monthly income between Tk. 10,000.00 and Tk. 30,000.00 accounts for 30% of Amtali households. People of this category are dependent on farming in their own lands and/or share-cropping and earn additional income from small businesses.

**d) Other Existing Amenities for Community Welfare**

81. Roads in Amtali Pourashava area have a total length of 81.75km (earthen: 30.80km; BT and CC: 35.95km and HBB: 15.00km). Educational institutions include 4 colleges, 2 collegiate schools, 27 high schools, 13 junior schools, 43 madrasahs, 101 government primary schools and 97 private primary schools. 66% of the population in Amtali has attended school for six years or more through utilizing facilities of these existing educational institutions. There is no private or public bus service available for internal movement of passengers at Amtali. At present, there is no designated authority for the management of traffic at the pourashava, the owners of the transport agencies decide about their routes and manage their traffic.

**e) Historical, Cultural and Archaeological Characteristics**

82. The road subproject components are not immediately located near historical, cultural and archaeological sites, no excavation works will be conducted in the vicinities of such sites. There are no other scheduled or unscheduled archaeological, paleontological, or architectural sites of heritage listed by local and/or national authority.

## 5. POTENTIAL ENVIRONMENTAL IMPACTS

### 5.1 ENVIRONMENTAL SCREENING CONSIDERATIONS

83. The baseline environmental data (Section 3) that the subproject component is located in Amtali urban area and hence no natural habitat is left at the site. There are no protected areas, forest within or near the location of the proposed road and road side drain sub-project components. The proposed road has main road and link roads. These are connecting different parts of the town. The proposed subproject has been planned to minimize any adverse environmental impacts, and adequate provisions have been incorporated into the project design to mitigate the impacts.

84. The Rapid Environment Assessment (REA) Checklist, as prescribed for use by ADB is attached as **Annexure I**. From this, it can be seen that the area where environmental impacts have been identified as temporary impacts, including noise and dust occurring during the time of the construction activities.

85. Preliminary design, field visits and results of the rapid environmental assessment indicate that road and road side drain subproject components' implementation will not be having major negative impacts as activities will be localized/site-specific and of short duration. Several aspects of the environment, that are not expected to be affected by the subproject, can be screened out of the assessment at this stage. **Table 12** reports the extent of impact.

86. Refer to the guidelines detailed in the **Traffic Management Plan (TMP)** given in **Annexure I of EMP**, whereby the Contractor shall prepare and submit for approval from the Employer, details of all required mitigate measures, associated with vehicular and pedestrian road-user issues, during any possible closure and/or infringement to road access through the course of implementation.

**Table 12: Fields in which the subproject is not expected to have significant impacts**

Field	Rationale
<b>A. Physical Characteristics</b>	
Topography, landforms, geology and soils	Required amount of materials will not cause alteration of topography, landforms, geology and soils. Erosion hazard is insignificant as trenching and excavation works will be conducted only during construction stage (short-term) and specific to sites along public ROWs.
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	Trenching and 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. 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 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, along 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 proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
<b>B. Biological Characteristics</b>	
Biodiversity	Activities being located in the built-up area of Amtali pourashava will not cause direct impact on biodiversity values. The construction activities do not anticipate any cutting of trees.

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Field	Rationale
<b>C. Socioeconomic Characteristics</b>	
Land use	No alteration on land use. Rehabilitation of existing road sub-project components is prioritized over new construction, using vacant government and pourashava land and right of way (ROW).
Type of community spread	No alteration on type of community spread.
Existing provisions for pedestrians and other forms of transport	Road closure is not anticipated. Hauling of construction materials and operation of equipment on-site can cause traffic problems. However, the proposed subproject will follow existing ROW alignment and impact is short-term, site-specific and within a relatively small area. There are well developed methods for mitigation.
Socio-economic status	Subproject components will be located in government and pourashava land and existing ROWs thus there is no requirement for land acquisition or any resettlements. Manpower will be required during the 18-months 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 Amtali 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.
<b>D. Historical, Cultural, and Archaeological Characteristics</b>	
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.

**5.2 POSITIVES IMPACTS**

87. Based on project particulars **Chapter 3** and the existing environmental conditions **Chapter 4** potential positive impacts have been identified that are likely to result from the proposed sub-project project and wherever possible these have been quantified.

**5.2.1 Impact during Planning and Design Phase**

**a) Employment opportunities**

88. During the planning and design period, new jobs will be created for the skilled and unskilled manpower in the community to conduct topographical and geological investigations. In addition women will have equally an opportunity to secure employment.

**b) Skills transfer**

89. The international consultant will associate with local partners during planning, construction and supervision. In the process of planning and design the local technical manpower will work with the international experts. This process of working together will transfer design and planning tools, computer design software and other useful guideline which are used in similar topographical conditions in the world.

**c) Training**

90. The international consultant will provide training to local counter parts for activities likely to be implemented during planning and construction phases. This training and trained manpower will go a long way in meeting the requirements of the country in the infrastructure sector and roads and road side drains in particular.

**5.2.2 Impacts during Construction Phase**

**a) Employment Opportunities**

91. During the construction phase it is estimated that about 160-170 people will be working as labour both skilled and unskilled. A majority of unskilled labour will be sourced from the local residents and hence this will create and employment. Indirect employment will be in the form of suppliers and



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other forms of sub-contracted works that will be required for construction of project components. Women will also have an opportunity to secure employment as per required skill.

**b) Enhancement of Rural Economy**

92. The rural people will get an opportunity to work for the project. This will increase their income. Those are involved in trade will have opportunity to supply the items required for the work force working at site.

**c) Social Interaction**

93. The National and International; local and regional manpower will be working together for the project. This interaction will enhance social interaction between the people of two different places and levels.

**d) Boost to Industrial Activities**

94. During construction, country made product will be utilized such as cement, gravel, reinforcement, steel, pipes etc. The consumption of these will give boost to industrial production of material manufacturing organization. During construction, supply of construction materials, direct sale of household goods, consumables and foodstuffs to the workers will improve trade at local and regional levels. This will provide direct and indirect employment.

**5.2.3 Impacts during Project Operation**

**a) Improved Transport System, Accessibility and Communication**

95. As a consequence to the poor road condition, investors in the transport industry have no incentive, hence the public transport system is underdeveloped, unreliable and not in use. Residents, therefore, have to seek other means of transport from unauthorized vehicles such as rickshaw (tri-cycle), motor cycle, pick-ups and trucks. With the improvement of the road, transport will be improved both in terms of travel time, comfort, safety and lower costs associated with an increase in public service vehicles.

**b) Employment Opportunities**

96. In the post construction phase the project will provide social benefits in terms of direct employment by way of better commercial and industrial development of the area. Additionally more people may be indirectly employed in allied activities and trade. In the operation phase of the project more job opportunities will arise in various sectors such as the transport industry, the tourism sector, commerce and trade of agriculture products.

**c) Enhancement of Rural Economy (Agriculture and Trade)**

97. The road will provide growth to the town as well as improving trade with the other nearby locality through faster transportation of man and material. The following are likely to be achieved.

- Quick, easy and cheaper transport of perishable farm products (e.g., vegetables and fruits) and livestock to markets;
- Cheaper and available farm inputs and ease in provision of services to farmers;
- Easy access to bigger and better town markets;
- Improved marketing of agricultural products, thus higher prices.

All the above impacts on this dominant sector will have indirect positive impacts on other sectors, especially trade and commerce, transportation, health and nutrition and education.

**d) Reduction in Length and Travel Time between Two Destinations**

98. The proposed roads intersect with number of important places. On commissioning, the roads, will improve connectivity between two places, provides faster access to school, college and hospital resulting in reduction in length and travel time and facilitate the development of new economic corridor.

**e) Potential to Improve Drainage and its Environmental Benefits**

99. The current drainage structures are mainly inadequate and/or in disrepair. Often the structures cannot accommodate high flows associated with flash floods in the wet seasons. In



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addition, soil depositions, debris and solid waste have also clogged several drainage structures where routine maintenance activity is inactive.

### **f) Skills Transfer and Training**

100. Through labour recruitment locally the workers will have an opportunity to learn an array of skills that relate to road rehabilitation and reconstruction. Improved transport will improve interaction with other communities that will also provide an opportunity for further learning and cultural exchange.

### **g) Enhanced Social Interaction**

101. The infrastructures for social services developed in the area are schools, health centres, mosque, and college. The expected construction/improvement of the road will augment existing social amenities and stimulate growth in other sectors, ultimately adding to development. With the construction of roads, the main artery for social interaction amongst towns and settlements along the route shall be strengthened. The general quality of life along the route will be enhanced.

### **h) Road Safety**

102. The operation of roads will make travelling easy. Improved road will improve road Safety and reduction in road accidents.

### **i) Reduction in Greenhouse Gases**

103. During operation of road the vehicles will operate closer to design speed which will help reduction of emission of hydrocarbons and carbon-monoxide from exhaust. Hence the emission reduction of carbon monoxide will decrease the green house gases at local and regional levels which will have positive impact locally and regionally.

### **j) Reduction in Fuel Consumption**

104. The vehicles will be provided with better fuel performance at optimum air to fuel ratio which is optimum around design speed. The roads are designed for 40 km per hour or more which is closer to design speed. This will facilitate in less fuel consumption which will have less burden on exchequer and will be direct impact on country economy.

## **5.3 NEGATIVE IMPACTS**

105. Leopold matrix has been used to show possible interaction between developmental activities and a set of environmental characteristics. On top on X-axis, project cycle activities are considered while on Y-axis, Valued Ecosystem Components (VEC) are taken to identify the impacts, through interaction method. The boxes are marked with possible impact during different phases of project cycles. Impacts on environmental component due to project activities are summarized in **Table 13**. Mostly the impacts during project construction have been considered and reported.

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**Table 13: Impact Matrix for Potential Environmental Impacts**

Component Affected	Project Activity								
	Pre-construction Phase	Construction Phase							Operation Phase
	Land Demarcation	Site clearance	Removing trees and vegetation	Contractor camps	Vehicles & Machines operation & maintenance	Quarries	Construction/modification of Roads	Construction Machinery	Operation
Soil	Loss of land	Loss of Soils	Erosion and loss of top soil	Contamination from wastes	Contamination by fuel and lubricants Compaction of soil	Increase in erosion, siltation and slope instability	Soil pollution from Construction Spoils	Pollution due to spills	Soil contamination due to surface runoff
Ground Water			Evaporation	Water extraction for drinking and other purposes	Water extraction for cleaning		Exploitation of water for construction		Maintenance of trees /shrubs
Surface water	Loss of water body	Change in water quality	Siltation Torrent runoff	Pollution from sanitary & other wastes	Contamination by fuel & lubricants	Water logging and mosquito breeding	Change in water quality and reduction of GW recharge	Pollution due to spill into water bodies	Degradation due to spills & road runoff
Drainage		Change in natural drainage pattern	Change in natural drainage pattern	Change in drainage pattern due to disposal of wastes on soils	Change in natural drainage pattern due to spills	Change in drainage pattern	Interference with natural drainage and water logging		Cleaning & maintenance
Air Quality		Increase in SPM	Reduced buffering of air pollution, change in climate	Pollution due to fuel burning	Dust & air pollution	Dust pollution	Dust pollution and odour problems	SPM, SO <sub>2</sub>	Increase in SPM, SO <sub>2</sub> and NO <sub>x</sub>
Noise Quality		Increase in Noise level	Reduced buffering of Noise		Increase in Noise level	Vibration from blasting operations	Vibrators, mixing plant noise etc.	Increase in Noise	Increase in noise levels due to increased traffic.
Flora & Fauna		Loss of trees Impact on Fishery	Loss of trees	Cutting of trees for fuel burning			Disturbance to Flora and fauna		
Socio-economic	No Land Acquisition		Loss of trees	Transmission of Disease					
Loss to Utilities		19 Electric Poles							

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**5.3.1. Impact during Planning and Design Phase**

106. **Land Acquisition and Resettlement.** The proposed roads and road side drains including its subcomponents are mostly located in existing or public ROWs. Minor resettlement issue may be raised during construction period. Road embankment side trees should be fallen during construction time which is situated on pourashava land as government rules. Existing Pavement Right of way (RoW) width is the pourashava/government land and poura people planted the trees adjacent the pavement edging side. Little compensation may be required to the poura people before the pavement construction work. Unauthorized boundary wall also to be dismantled during construction period. Proposed road side canal developed few meandering due to tidal water flow. These meandering areas existing road embankment need to be shifted due to erosion and little land to be required for increase the road width. People agreed will voluntarily give their land to the pourashava authority (if required for widening road) and take out trees including other things for their better communication with their own responsibility and at free of cost during Focused Group Discussion (FGD) meeting on the resettlement issue. Whatever felling of trees required will be necessary will be compensated through tree plantation for every tree felled, in addition to the required tree plantation in the design. The process will be implemented by the contractor, who will also maintain the saplings for the duration of his contract.

107. Planning principles and design considerations have been reviewed and incorporated into the site planning process whenever possible. The subproject will be in properties held by the Pourashava and access to the subproject sites is through public ROW and existing roads; hence, land acquisition and encroachment on private property will not occur.

108. **Addressing Climate Change Impacts and Mainstreaming Climate Resilience:** Detail design of the subproject roads and road side drains provide for possible measures, both structural and non-structural, to integrate climate resilient design standard into the road and road side drain subproject. Such actions are to include: (a) raising of road levels to optimum heights; (b) bitumen carpeting increased to required thickness; (c) proper compaction of soil beneath carpeted layers; (d) preference to cement concrete (CC) pavement with appropriate temperature reinforcement and guide wall to protect erosion and sliding where there are threats of inundation; (e) provision of cross-drains and uPVC pipes as required; and (e) turf and tree plantation along the road shoulders and roadside slopes. Details of the project effects and related mitigations are given in the Environmental Management Plan, refer to **Appendix F**.

109. **Change of Land Use due to Proposed Road/Borrow/Quarry Areas:** About 22,603 m<sup>3</sup> of earth work is likely to be involved in up-gradation/construction of roads which will completely be imported from outside of Amtali Pourashava area. So, there will be no impact on land environment from land excavation. However, it will be appropriate to collect the material from authorized miners. Besides, proper will be taken to mitigate impact that may be caused due to transportation of soil.

**5.3.2 Impact during Construction Phase**

110. 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.

111. **Construction method:** Trenches will be dug by backhoe digger, supplemented by manual digging where necessary. Required volume of soil 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.

112. 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.

113. Although construction of these project components involves quite simple techniques of civil work, the invasive nature of excavation and the project sites in built-up areas of Amtali where there

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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, Amtali roads and road side drain subproject is unlikely to cause significant adverse impacts. The potential adverse impacts that are associated with construction activities can be mitigated to acceptable levels, as detailed in the **Environmental Management Plan** as given in **Appendix F**.

### **i) Soil Loss**

114. There will be no loss of soil of construction sites from excavation as the whole amount of required 22,603 m<sup>3</sup> volume of soil will be brought from outside of Pourashava area. The construction will be completed in 18 months. The soil erosion is likely to take place due to construction of roads and road side drains. Road surface area will be stripped for cleaning of road surface for the project work. Excavated earth material will be reused in the road construction or will be used to fill the low laying areas hence its disposal is not likely to have impact on the environment. To prevent the soil erosion, monsoon season work is likely to be stopped. During the construction, vegetation will need to be cleared within the proposed RoW which may pose some soil erosion problem during first few rains. Embankment/slopes near newly constructed culverts and structures may be prone to the soil erosion. Such embankment and slopes will need to be stabilized as soon as construction is over. The impact of soil loss is of short duration and will be reversible.

### **ii) Soil Pollution**

115. The soil pollution will be due to first stripping of soil which is rich in carbon to nitrogen ratio being 13.8 to 18.2; secondly due to improper disposal of waste material on the open ground. The waste likely to fall on the ground may be solid waste / liquid waste from labour camps. Soil pollution may also be due to spillage of oil and grease by construction machinery and equipment. Appropriate waste disposal methods have to be adopted. Proper care should be taken while locating the above utilities / facilities so as to minimize the soil pollution. The impacts are of short duration and will be reversible.

### **iii) Disruption in Drainage Pattern**

116. The road and road side drain will traverse 4.531 km and 0.217 km respectively. The roads that intersect drainage basins generally modify the natural flow of surface water by concentrating the flow to certain points and increasing the velocity of flow. Depending upon the flow, these changes can contribute to flooding, soil erosion, channel modification, siltation of streams etc. These effects are often felt well beyond the immediate vicinity of the road. Being the existing road getting modified by upgrading which is on the existing alignment; hence no change in drainage pattern is anticipated due to the project. However, proper cross drainage works on the alignments will be required. There are numbers of cross drainage works which will also need improvement.

### **iv) Water Pollution**

117. Surface water bodies such as canal and ponds are located along the road. Construction of road including subcomponents may also create water pollution during construction phase. The short-term increase in runoff laden with sediment and nutrients may also occur due to the construction activities. The suspended sediments and the associated pollutants may get washed into these water sources leading to change in water quality. In addition, construction of culverts may increase turbidity. Contamination of water bodies may be resulted in due to spilling of construction materials, oils and greases and paint during transportation and at the equipment yards. But the quantity of such spills will be negligible. Care, however, needs to be taken to provide adequate sanitary facilities and drainage in the temporary colonies of the construction workers. Provision of adequate washing and toilet facilities with septic tanks and appropriate refuse collection and disposal system should be made obligatory. Water pollution impacts on surface water quality during construction will be low, spatially restricted and very short term. Such impacts during the construction phase will be moderate particularly in areas of culvert construction but short term and reversible.

### **v) Increased Water Demand**

118. The water requirement will be increased during construction phase. About 160-170 people are estimated during peak period. The peak demand is estimated about 134 KL/day. In addition, water

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will be required for construction purpose all along the road components. All these activities shall have to be located within the vicinity of the project site during construction phase, hence proper care have to be taken while deciding the location of these activities. Identification of suitable locations shall have to be carried out based on water availability in order to safeguard the nearby environment. Water sources and quality, including surface water, is likely to be impacted due to road component construction activities such as setting up of workers camp, transportation and storage of construction material.

### **vi) Health Risks due to Waste Disposal**

119. Health risks include disease hazards due to lack of sanitation facilities (water supply and human waste disposal) to the workers during construction both at construction site and at Contractor's camp. Unscientific disposal of waste from contractor's camp can lead to contamination of both ground and surface water. This could lead to outbreak of water borne disease such as diarrhoea, dysentery, typhoid etc. The solid waste generated in contractor's camp if not treated properly may cause leaching and environmental pollution. Management measures include proper sanitation, health care, and solid waste disposal facilities. In addition to these, efforts need to be made to avoid water spills, adopt disease control measures. The impact will be of short duration and reversible.

### **vii) Pollution at Construction Site**

120. Construction materials will be required for the construction of road pavement, protection walls and culverts, road side drains, cross drains etc. About 10-15% of the construction material is left behind by the contractor as construction waste/spoils. The material required for construction is estimated 14,972 m<sup>3</sup>. Hence, construction spoils will be about 1,497 m<sup>3</sup>. Dumping of construction waste/spoil in haphazard manner may cause surface and ground water pollution near the construction sites and breeding site for mosquitoes, hence, it is proposed to clean the area and dump/dispose the construction spoils at the dumping site specified by the local authority to avoid any adverse impact on health and well-being of people.

### **viii) Air Pollution**

121. The impact on air environmental is a factor of type of vehicle, fuel used and its capacity. The consultant has taken emission factor to estimate the pollution potential on air environment during construction. The material will be transported by canal route and hence the impact on air environment will be insignificant. In the construction phase, air quality impacts are of short duration. The most important pollutant during this phase will be suspended particulate matter. Such deterioration of air quality can be assigned to:

- Fugitive dust emission from construction activities like excavation, back-filling and concreting;
- Hauling and dumping of earth & construction spoils;
- Vehicular movement along the feeder roads or temporary diversions.
- Gaseous emission from construction equipment and vehicular traffic.

Impacts on air quality will be low and spatially restricted along the immediate site of construction. The above will be operated at different location the impact at a particular site will be insignificant.

### **x) Noise Levels**

122. The magnitude of impact during the construction phase will depend upon the types of the equipment used, the construction methods employed and the scheduling of the work. Noise associated with the roads and road side drains development affects the environment through which they pass and has four main sources: a) vehicles; b) friction between vehicles and the road surface; c) driver behavior; and d) construction and maintenance activity. Vehicle noise comes from the engine, transmission, exhaust, and suspension, and is greatest during acceleration, on upgrades, during engine braking, on rough roads, and in stop-and-go traffic conditions. Poor vehicle maintenance is a contributing factor to this noise source. Frictional noise from the contact between tires and pavement contributes significantly to overall traffic noise. The level depends on the type and condition of tires and pavement. Frictional noise is generally greatest at high speed and during quick braking. Drivers contribute to road noise by using their vehicles' horns, by playing loud music, and sudden braking or acceleration. Road component construction and maintenance generally require the use of heavy machinery, and although these activities may be intermittent and localized, they nevertheless contribute sustained noise during equipment operation. Construction activities are expected to

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produce noise levels in the range of 80-85 dB (A) at 15 m distance which will decrease with increase in distance. Noise due construction machinery is predicted as presented in **Table 14**. The noise levels will be with a limit of 55-65 dB (A) at a distance of 100-125 m from construction site. The expected noise levels due to operation of construction machinery at site are summarized in **Table 15**. The noise levels will decrease with distance.

**Table 14: Noise Levels during Construction, dB(A)**

Source	Dump Truck	Compactor	Dozer	Excavation by Shovel	Excavation by caterpillar
Noise Level dB(A)	83	81	85	87	87
Source Distance (m)	15	15	15	15	15
Noise Levels at Distance (m) from source					
20	78.5	76.5	80.5	82.5	82.5
25	76.1	74.1	78.1	80.1	80.1
30	74.0	72.0	76.0	78.0	78.0
35	72.1	70.1	74.1	76.1	76.1
40	70.5	68.5	72.5	74.5	74.5
45	69.0	67.0	71.0	73.0	73.0
50	67.5	65.5	69.5	71.5	71.5
55	66.2	64.2	68.2	70.2	70.2
60	65.0	63.0	67.0	69.0	69.0
75	61.5	59.5	63.5	65.5	65.5
100	56.5	54.5	58.5	60.5	60.5
125	54.6	52.6	56.6	58.6	58.6
150	53.0	51.0	55.0	57.0	57.0
175	51.7	49.7	53.7	55.7	55.7
200	50.5	48.5	52.5	54.5	54.5
225	49.5	47.5	51.5	53.5	53.5
250	48.6	46.6	50.6	52.6	52.6

Source: DDS Consultant Computed at Distances

**Table 15: Noise Due to Construction Machinery**

S. No.	Machine	Operation	Noise In dB(A)
1.	Dump Truck	Haul	83
2.	Compactor	Fill	81
3.	Dozer	Fill	85
4.	Excavation by Shovel	Cut	87
5.	Excavation by Caterpillar	Cut	87

Source: Consultant's Survey at other sites

**xi) Loss of Biomass**

123. During environmental survey, environmental team has estimated that some trees likely to fall within ROW during construction of the project. The loss of biomass is only from non-forest land.

**5.3.3 Impact during Operation and Maintenance Phase**

124. In the operations and maintenance (O&M) phase, the roads including subproject components will operate with routine maintenance, which should not affect the environment. Routine repairs and

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unblocking of side drains will be very small in scale, to be conducted manually by small teams of men with simple equipment (shovels, wheelbarrows, etc.) and works will be very short in duration thus will not cause significant physical impacts. Traffic may be interrupted temporarily but this work will be very small in scale, infrequent, and short in duration, so there will be no economic or other implications. The infrastructures 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. O&M will be the responsibility of Amtali local authority, which will be given training by this project.

125. To maintain the safety of workers and road-users, such work should be coordinated with the local police department so that adequate warning signs and traffic diversions can be set up when necessary. Debris/sediments from drainages need to be collected and disposed at a designated site such as the landfill. It is important that the designated disposal site's base is of a non-permeable membrane in order to prevent leachate that can contaminate the soil and groundwater. The potential adverse impacts that are associated with O&M activities can be mitigated to acceptable levels with the detailed mitigation measures detailed in the **Environmental Management Plan** given in **Appendix F**.

**i) Air Pollution**

126. The extent of air pollution will depend upon i) the rate of vehicular emission and ii) the prevailing meteorological conditions. The traffic data for the year 2014 and 2034 is available in **Chapter 3**. The emission factors for vehicles have been used to estimate the ground level concentration near the roads. The Caline4 has been used to predict the carbon monoxide and nitrogen oxides. The results so obtained has indicated that increase in pollutants concentration will not be significant due to less growth of vehicles up to year 2034. Air quality is likely to improve in the initial years after commissioning because of saving of fuel in the vehicular traffic riding on smooth and improved roads with much less interruption.

**ii) Noise Levels**

127. During the operation phase of the subproject components, movement of heavy and light vehicles is expected to give rise to higher ambient noise levels. In order to quantify the project induced noise impacts with respect to existing noise levels, noise monitoring was carried out. The day time noise levels may be 35 to 45 dB (A). Assessment of noise impacts due to the project have been carried out using Highway Noise Model based on the guidelines suggested by Federal Highway Administration (FHWA). The maximum speed assumed for the present scenario is 40 km/hr. **Table 16** shows noise emitted by different vehicle types. The computed results have indicated a maximum increase in noise level to the tune of 5 dB (A) being average around 43 dB (A) during peak hours.

**Table 16: Noise Emitted by Different Vehicle Types in dB (A)**

Speed (Kmph)	Vehicle Type			
	Cars	Trucks	Buses	2-Wheelers
40	65.0	81.0	81.0	68.0

**i) Water and Soil Pollution**

128. The spill of oil, grease and other chemical/ material on road may pollute the soil and surface and ground water. Such spills shall be closely monitored.

**5.4 IMPACTS ANALYSIS**

129. Checklist is the list of environmental parameters or impact indicators, which the environmentalist is encouraged to consider when summarizing the potential impacts. A typical checklist identifying the anticipated environmental impacts due to the project activities are shown in **Table 17**. The impacts have been categorized and analyzed in the following manner:

- i) Nature (positive/negative, direct/indirect);
- ii) Magnitude (high, moderate, low);
- iii) Extent/location (area/volume covered, distribution);
- iv) Timing (during construction or operation, immediate; or delayed);
- v) Duration (short term/long term, intermittent/continuous);

- vi) Reversibility/irreversibility;
- vii) Likelihood (probability, uncertainty); and
- viii) Significance (local, regional, global).

## **5.5 CUMULATIVE IMPACT**

130. 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 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, interventions, even if not directly related to the proposed subproject; and
- (iv) future developments that are reasonably foreseeable and sufficiently certain to proceed.



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**Table 17: Impacts Analysis**

S. No.	Activity	Potential Impact	Nature	Magnitude	Extent/ Location	Timing/ Phase	Duration	Reversible /Irreversible	Likelihood	Significance
i)	Planning and Design of Roads	Skill Transfer & Training	Positive Direct	Low	Medium	Pre-Construction	Long Term		Probable	Regional
ii)	Disposal of waste material, construction spoils, spill of oil and grease from construction machinery.	Soil Pollution	Negative Direct	Low	Small area	Construction	Short Term	Reversible	Probable	Local
iii)	Exposed surface due to widening of ROW, borrow pits, quarries site construction of cross drainage	Soil Loss/ Erosion on ROW	Negative Direct	Low	Small area	Construction/ Operation	Short Term	Reversible	Probable	Local
		Soil Loss from Borrow/Quarry Areas	Negative Direct	Low	Small area	Construction	Short Term	Reversible	Probable	Local
iv)	Vehicles Movement on adjoining productive land	Loss of soil fertility	Negative Direct	Low	Small area	Construction	Short Term	Reversible	Probable	Local
v)	Construction of road, borrow areas and quarry sites	Change in Natural Drainage Pattern	Negative Direct	Low	Small area	Construction	Short Term	Reversible	Probable	Local
vi)	Runoff from roads, quarry site and borrow areas; construction of abutments on canals	Water Pollution	Negative Direct	Low	Small Distribution	Construction	Short Term	Reversible	Probable	Local
vii)	Disposal of waste	Health Risk	Negative Direct	Low	Low	Construction	Short Term	Reversible	Probable	Local
viii)	<b>1.3.2 Use of water in Construction and drinking</b>	<b>1.3.3 Increased Water Demands</b>	Negative Direct	Low	low	Construction	Short Term	Reversible	Probable	Local
ix)	Widening of Road, construction of culverts	Encroachment into water bodies	Negative Direct	Low	low	Construction	Short Term	Irreversible	Probable	Local
x)	Widening of Road,	Loss of Physical Cultural Resources	No Impact							
xi)	Widening of Road,	Re location of electrical poles	Negative Direct	Low	Less	Construction	Short Term	Reversible	Probable	Local
xii)	Movement of vehicles for construction works and then use of road	Air Quality	Negative Direct	Low	low	Construction/ Operation	Long Term	Reversible	Probable	Regional
		Increase in Green House Gases	Negative Direct	Low	low	Construction/ Operation	Long Term	Reversible	Probable	Regional
		Fuel Consumption	Negative Direct/ Indirect	Low	low	Construction/ Operation	Long Term	Irreversible	Probable	Regional
		Noise Levels	Negative Direct	Low	low	Construction/ Operation	Long Term	Reversible	Probable	Regional
xiii)	<b>1.3.4 Construction and operation of road</b>	<b>1.3.5 Employment Opportunities</b>	Positive Direct	Medium	Large Distribution	Construction/ Operation	Long Term		Probable	Regional
		Enhancement of Rural Economy	Positive Direct	Medium	Large Distribution	Construction/ Operation	Long Term	Permanent	Probable	Regional
xiv)	Operation of road	Reduction in length and travel time	Positive Direct	Medium	Permanent	Construction/ Operation	Long Term		Probable	Regional
		Enhanced Social Interaction	Positive Direct	Medium	Permanent	Construction/ Operation	Long Term		Probable	Regional
xv)	Construction of roads, culverts and Operation of road	Skill Transfer and Training	Positive Direct	Medium	Permanent	Construction/ Operation	Long Term		Probable	Regional
xvi)	Construction Activities	Workers Safety	Negative	Low	Temporary	Construction	Short Term	Reversible	Probable	Local
xvii)	Employment of outside labour	Health Safety (Transmission of STD, HIV/AIDS)	Negative	Low	Temporary/ Permanent	Construction	Short Term	Reversible	Probable	Local

## **6 GRIEVANCE REDRESS MECHANISM**

131. Generally complaint procedures are developed for those who have been adversely affected by the Project infrastructure and/or have not been compensated as per law/ legal entitlement. In this case no land related dispute is applicable as the land is already owned by the authorities. A project-specific grievance redress mechanism (GRM) will be established to receive, evaluate, and facilitate the 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. A common GRM will be in place for social, environmental, or any other grievances related to the project. GRM was discussed with stakeholders during field visits. The GRM will provide an accessible and trusted platform for receiving and facilitating 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.

132. Pourashava-wide public awareness campaigns will ensure that **awareness on grievance** redress procedures is generated through the campaign. The project implementation unit (PIU) safeguards assistant and institutional capacity and community development consultants (ICCDC) that 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 PIU safeguards assistant to help ensure that their grievances are addressed. 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.

133. The grievance registration form is available in **Annexure II**. 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) safeguards 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 safeguards assistant.

134. **Grievance Redress Process.** In case of grievances that are immediate and urgent in the perception of the complainant, the contractor and supervision personnel from the project management and supervision consultants (PMSC) on-site 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 safeguards assistant, contractors, PMU safeguards officer, PMSC environmental and social safeguards specialists will be posted at all construction sites at visible locations.

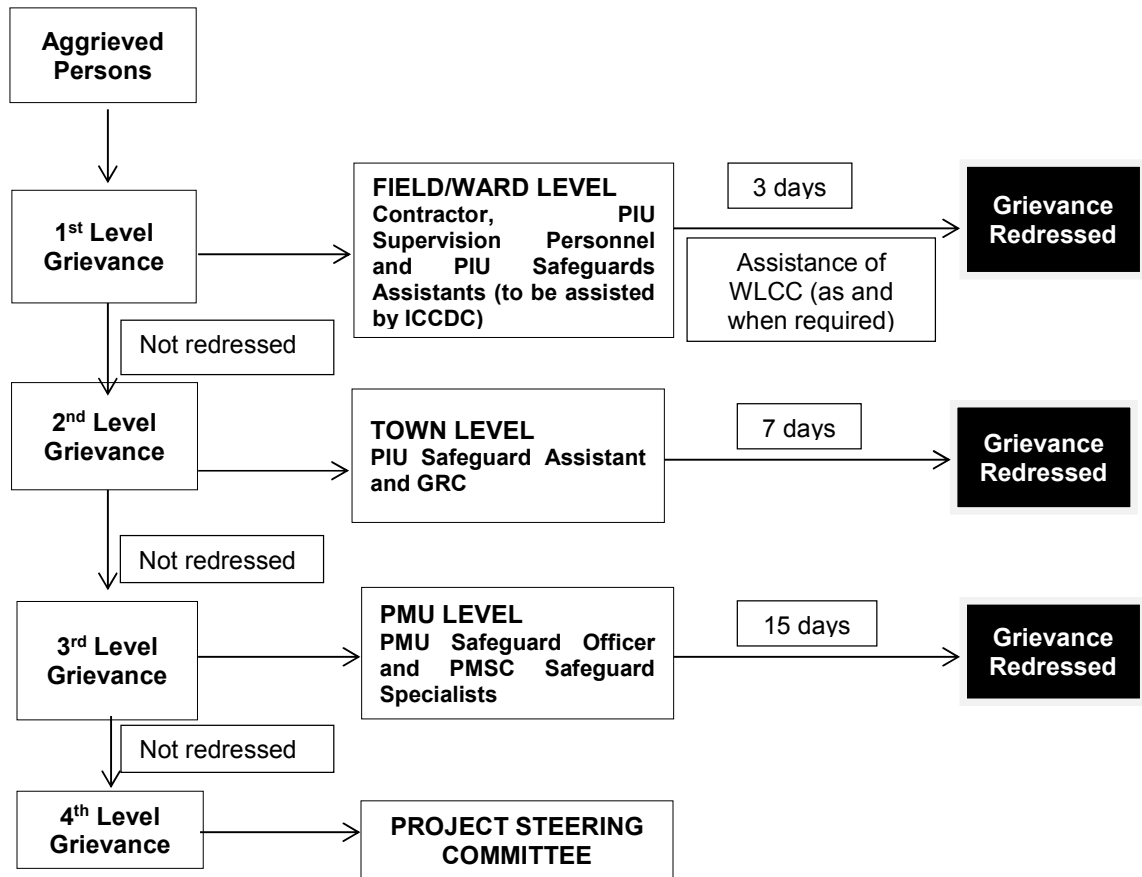
- (i) **1st Level Grievance.** The contractors, PIU supervision personnel and PIU safeguards assistant can immediately resolve issues on-site in consultation with each other, and will be required to do so within 3 days of receipt of a complaint/grievance. Assistance of ward level coordination committees (WLCC) will be sought if required for resolution of the issue, by any one or all of them jointly.
- (ii) **2nd Level Grievance.** All grievances that cannot be redressed within 3 days at field/ward level will be jointly reviewed by the grievance redress committee (GRC) at town-level and PIU safeguards assistant, who will attempt to resolve them within 7 days. The PIU safeguards assistant will be responsible to see through the process of redressal of each grievance.
- (iii) **3rd Level Grievance.** The PIU safeguards assistant will refer any unresolved or major issues to the PMU safeguards officer and PMSC (third level of grievance redress), who will resolve them within 15 days.
- (iv) **4th Level Grievance.** Very major issues that are beyond the jurisdictional authority of the GRC or those that have the potential to cause social conflicts or environmental damage or those that remain unresolved at PMU level, will be referred to the project steering committee (PSC) to be resolved within 14 days. All decisions taken by the GRC and PSC will be communicated to the APs by the PIU safeguards assistant. In the event that the established GRM is not in a position to resolve the issue, the affected person also can use

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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 ADB Accountability Mechanism information will be included in the PID to be distributed to the affected communities, as part of the project GRM.

135. Grievance redress process can be diagrammatically represented as under (Figure 4):

**Figure 4: Grievance Redress Process**



136. **Records** will be kept by PIU 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 affected and final outcome. The number of grievances recorded and resolved and the outcomes will be displayed/disclosed in the PMU office, municipal office, and on the web, as well as reported in monitoring reports submitted to ADB on a semi-annual basis. All **costs** involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the concerned PIU at town-level; while costs related to escalated grievances will be met by the PMU.

## 7 PUBLIC CONSULTATION

### 7.1 PUBLIC CONSULTATIONS AND PARTICIPATION

137. Public participation and community consultation has been taken up as an integral part of environmental assessment process of the project. Consultation was used as a tool to inform and educate stakeholders about the proposed action both before and after the development decisions were made. It assisted in identification of the impacts problems associated with the project. This participatory process helped in reducing the public resistance to change and enabled the participation of the local people in the decision making process. Initial Public consultation has been carried out in the project area with the objectives of minimizing probable adverse impacts of the project and to achieve speedy implementation of the project through bringing in awareness among the community on the benefits of the project. As part of the project consultations, efforts were made to consult with the public as well as a number of local authorities, to determine their thoughts, opinions and feedback on the impact of the proposed Shelter. Information and comments collected from the public early in the study process were of use.

138. As part of the impact assessment, the consultants conducted focus group discussions with selected groups at the locations of the proposed four roads, refer to the **Due Diligence Report** given in **Appendix G**.

### 7.2 STAKEHOLDERS

139. Involving stakeholders through participatory direct or indirect consultations is central to completion of the IEE. Therefore, during the public consultations and disclosure of information, various groups of stakeholders were consulted. The stakeholders were those who have an interest in the project, and who will be involved in the further consultative process.

### 7.3 PUBLIC PARTICIPATION – METHODS AND PROCESS

140. During these consultations, the communities were explained about the project, its benefits, social and environmental impacts. The participants were encouraged to (i) be open and make known their concerns and claims. The presentation highlighted the project background, objectives, expected upcoming activities, social economic information, and environmental information. The salient features of the meetings are presented below:

- Create awareness of the project;
- To obtain stakeholders responses, feedback and concerns on the project;
- To obtain environmental information on the community.

141. After the presentations, the community was given opportunity to give their views, comments and queries. Different community problems were addressed during the meeting in which the local participants expressed repeatedly their main concerns as follows:

- Road connectivity and access;
- Prospects of jobs and income generating activities;
- Likely impacts and proposed mitigation measures.

142. Any comments or questions raised by stakeholders were responded to. Safety opportunities associated was a theme brought up in the meetings. Both the positive and negative impacts of the project on people and the environment were explained. Positive impacts include job opportunity, skill development, better roads, less travel time and less fuel consumption while negative impacts are air pollution, dust, influx of people, and noise.

143. The project will follow government policies in protecting the population. All the participants confirmed that they appreciate the Project. The project received high degree of acceptability which will boost local economy.

## **7.4 FINDINGS FROM PUBLIC CONSULTATION MEETING**

### **7.4.1 SUMMARY OF DISCUSSION**

144. For details of the public consultations and Focus Group Discussions held during the design stage of the sub-project, refer to the Due Diligence Report given in **Appendix G**. People were keen to know the possibility of employment in the project. There is a requirement of about 160-170 people (estimated) during the peak period of the project. The employment is largely depends on the types of job and will be assessed on a case to case basis by the contractor according to needs.

- i) Condition of the existing roads is poor, broken, narrow, low-lying and flood prone, and inconvenient for smooth traffic flow. People are facing the following several problems in their daily life for long period because of the above mentioned conditions of the roads:
  - People do not feel easy to walk through roads and this problem is acute especially for the aged people. The problems become more acute for the residents especially the residents including students to go to school/workplace/market during rainy season as the roads go under water, and become slippery and dirty.
  - Roads are insufficiently wide for two vehicles to cross each other, for auto rickshaw/cart owners/pullers to bring vehicles to their own house, to accommodate space for water supply line, drainage etc services.
  - Roads become muddy and dirty during the rain which creates traffic accident and problem for traffic movement.
  - Vehicles especially ambulance and fire service vehicles, rickshaws and vans (three-wheeler), auto rickshaw etc cannot easily run through the roads and for this reason they, generally, do not want to respond to emergency of the residents. It creates problem for the people to carry goods and materials including agro products their house, to get vehicle and to take patients especially pregnant women to health centre, to bring construction materials to construct new house/repair house etc. Besides, people are to pay much more to vehicle driver/puller than normal rate because of broken condition of road.
- ii) Hence, proper improvement/development of the road infrastructures for smooth transport network is their critical needs and also long cherished desire. That is why; local people expressed their deepest interest for development of the selected roads under the sub-project. Besides, they need improved transportation network on emergency basis for their present and future life. People were happy to know that road project is coming to their town. They are ready to provide required land and to take out trees including other things on voluntary basis (without cost and with own responsibility) for the purpose of widening the roads.
- iii) The road schemes will improve socio-economic-physical conditions of the local people through creating more opportunity of income, employment, environmental improvement, smooth transportation system as well as exploiting local resources for boosting local productions.
- iv) Priority for jobs should also be given to those who will have any negative impact due to the project. Both men and women shall be considered with equal opportunity.
- v) Participant has also shown their inclination to participate in the project during planning and construction.
- vi) The participants were also very keen to know the likely date of start which will be after monsoon.

### **7.4.2 FUTURE CONSULTATION AND DISCLOSURE**

145. This IEE and other relevant documents will be made available at public locations in the Pourashava and posted on the websites of executing agencies and ADB. The consultation process will be continued and expanded during the project implementation, to ensure stakeholders participate fully in project execution, as well as to implement comprehensive information, education, and communication plan.

146. The public consultation and disclosure program with all interested and affected parties will remain a continuous process throughout the project implementation, and shall include the following:

- (i) Consultations during construction phase: (a) public meetings with affected communities to discuss and plan work programs and allow issues to be raised and addressed once construction has started; and (b) smaller-scale meetings to discuss and plan construction work with individual communities to reduce disturbance and other impacts, and to provide a mechanism through which stakeholders can participate in project monitoring and evaluation.
- (ii) Project disclosure: (a) public information campaigns (via newspaper, flyers, and media) to explain the project to the wider city population and prepare them for disruptions they may

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experience once construction is underway; (b) public disclosure meetings at key project stages to inform the public of progress and future plans, and to provide copies of summary documents in local language; (c) formal disclosure of completed project reports by making copies available at convenient locations in the study areas, and informing the public of their availability; and (d) providing a mechanism through which comments can be made.

147. For the benefit of the community, the summary of the IEE will be translated in the local language and made available at (i) offices of executing and implementing agencies, (ii) area offices, (iii) consultant teams' offices; and (iv) contractor's campsites. It will be ensured that the hard copies of IEE are kept at places which are conveniently accessible to people, as a means to disclose the document and at the same time creating wider public awareness. An electronic version of the IEE will be placed in the official website of executing and implementing agencies and the ADB website after approval of the IEE by ADB.

## **8 CONCLUSION AND RECOMMENDATIONS**

### **8.1 CONCLUSIONS**

148. Based on Project Description (**Chapter 3**), Environmental Baseline Data (**Chapter 4**), Environmental Impacts Assessment (**Chapter 5**), and Environmental Management Plans, (**Chapter 6**) the following conclusions are drawn:

- i) The Amtali subproject components including roads, drains, culverts, cross drains, protection wall, and tree plantation are in plain terrain in the Amtali District of Barisal Division. The subproject includes 4 roads of 4.531 km which is flexible pavement of 2.50 m~3.00 m~3.70 m width and 2 road side RCC drains of 0.217 km with top slab including RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts (one vent), 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter and 12 road crossing uPVC pipes. Amtali is an important Pourashava of Barguna District under Barisal Division. It is located between latitude 21°51' and 22°18' north and between longitude 90°00' and 90°23' east. Amtali pourashava consists of 9 wards and occupies an area of 8.75 km<sup>2</sup>. The roads and road side drains have been selected based on criteria explained in Project Administrative Management (PAM).
- ii) The PPTA feasibility study, completed in October 2013, has provided a comprehensive set of recommendations for the planning, design and implementation of the Project. Based on the recommendations of this study, the DDS Consultant has completed the detailed engineering design for the construction of roads, drains, protection walls and culverts in Amtali. The sites are oriented in such a way so that it has minimum environmental and social impacts.
- iii) There is no resettlement or land acquisition requirement in this subproject. Categorization form is prepared and submitted in Annexure –III.
- iv) The data has been compiled from available literature and discussion. In order to develop the climate resilient road from drainage and rainfall point of view; 2 road side RCC drains of 0.217 km with top slab including RCC pre-cast protection wall of 115 m, pre-cast CC block of 290.60 m, 12 RCC Box culverts, 02 Cross drains, 02 RCC pipe cross drains of 600mm diameter and 12 road crossing uPVC pipes have been planned. About 19 electrical poles are existing on the extended ROW will be relocated. The special attention was also given for protection of water and cultural resources, and monitoring during construction.
- v) The integration of roads and road side drains with urban and semi-urban areas will help in economic development of the town. The roads and road side drains will help improve social and cultural environment and development of other sectors like agriculture, commerce and trade. Hence, the proposed roads and road side drains will play an important role in economical growth and reduction of the poverty. Educational, cultural and health centres will have an easy access thus making improved living standards and quality of life of the people. The supporting activities in trade and material supply will also get benefitted from the project.
- vi) The subproject components are roads and road side RCC drains including RCC pre-cast protection wall, pre-cast CC block, RCC Box culverts, Cross drains, RCC pipe cross drains, road crossing uPVC pipes, shoulders and footpath on side of road, side drains to drain road runoff and surrounding areas, tree plantation for soil erosion control and side protection. The contract is designated as **e-GP/CTEIP/2014-15/AMT/RD/02**. The environmental mitigation cost is estimated as TK 779,860 out of which environmental monitoring cost is TK 384,000 and environmental management cost is TK 395,860. This **Appendix E**: IEE is to be read in conjunction with the attached Appendix B: EMP, which gives a detailed breakdown of the costs for the Environmental Management and Monitoring, which are also referred in the attached Bill of Quantities.
- vii) The adverse environmental impacts will occur during the construction period, and will be of a relatively short duration. Adequate provisions have been incorporated into the planning and design of the roads and road side drains to minimize or mitigate these unavoidable environmental impacts that are a result of the works.
- viii) The major positive achievements of roads are:
  - Development of roads will serve not only the influence area but also the surrounding area in the town.
  - Establishment of roads development will stimulate ancillary projects which will improve economical status of the local population;

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- More employment of local people during construction phases;
  - Reduction in fuel consumption, increase in road safety, less emission and greenhouse gases responsible for climate change;
  - Will be potential socio-economic enhancement of rural economy by connecting people to semi-urban areas;
  - Skill Transfer and Training.
- viii) The major negative impacts will be cutting/ already cut trees on road side; increase in about 5 dB(A) of noise on road side in 2034 to 43 dB(A). In addition, there will be insignificant increase in ambient air quality and noise at about 250 m from source and will be at acceptable level for mixed land use. The noise and air quality of the project area is within the permissible limits. The overall impact on air and noise quality during construction is limited to site and of short duration and can be mitigated.
- ix) It is proposed to plant at least 3,994 trees on roadside to mitigate the negative impact of trees. This will keep the ecological function in circulation. The noise impact at source will be mitigated by job rotation and use of ear plug and other measures suggested in EMP. Retaining and protection wall is planned to protect the ponds from soil erosion and water pollution. In addition, embankments wherever required has been protected against erosion due to climate change by jute fabric and sowing of grass.
- x) The environmental mitigation measures as stipulated in EMP and in the obtained environmental permit shall be monitored during implementation of the road sub-project. In order to perform monitoring of EMP the contractor shall engage experienced laboratory and third party services in complying the required environmental testing of parameters listed in **Section 2**.
- xi) The labour camps shall be established with the septic tank and soak pit for treatment and disposal of sewage and sullage water to avoid pollution of water bodies. Contractor has to make own arrangement for water supply for construction and domestic purpose.
- xii) The environmental monitoring will be required before the start of the construction and during the construction phase. The parameters of Water Quality, Air Quality, Noise quality, and Soils shall be monitored; as specified in **Section 2 of EMP**.
- xiii) During public consultation recommendations were drawn including: i) involve local communities in all stages of project planning and development, ii) establish permanent communication between project initiators and local authorities, iii) setup grievance redress mechanism which will publicized through Pourashava level co-ordination committee and monitoring register and iv) during construction, local people including women shall be given first priority in the employment of skilled and unskilled labour.

### **8.2 RECOMMENDATIONS**

149. In view of above, it is concluded that the Project will bring benefit to the people of the area, especially during cyclones and storm surge. The negative impacts occurring during implementation are within the manageable limits and shall be mitigated with the proposed Environmental Management Plan and hence project may be implemented.

### **8.3 DISCLOSURE OF ENVIRONMENTAL SAFEGUARDS INSTRUMENTS**

150. The LGED will disclose this Environmental Management Framework by making copies available at its head office and in District / Pourashava where the Project is situated. The copies shall also be made available to the Local Government's Agencies, the Environmental and Social Group and other stakeholders. The Government of Bangladesh will also authorize the Asian Development Bank to disclose this IEE and EMP electronically through its InfoShop.



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**ANNEXURE I: RAPID ENVIRONMENTAL ASSESSMENT CHECKLISTS**

**Construction/ improvement of 04 nos. roads of 4.531 km length and 02 nos. road side drains of 0.217 km length in Amtali Pourashava under Barguna District**

Screening Questions	Yes	No	Remarks
<b>A. Project Siting</b>			
<b>Is the project area adjacent to or within any of the following areas:</b>			
• Underground utilities		No	
• Cultural heritage site		No	
• Protected Area		No	
• Wetland/Ponds		No	
• Mangrove		No	
• Estuarine		No	
• Buffer zone of protected area		No	
• Special area for protecting biodiversity		No	
• Bay		No	
<b>B. Potential Environmental Impacts</b>			
<b>Will the Project cause:</b>			
• Encroachment on historical/cultural areas?		No	
• Encroachment on precious ecology (e.g. sensitive or protected areas)?	yes		4,607 trees will be planted along road sides
• Impacts on the sustainability of associated sanitation and solid waste disposal systems?		No	
• Dislocation or involuntary resettlement of people?		No	
• Disproportionate impacts on the poor, women and children, Indigenous Peoples or other vulnerable groups?		No	
• Accident risks associated with increased vehicular traffic, leading to loss of life?	yes		EMP to be followed
• Increased noise and air pollution resulting from increased traffic volume?	Yes		EMP: to be followed
• Occupational and community health and safety risks?	yes		EMP to be followed
• Risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during project construction and operation?		No	
• Generation of dust in sensitive areas during construction?	Yes		EMP: to be followed
• Requirements for disposal of fill, excavation, and/or spoil materials?	Yes		EMP to be followed
• Noise and vibration due to blasting and other civil works?	Yes		EMP: to be followed
• Long-term impacts on groundwater flows as result of needing to drain the project site prior to construction?		No	
• Long-term impacts on local hydrology as a result of building hard surfaces in or near the building?		No	
• Large population influx during project construction and operation that causes increased burden on social infrastructure and services (such as water supply and sanitation systems)?		No	
• Social conflicts if workers from other regions or countries are hired?		No	
• Risks to community safety caused by fire, electric shock, or failure of the buildings safety features during operation?		No	
• Risks to community health and safety caused by management and disposal of waste?	yes		EMP to be followed
• 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?		No	

Note: Hazards are potentially damaging physical events.

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**ANNEXURE II: GRIEVANCE REGISTRATION FORM**

(Bangla translation to be available)

The **Coastal Towns Environmental Infrastructure Project (CTEIP)** 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 the information to remain confidential, please inform us by writing/typing **\*(CONFIDENTIAL)\*** above your name.

Thank you.

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

**FOR OFFICIAL USE ONLY**

<b>Registered by:</b> (Name of Official Registering Grievance)	
<b>Mode of Communication:</b> Note/Letter E-mail Verbal/Telephonic	
<b>Reviewed by:</b> (Names/Positions of Officials Reviewing Grievance)	
<b>Action Taken:</b>	
<b>Whether Action Taken Disclosed:</b>	Yes No
<b>Means of Disclosure:</b>	

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**ANNEXTURE III: CATEGORIZATION FORM  
INVOLUNTARY RESETTLEMENT IMPACT CATEGORIZATION**

Date: \_\_\_/\_\_\_/2015

<b>A. Project Data</b> <table style="width: 100%; border: none;"> <tr> <td style="width: 20%;">Country/Project Title</td> <td style="width: 15%;">No./Project</td> <td style="width: 20%;">Country: Bangladesh</td> <td style="width: 45%;">ADB No.: (No. to be designated)</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Coastal Towns Environmental Infrastructure Project (CTEIP)</td> </tr> <tr> <td colspan="2"></td> <td colspan="2">Subproject: <b>e-GP/CTEIP/2014-15/AMT/RD/02</b></td> </tr> </table>				Country/Project Title	No./Project	Country: Bangladesh	ADB No.: (No. to be designated)			Coastal Towns Environmental Infrastructure Project (CTEIP)				Subproject: <b>e-GP/CTEIP/2014-15/AMT/RD/02</b>	
Country/Project Title	No./Project	Country: Bangladesh	ADB No.: (No. to be designated)												
		Coastal Towns Environmental Infrastructure Project (CTEIP)													
		Subproject: <b>e-GP/CTEIP/2014-15/AMT/RD/02</b>													
<b>B. Involuntary Resettlement Category</b> <p align="center">[    ] New                      [    ] Re-categorization — Previous Category [    ]</p>															
<input type="checkbox"/> Category A	<input checked="" type="checkbox"/> Category B	<input type="checkbox"/> Category C	<input type="checkbox"/> Category FI												
<b>C. Comments</b>  <p>No unavoidable dislocation or involuntary resettlement of persons affected by the subproject will take place as a result of the construction of the Amtali roads and road side drains at the below listed sites located within Amtali Pourashava, District: Barguna:</p> <p><b>Road No. 1:</b> Construction/improvement of road from Sabujbag Selim's house to R&amp;H road via TNT &amp; College Mosque (ward 05 &amp; 06)</p> <p><b>Road No. 2:</b> Construction/improvement of Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (ward 08)</p> <p><b>Road No. 5:</b> Construction/improvement of Zilla Parisad road to Muktizodda School via Mofij Taluker house (ward 06 &amp; 05)</p> <p><b>Road No. 6:</b> Construction/improvement of Mazar road to ATO Kashem Mia house via Lakerpar (ward 03)</p> <p>Refer to Involuntary Resettlement Impact Categorization Checklist below.</p>															

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**Annexure IVa: Involuntary Resettlement Impact Categorization Checklist:**

**Road No. 1: Construction/improvement of road from Sabujbag Selim's house to R&H road via  
TNT & College Mosque (ward 05 & 06)**

<b>Probable Involuntary Resettlement Effects</b>	<b>Yes</b>	<b>No</b>	<b>Not Known</b>	<b>Remarks</b>
<b>Involuntary Acquisition of Land</b>				
1. Will there be land acquisition?		No		
2. Is the site for land acquisition known?				<b>Not applicable</b>
3. Is the ownership status and current usage of land to be acquired known?				<b>Not applicable</b>
4. Will easement be utilized within an existing Right of Way (ROW)?				<b>Not applicable</b>
5. Will there be loss of shelter and residential land due to land acquisition?				<b>Not applicable</b>
6. Will there be loss of agricultural and other productive assets due to land acquisition?				<b>Not applicable</b>
7. Will there be losses of crops, trees, and fixed assets due to land acquisition?				<b>Not applicable</b>
8. Will there be loss of businesses or enterprises due to land acquisition?				<b>Not applicable</b>
9. Will there be loss of income sources and means of livelihoods due to land acquisition?				<b>Not applicable</b>
<b>Involuntary restrictions on land use or on access to legally designated parks and protected areas</b>				
10. Will people lose access to natural resources, communal facilities and services?		No		
11. If land use is changed, will it have an adverse impact on social and economic activities?		No		
12. Will access to land and resources owned communally or by the state be restricted?		No		
<b>Information on Displaced Persons:</b>				<b>Not Applicable</b>
Any estimate of the likely number of persons that will be displaced by the Project? If yes, approximately how many? _____				[-] No    [-] Yes
Are any of them poor, female-heads of households, or vulnerable to poverty risks?				[-] No    [-] Yes
Are any displaced persons from indigenous or ethnic minority groups?				[-] No    [-] Yes

Note: The project team may attach additional information on the project, as necessary.

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**Annexure IVb: Involuntary Resettlement Impact Categorization Checklist:**

**Road No. 2: Construction/improvement of Wapda road to Kamal Sangbadik house via Mostafa Commissioner and Firoj house (ward 08)**

<b>Probable Involuntary Resettlement Effects</b>	<b>Yes</b>	<b>No</b>	<b>Not Known</b>	<b>Remarks</b>
<b>Involuntary Acquisition of Land</b>				
1. Will there be land acquisition?		No		
2. Is the site for land acquisition known?				<b>Not applicable</b>
3. Is the ownership status and current usage of land to be acquired known?				<b>Not applicable</b>
4. Will easement be utilized within an existing Right of Way (ROW)?				<b>Not applicable</b>
5. Will there be loss of shelter and residential land due to land acquisition?				<b>Not applicable</b>
6. Will there be loss of agricultural and other productive assets due to land acquisition?				<b>Not applicable</b>
7. Will there be losses of crops, trees, and fixed assets due to land acquisition?				<b>Not applicable</b>
8. Will there be loss of businesses or enterprises due to land acquisition?				<b>Not applicable</b>
9. Will there be loss of income sources and means of livelihoods due to land acquisition?				<b>Not applicable</b>
<b>Involuntary restrictions on land use or on access to legally designated parks and protected areas</b>				
10. Will people lose access to natural resources, communal facilities and services?		No		
11. If land use is changed, will it have an adverse impact on social and economic activities?		No		
12. Will access to land and resources owned communally or by the state be restricted?		No		
<b>Information on Displaced Persons:</b>				<b>Not Applicable</b>
Any estimate of the likely number of persons that will be displaced by the Project? If yes, approximately how many? _____				[-] No    [-] Yes
Are any of them poor, female-heads of households, or vulnerable to poverty risks?				[-] No    [-] Yes
Are any displaced persons from indigenous or ethnic minority groups?				[-] No    [-] Yes

Note: The project team may attach additional information on the project, as necessary.

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**Annexure IVc: Involuntary Resettlement Impact Categorization Checklist:  
Road No. 5: Construction/improvement of Zilla Parisad road to Muktizodda School via Mofij  
Taluker house (ward 06 & 05)**

<b>Probable Involuntary Resettlement Effects</b>	<b>Yes</b>	<b>No</b>	<b>Not Known</b>	<b>Remarks</b>
<b>Involuntary Acquisition of Land</b>				
1. Will there be land acquisition?		No		
2. Is the site for land acquisition known?				<b>Not applicable</b>
3. Is the ownership status and current usage of land to be acquired known?				<b>Not applicable</b>
4. Will easement be utilized within an existing Right of Way (ROW)?				<b>Not applicable</b>
5. Will there be loss of shelter and residential land due to land acquisition?				<b>Not applicable</b>
6. Will there be loss of agricultural and other productive assets due to land acquisition?				<b>Not applicable</b>
7. Will there be losses of crops, trees, and fixed assets due to land acquisition?				<b>Not applicable</b>
8. Will there be loss of businesses or enterprises due to land acquisition?				<b>Not applicable</b>
9. Will there be loss of income sources and means of livelihoods due to land acquisition?				<b>Not applicable</b>
<b>Involuntary restrictions on land use or on access to legally designated parks and protected areas</b>				
10. Will people lose access to natural resources, communal facilities and services?		No		
11. If land use is changed, will it have an adverse impact on social and economic activities?		No		
12. Will access to land and resources owned communally or by the state be restricted?		No		
<b>Information on Displaced Persons:</b>				<b>Not Applicable</b>
Any estimate of the likely number of persons that will be displaced by the Project? If yes, approximately how many? _____				[--] No    [--] Yes
Are any of them poor, female-heads of households, or vulnerable to poverty risks?				[--] No    [--] Yes
Are any displaced persons from indigenous or ethnic minority groups?				[--] No    [--] Yes

Note: The project team may attach additional information on the project, as necessary.

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**Annexure IVd: Involuntary Resettlement Impact Categorization Checklist:  
Road No. 6: Construction/improvement of Mazar road to ATO Kashem Mia house via Lakerpar  
(ward 03)**

<b>Probable Involuntary Resettlement Effects</b>	<b>Yes</b>	<b>No</b>	<b>Not Known</b>	<b>Remarks</b>
<b>Involuntary Acquisition of Land</b>				
1. Will there be land acquisition?		No		
2. Is the site for land acquisition known?				<b>Not applicable</b>
3. Is the ownership status and current usage of land to be acquired known?				<b>Not applicable</b>
4. Will easement be utilized within an existing Right of Way (ROW)?				<b>Not applicable</b>
5. Will there be loss of shelter and residential land due to land acquisition?				<b>Not applicable</b>
6. Will there be loss of agricultural and other productive assets due to land acquisition?				<b>Not applicable</b>
7. Will there be losses of crops, trees, and fixed assets due to land acquisition?				<b>Not applicable</b>
8. Will there be loss of businesses or enterprises due to land acquisition?				<b>Not applicable</b>
9. Will there be loss of income sources and means of livelihoods due to land acquisition?				<b>Not applicable</b>
<b>Involuntary restrictions on land use or on access to legally designated parks and protected areas</b>				
<b>10. Will people lose access to natural resources, communal facilities and services?</b>		No		
<b>11. If land use is changed, will it have an adverse impact on social and economic activities?</b>		No		
<b>12. Will access to land and resources owned communally or by the state be restricted?</b>		No		
<b>Information on Displaced Persons:</b>				<b>Not Applicable</b>
Any estimate of the likely number of persons that will be displaced by the Project? If yes, approximately how many? _____				[--] No    [--] Yes
Are any of them poor, female-heads of households, or vulnerable to poverty risks?				[--] No    [--] Yes
Are any displaced persons from indigenous or ethnic minority groups?				[--] No    [--] Yes

Note: The project team may attach additional information on the project, as necessary.