Government of the People's Republic of Bangladesh

Ministry of Local Government, Rural Development and Cooperatives

Local Government and Engineering Department (LGED)

Environmental & Social Management Framework (ESMF) for Bridge Construction, Rehabilitation and Maintenance in LGED

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Abbreviations

ADB	Asian Development Bank
AE	Assistant Engineer
APs	Affected Persons
ARIPO	Acquisition and Requisition of Immovable Property Ordinance
ARP	Abbreviated Resettlement Plan
BARC	Bangladesh Agriculture Research Council
BAE	Bangladesh Agricultural Extension
BBA	Bangladesh Bridge Authority
BBS	Bangladesh Bureau of Statistics
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BCRMP	Bridge Construction, Rehabilitation and Maintenance Program
BFIDC	Bangladesh Forest Industries Development Corporation
BFRI	Bangladesh Forest Research Institute
BIWTA	Bangladesh Inland Water Transport Authority
BMD	Bangladesh Meteorological Department
BNBC	Bangladesh National Building Code
BNH	Bangladesh National Herbarium
BOD	Biochemical Oxygen Demand
BOQ	Bill of Quantities
BRTA	Bangladesh Road Transport Authority
BWDB	Bangladesh Water Development Board
CBO	Community Based Organizations
CC	Climate Change
CE	Chief Engineer
CI	Corrugated Iron
CNG	Compressed Natural Gas
CO	Carbon Monoxide
COD	Chemical Oxygen Demand
CUL	Compensation under law
CSWG	Community and Social Welfare Groups
DAE	Department of Agriculture Extension
DoE	Department of Environment
DC	Deputy Commissionaire
DDM	Department of Disaster Management
DLAC	District Land Acquisition Committee
DoF	Department of Fisheries
DG	Director General
DoE	Department of Environment
DPHE	Department of Public Health Engineering
DS	Design and Supervision
DSW	Department of Social Welfare
EA	Environmental Assessment
EC	Environmental Clearance
ECA	Environmental Critical Area

ECC	Environmental Clearance Certificate
ECR	Environmental Conservation Rule
ECoP	Environmental Code of Practice
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMIS	Environmental Management Information Systems
EMP	Environmental Monitoring Plan
EMS	Environmental Management System
EMU	Environmental Management Unit
EP	Entitle Persons
EPA	Environment Protection Authority
EPAs	Environmentally Protected Areas
EPM	Environmental Planning and Management
EQS	Environmental Quality Standard
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization
FC	Fecal Cauliform
FGD	Focus Group Discussion
FI	Financial Intermediary
GCM	Growth Ceneter
GIIP	Good International Industry Practice
GIS	Geographical Information System
GOB	Government of Bangladesh
GON	Government of Nepal
GPP	Guidelines for People's Participation
GPS	Global Positioning System
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GRO	Grievance Resolution Officer
HCG	House Construction Grant
HTG	House Transfer Grant
HQ	Headquarter
ICZMP	Integrated Coastal Zone Management Project
IDA	International Development Association
IEB	Institution of Engineers, Bangladesh
IEFs	Important Environmental Features
IEE	Initial Environmental Examination
IECs	Important Environmental Components
IFC	International Finance Corporation
ILO	International Labour Organization
IP	Indigenous Peoples
IPP	Indigenous Peoples Plan
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KM	Kilometer
LA	Land Acquisition

LAP	Land Acquisition Plan
LGED	Local Government and Engineering Department
LGI	Local Government Institute
MDSP	Multi-purpose Disaster Shelter Project
MGSP	Municipal Governance and Services Project
MOEF	Ministry of Environment and Forests
MS	Management Support
NAPA	National Adaptation Program of Action
NBSAP	National Biodiversity Strategy & Action Plan
NC	North Central
NE	Northeast
NGO's	Non-Government Organizations
NLTP	National Land Transport Policy
NOx	Nitrogen Oxides
NW	Northwest
NWP	National Water Policy
NEMAP	National Environmental Management Plan
NWMP	National Water Management Plan
MM	Millimeter
OP	Operation Policy
PAPs	Project Affected Persons
PD	Project Director
PIA	Project Influence Area
PIU	Project Implementation Unit
PM	Particulate Matter
PMU	Project Management Unit
PPE	Personnel Protective Equipment
PRSP	Poverty Reduction Strategy Paper
PWD	Public Works Department
RCC	Reinforced Cement Concrete
RAP	Resettlement Action Plan
RHD	Roads and Highways Department
ROW	Right of Way
RP	Resettlement Plan
RAP	Resettlement Action Plan
RTIP	Rural Transport Improvement Project
SCC	Suggestions and Complaint Committee
SCM	Suggestions and Complaint Mechanism
SECs	Special Environmental Clauses
SIA	Social Impact Assessment
SME	Small and Medium-sized Enterprises
SIMF	Social Impact Management Framework
SOx	Sulfur Oxide
SPM	Suspended Particulate Matter
SRDI	Soil Resource Development Institute
TC	Total Cauliform
TDF	Tribal Development Framework
TMP	Traffic Management Plan
ToR	Terms of References

TRG	Transfer and Reconstruction Grant
UNDP	United Nations Development Programme
UP	Union Parishad
URO	Upazila Revenue Officer
USA	United States of America
VNR	Vested and Non-resident
USGS	United States Geological Survey
WARPO	Water Resources Planning Organization
WB	World Bank

CHAPTER ONE : BACKGROUND AND RATIONALE FOR AN ENVIRONMENTAL AND MANAGEMENT FRAMEWORK FOR THE BRIDGES IN LGED

1.1 Introduction

This Environmental and Social Management Framework (ESMF) has been prepared to deal with environmental and social issues associated with the construction, rehabilitation and maintenance of different road structures including bridge & culvert of the Local Government Engineering Department (LGED) under Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives. The Government of Bangladesh (GoB) and international assistance agencies recognize that improved access through a better transport network is the key to economic development and poverty reduction. The ESMF has been designed as guidance for LGED in addressing environmental and social issues related to the rural bridge programmes It can be envisaged that implementation of the ESMF will ensure compliance with relevant legislation, policies and regulations under the Constitution of the People's Republic of Bangladesh.

1.2 Background

Bangladesh is a densly populated country of the world with an estimated 162 million (BBC news 2017) people living in a geographical area of about 143,998 sq.-km (BBC news 2017). About two-third of this population lives in the rural areas. Rural road network1 of the country comprises a total of 301,368 km of roads. Of which 27,923 km (74%) of the Upazila Roads; 18,697 km (42%) of the Union Roads; 15,219 km (14%) of the Village Roads Type-A and 4,912 km (5%) of the Village Roads Type-B have so far been improved. A total of 1,183,440 meters of bridges/culverts have also been built on the rural roads of various categories during this period. Rural roads constitute most of the roads in the national network of Bangladesh. These roads provide improved access to the growth centers and markets; farms; financial, educational, social and welfare institutions; rural services delivery centers etc. Rural roads thus contribute immensely towards increased agricultural production, facilitate marketing of agricultural products, make easy availability of agricultural inputs at the farm level and facilitated reaching the health, education and administrative services at the doorsteps of the common and marginal people of the rural areas.

The rural road network is constrained with the numerous rivers and their tributaries. Often, a bridge connects two separate road sections to provide full connectivity to isolated rural communities. Requirements for bridges on rural roads are therefore, huge. The current available inventory suggests that a bridge is required for every 4.5 km of Upazila and Union roads. Two-thirds of these gaps now have structures, leaving a third of them to be bridged (Table 1-1).

[1]Rural roads will mean Upazila roads, Union roads and Village roads including their appurtenant structures, which have been classified and defined by the Government of Bangladesh under its Gazette Notification No. PC/TS/Classification Committee/06 dated 6th November, 2003.

Table 1-1: Bridges and Non-Bridged Gaps on Upazila and Union Roads

Road Type	Total bridged plus non-bridged gaps		Existing Bridges				Existing Gaps	
	Number	Length (m)	No.	Length (m)	Longest length (m)	Average length (m)	No.	Length (m)
Upazila Road (UZR)	8,491	307,221	7,515	235,529	900	31	976	71,692
Union Road (UNR)	8,753	261,756	7,044	165,600	650	24	1,709	96,156
UZR+UNR	**17,244**	**568,977**	**14,559**	**401,129**	**900**	**28**	**2,685**	**167,848**
Source: Road Database of Road Maintenance and Road Safety (RMRS) Unit, LGED, December 2012								

LGED through its several bridge projects prepare and implement plans for dealing with environmental and social impacts. This Environmental and Social Framework will give a general guideline for any bridge programs/projects with the procedure for identifying, dealing and controlling environmental and social impacts.

1.3 Functions of Local Government Engineering Department

Local Government Engineering Department (LGED) is an attached department of the Local Government Division under the Ministry of Local Government, Rural Development and Cooperatives. LGED is responsible for development and management of local infrastructure including rural roads, bridges, culverts, waterways, markets, river jetties and others for contributing in socioeconomic development of the rural community and overall reducing poverty in the country. LGED is developing, maintaining and managing transport, trading and small scale water resources infrastructure at the local level by ensuring LGI and community participation and taking care of environmental and social issues. LGED provides technical and managerial support to Urban Local Government Institutions (City Corporations, City Councils) to implement urban infrastructure development program. LGED works closely with the local stakeholders to the broad objectives of LGED's development activities to improve the socio-economic condition of the country through supply of infrastructures at local level and capacity building of the stakeholders. LGED promotes labour-based technology to create employment opportunity at local level and uses local materials in construction and maintenance to optimize the project implementation cost with preserving the desired quality. LGED operates with finances from internal and external resources including bilateral and international development partners.

LGED is highly decentralized organization where ninety nine percent of total manpower works at District and Upazila (Sub-District) level. The Chief Engineer is the head of the organization supported by four Additional Chief Engineers with subsequent supporting manpower. The total manpower under permanent payroll is 10287 both at head quarters and field levels. The thematic functional areas of LGED can be illustrated as follows (Figure 1-1).

Figure1-1: Functions of LGED

1.4 Rural Roads and Bridges Maintenance Policy

In 2013, Government of Bangladesh (GoB) has adopted a Rural Roads and Bridges Maintenance Policy. The objective of this Policy is to develop a sustainable rural transport system through appropriate maintenance management to provide safe operation of vehicles and to ensure necessary funding for their maintenance establishing a comprehensive and reliable inventory of roads, bridges and culverts across the country.

1.5 Rationale for Environmental and Social Management Framework

Local Government Engineering Department through its several bridge programs aims to enhance and expand rural connectivity through construction, upgradation, rehabilitation and maintenance of rural bridges across the country. These programs are being implemented by phases based on availability of resources. The approach of these programs is to undertake design, construction, rehabilitation or expansion of rural bridges in phases based on availability and allocation of resources. Under this programmatic planning approach, environmental and social impacts including safeguard compliance issues will be identified when any specific project and bridge sites will be selected and designed for implementation. Project activities will largely be on existing available lands, but in special circumstances, additional private land may be required and existing public land may need to be resumed from

authorized or unauthorized private uses. Works and site selection will be done through all-inclusive consultative process. However, exact locations with construction boundary as well as associated social impacts including safeguards compliance issues will be identified when site specific design will be prepared at the implementation stage. LGED has therefore, prepared this Environmental and Social Management Framework (ESMF) to deal with safeguard compliance and social issues likely to arise during design and implementation of the any specific program. The ESMF has been prepared following the relevant national laws, policies and guidelines and in compliance with the environmental and social safeguard polices of major development partners working in Bangladesh. The ESMF will be updated in the subsequent project phases based on experience and lessons learnt from preceding projects.

The ESMF will help to identify nature and magnitude of impacts on a continuing basis. As the impact details become available, the ESMF will provide the basis to carry out environmental and social screening and impact assessment, and preparation and implementation of environmental and social management plans including environmental management plan (EMP), resettlement action plan (RAP) and tribal peoples development plan (TPDP), as may be required to mitigate adverse impacts under the individual subprojects in each program project.

1.6 Objectives and Methodology

1.6.1 Key Objectives of the ESMF

Development projects bear the risks for potential environmental and social impacts likely to occur in the physical, biological, social, cultural and sometimes archaeological spheres. Adverse impacts may result from development works. Precaution and different mitigation works will bring adverse effects down to tolerable level for promoting sustainable development. The ESMF intends to provide technical and managerial inputs and guidance into the design of the rural bridges on upazila, union and village roads, through identification of key environmental and social issues related to the foreseen projects (hereunder referred as "RB Subprojects" or RBSP), mitigate potential impacts and concerns and devise opportunities to enhance the benefits. The framework integrates in a step by step approach the most important environmental and social considerations into all stages of project preparation, implementation, monitoring and operation and is applicable to all future sub-projects funded under the RBMP.

The main objective of the ESMF is to provide a guideline to the project related persons to plan, design and monitor project activities without doing any or less harm for the project beneficiaries. The ESMF will help to take proper measures to protect or minimize environmental and social hazards due to project works. This will ensure participation of project beneficiaries in project development works and also will help LGED to take prior action for activities are not covered by country laws and government instructions. The ESMF will help to:

- Review existing national policies, regulations, operational guidelines and institutional arrangements to address and mitigate environmental and social impacts of rural bridges maintenance projects.
- Assess the compatibility of the core principles of GoB policies with policies of the development partners, identify gaps, and present recommendations for addressing the gaps.
- Describe the tools and procedural steps to assess the environmental and social issues for all project-related activities, and describe stepwise the corresponding management requirements in the entire project cycle.

- Prepare a screening and consultation framework for environmental and social assessment of the proposed sub-projects; this framework shall include all parties involved, particularly focusing on service providers to ensure that the safeguard measures prescribed in the environmental and social management plans are duly followed and enforced.
- Refer to established principles relating to environmental and social safeguard mechanisms to be incorporated in LGED's bridge development programs;
- Assist the ESMU of LGED in the preparation of IEEs, ElAs and SlAs to be used as standard operational assessment and management models for future sub-projects becoming selected under the RBMP.
- Identify practical, feasible, credible and cost effective measures to offset or to reduce adverse environmental and social impacts to acceptable level, and ways to enhance positive impacts. As applicable, also address secondary, induced and cumulative impacts that may be associated with the for the coming road construction activities.
- Make specific reference to the public consultation process and the consultation framework, describing adequate participatory mechanisms particularly with respect to local employment, gender issues, empowerment and local control instruments.
- Prepare a Resettlement Policy Framework.
- Prepare a Tribal Peoples Development Framework.
- Recommend measures to strengthen project implementation mechanisms and institutional arrangements at different phases of the project cycles, with respect to the Environmental and Social/Resettlement Management Plans.
- Provide a detailed account on strengthening the institutional capacity of LGED, in specific of the unit in charge, the ESMU.

1.6.2 Methods Applied to Prepare the ESMF

The following approach and methodology was used for preparing the ESMF.

- Review of existing laws, policies and administrative systems in the country;
- Review of pertaining operational guidelines from various development partners (WB, ADB, JICA) being actively involved in the country's transport sectors;
- Review of safeguards planning documents like EMF, EIA, SMF,RAP, SIA reports prepared by LGED for ongoing and past projects.
- Stakeholders consultation involving communities from both rural and urban areas, elected representatives, civil society, NGOs and Environment and Social Safeguard Specialists from different LGED projects.
- Structured survey including environmental and social screening and impact assessment of sample bridge sites.
- Collection and review of secondary data and information on socioeconomic, poverty, gender and other parameters of influence area population.

The detailed and in-depth literature review was conducted to collect project relevant secondary data and to identify the good practices and environmental issues faced in the existing projects. Previous EMF of LGED and other national and international EMF/ESMF were reviewed as well as EIA report of different projects were reviewed (details are given in Annex-A).

1.6.3 Sources of Information/Data

For the preparation of EMF, different types of data were collected from the primary as well as secondary sources. Detailed description of the data sources are given below.

1.6.3.1 Secondary Information/Data Source

Secondary data were collected using the following tools and techniques:

- Review the policy, legal and administrative framework;
- Review the previous EMF and EIA reports, documents etc.;
- Data from different offices/organizations.

Table 1-2: List of Secondary Information/Data and its source

Serial No	Types of Data	Sources/Organizations
1	Climate	BMD,BARC
2	Physiography, Topography and Geology	National Topography Data Base, USGS, Banglapedia,Geological Survey of Bangladesh
3	Soil	SRDI,DAE,UNDP,FAO
4	Seismicity	BNBC Seismicity Map, BMD
5	Hydrology	BWDB
6	Flora and Fauna	Forest Department, IUCN, DoE
7	National Conservation Site of Importance	IUCN
8	Fisheries	Department of Fisheries
9	Socio-cultural, Religious and Archeological Sites	BBS, Banglapedia

1.6.3.2 Primary Information/Data Source

Primary data were collected using the following tools and techniques:

- Checklist for IEFs;
- Environmental Assessment (EA) Checklist;
- Questionnaire for Baseline Data Collection;
- Use of GPS technology to capture the actual location of the important features on the earth and prepare the map using GIS software.
- Environmental Quality Survey; and
- Stakeholders/Public Consultation.

Table1-3: Primary Information/DataSource

Serial No	Types of Data	Sources/Organizations
1	Air Quality	Measurement at field
2	Noise Level	Measurement at field
3	Water Quality(Ground and Surface)	Sampling at Site

4	Flora and Fauna	Field Survey
5	Socioeconomic information	Baseline survey, Social impact assessment, PAPs Census

1.7 ESMF Effectiveness

The ESMF shall become effective with the approval from the Chief Engineer following the policy vetting from the Local Government Division under the Ministry of Local Government, Rural Development, and Cooperatives.

1.8 Potential Users of the ESMF

This ESMF has been prepared for the Rural Bridges Maintenance Program designed for development, rehabilitation and maintenance of rural bridges for enhanced connectivity in rural areas of the country. The ESMF is applicable to all proposed subproject activities and through all stages of the subproject cycle, i.e. from pre-planning, planning and design, implementation to post-implementation. The design flow of ESMF activities will be coordinated and integrated into the project cycle. This does not waive the necessity of any project proponent to refer and comply with the national regulatory provisions of the country.

The concepts and procedures presented in this framework is intended to help LGED, stakeholders and project proponents to fulfil their social responsibilities as required under the national laws, policies and guidelines and regulations detailed in Chapter 3. The focal addressee within the LGED is the Environmental and Social Management Unit (ESMU) responsible for supervising and managing social risks sand impacts associated in all phases of development, rehabilitation and maintenance of rural bridge.

This ESMF will help keep the overriding environmental and social responsibilities firmly in mind during the scoping process while writing the Terms of Reference (TOR), while conducting the initial environmental and social screening (IESS) or environmental and social impact assessment (ESIA) regarding the program projects. It will also aid in the process of compliance monitoring in regards to each project's environmental and social management plans including EIA, EMP, RAP and TPDP.

Local Government Engineering Department (LGED) under the Ministry of Local Government, Rural Development and Cooperatives (MoLGRDC) is the main stakeholder and user of this ESMF. Other stakeholders and users include the Local Government Division, the CHT Development Board, Department of Environment, Department of Forest; Consultants, Contractors and Community level stakeholders.

1.9 Structure of the ESMF

The ESMF includes Methodological Framework for the ESMF

(i) Methodological Framework
(ii) Legal and policy guidelines;
(iii) Identification of potential environmental and social impacts;
(iv) Public consultation framework
(v) Environmental and social impact mitigation measures;
(vi) Resettlement policy framework;
(vii) Tribal people's development framework;

(viii) Institutional framework (including institutional strengthening) for SMF implementation; and
(ix) Environmental Management Information system.

CHAPTER TWO : LEGAL ACTS, POLICIES, REGULATIONS AND GUIDELINES

The following sections review the relevant national legislative, regulations and policy instruments and bring out the concerned aspects of these to the notice of the proponent for their awareness, education, cognizance and compliance and also for any reviewer of the document for environmental clearance. To address the environmental and social risks of any proposed project and its associated components and to protect and conserve the environment from any adverse impacts, the GoB has specified regulations, policy and guidelines. Potential lenders also have their own set of requirements (such as the WB, ADB, JICA, etc.) to which any project funded to them must operate.

2.1 Government of Bangladesh (GoB)

2.1.1 Relevant Acts, Regulations and Guidelines

2.1.1.1 Constitution of the Government Republic of Bangladesh

In our constitutions, the environmental issues also highlight the environmental protection and biodiversity conservation issues. In the Article 18 A: Protection and Improvement of Environment and Biodiversity; of the Constitution of the People's Republic of Bangladesh states that, *"The state shall* endeavor to protect and improve the environment and to preserve and safeguard the natural resources, biodiversity, wetlands, forest and wildlife for the present and future *citizens".*

2.1.1.2 Environmental Court Act, 2000 & subsequent amendments in 2002

The purpose of this act is to establish a formal system of environmental courts within Bangladesh, with a minimum of one active court to be maintained within each division. Specifically, the Act provides the framework for:

- Structure and jurisdiction of the court system;
- Powers and rights of the court and the relevant officers such as the Judges and Inspectors;
- Authority of the court to issue directives or penalties;
- Integration with other law-enforcement agencies; and
- Regulations for rights-of-appeal.

2.1.1.3 DOE's IEE/EIA including EMP Guidelines for Industry, 1997

The IEE/EIA Guidelines is a handbook for procedures for preparing the IEE/EIA including EMP and for reviewing them for the benefit of the development partners, environmental consultants, reviewers and academicians. While preparing these guidelines, the present environmental status as well as the need for rapid economic development of Bangladesh has been kept in view. These considerations have essentially resulted in simpler procedures to be followed for preparing the IEE/EIA including EMP and their review. This guideline is also applicable for the other projects.

2.1.1.4 LGED's Strategy, Guidelines and Environmental Code of Practices

In response to the ECA, 1995 and ECR, 1997, and recognizing the need of its donors to ensure sound environmental practices, LGED has developed guidelines and code of practices to ensure that its activities sustain, and where feasible enhance the environment. The LGED aims to implement all its projects in an environmentally sound and sustainable manner that meets all the requirements of the GOB and its financing partners. This approach is embodied in the LGED document:

- Environmental Assessment Guidelines for LGED Projects, LGED, October 2008.

Two documents have been prepared under RTIP which provide a sound basis for defining the environmental management procedures and arrangements:

- Manual for Environmental Supervision and Monitoring and Guidelines for Environmental Screening and Categorization of Sub-project, EMU, RTIP (RDP-26), September, 2004.
- Environmental Code of Practices (ECP), EMU, RTIP (RDP-26), September, 2004.

2.1.2 Environmental, Social and Natural Resources Protection

2.1.2.1 The Environmental Conservation Acts (ECA), 1995 and Amendments

The provisions of the Act authorize by the DG of DOE to undertake any activity that is deemed fit and necessary to conserve and enhance the quality of environment and to control, prevent and mitigate pollution. The main highlights of the act are:

- Declaration of Ecologically Critical Areas;
- Obtaining Environmental Clearance Certificate;
- Regulation with respect to vehicles emitting smoke harmful for the environment;
- Regulation of development activities from environmental perspective;
- Promulgation of standards for quality of air, water, noise, and soils for different areas and for different purposes;
- Promulgation of acceptable limits for discharging and emitting waste; and
- Formulation of environmental guidelines relating to control and mitigation of environmental pollution, conservation and improvement of environment.

2.1.2.2 The Environment Conservation Rules (ECR), 1997 and Amendments

The ECR, 1997 are the first set of rules promulgated under the ECA, 1995. These Rules provide for, inter alia, the following:

- The National Environmental Quality Standards (EQS) for ambient Air, Surface Water, Ground water, Drinking water, Industrial effluents, Emissions, Noise and Vehicular exhaust;
- Categorization of industries, development projects and other activities on the basis of actual (for existing industries/development projects/activities) and anticipated (for proposed industries/development projects/activities) pollution load;
- Procedure for obtaining environmental clearance;
- Requirements for undertaking IEE and EIA's as well as formulating EMP's according to categories of industries/development projects/activities; and
- Procedure for damage-claim by persons affected or likely to be affected due to polluting activities or activities causing hindrance to normal civic life.

2.1.2.3 National Environment Policy, 1992

The Bangladesh National Environment Policy, approved in May 1992, sets out the basic framework for environmental action together with a set of broad sectoral action guidelines. Key elements of the policy are:

- Maintaining ecological balance and ensuring sustainable development of the country through protection, conservation and improvement of the environment;
- Protecting the country from natural disasters;
- Identifying and regulating all activities that pollute and destroy the environment;
- Ensuring environment-friendly development in all sectors;
- Ensuring sustainable and environmentally sound management of the natural resources; and
- Promoting active association, as far as possible, with all international initiatives related to environment.

The policy also states that EIA's should be conducted before projects are undertaken and the DOE is directed to review and approve all EIA's.

2.1.2.4 National Conservation Strategy, 1992

The National Conservation Strategy, 1992 provides recommendations for sustainable development of the industrial sector. The key aspects of the strategy are as follows:

- Industries based on non-renewable resources should be made to adopt technology which conserves raw materials, and existing industries should be given incentives to install technical fixes to reduce wastage rate;
- All industries shall be subject to an EIA and the adoption of pollution prevention/control technologies shall be enforced;
- Hazardous or toxic materials/wastes shall not be imported as raw materials for industry;
- Import of appropriate and environmentally-sound technology shall be ensured; and
- Dependence on imported technology and machinery should gradually be reduced in favor of sustainable local skills and resources.

2.1.2.5 National Environmental Management Plan (NEMAP), 1995

The NEMAP is a wide ranging and multi-faceted plan, which builds on and extends the statements, set out in the National Environmental Policy. NEMAP was developed to address issues and management requirements related to the environment; it also sets out the framework within which the recommendations of the National Conservation Strategy are to be implemented. NEMAP was developed to achieve the following broad objectives:

- Identification of key environmental issues affecting Bangladesh;
- Identification of actions necessary to halt or reduce the rate of environmental degradation;
- Improvement of the natural environment;
- Conservation of habitats and bio-diversity;
- Promotion of sustainable development; and

- Improvement of the quality of life of the people.

To attain the above mentioned objectives, the plan groups all the relevant necessary actions under four headings, namely: institutional, sectoral, location- specific and long-term issues.

The institutional aspects reflect the need of inter-sectoral cooperation to tackle environmental problems which need new and appropriate institutional mechanisms at national and local levels. The sectoral action reflects the way the Ministries and agencies are organized and makes it easier to identify the agency to carry out the recommended actions. The location-specific action focuses particularly on acute environmental problems at local levels that need to be addressed on a priority basis. The long-term actions include environmental degradation to such degree that might become even more serious and threatening, if cognizance is not taken immediately.

2.1.2.6 The Noise Pollution Control Rules, 2006

The Noise Pollution Control Rules have been established in order to manage noise generating activities which have the potential to impact the health and wellbeing of workers and the surrounding communities. Under this legislation, control zones are listed as:

- Quiet Area – for example school or hospital;
- Residential Area – an area primarily occupied by dwellings;
- Mixed Area – area with a mix of residential, commercial and industrial land uses;
- Commercial Area – an area primarily occupied by businesses and officers; and
- Industrial Area – and area used for industry or manufacturing.

Day-time and night-time noise level restrictions are provided for these areas. Additionally, limits are provided for noise emissions from motor vehicles and boats.

2.1.2.7 Bangladesh Wildlife (Preservation) Order, 1973 (Amended in 1994)

This order aims to protect and conserve wildlife in Bangladesh. Wildlife preservation, conservation and management fall within the jurisdiction of the Forestry Department. Protection of wildlife is provided with lists of species within three schedules of the Order:

First Schedule Part I: List of crustaceans, amphibians, reptiles, birds and mammals of Bangladesh which are open to shooting and may be hunted with an ordinary game hunting permit (though since 1988 no hunting permits have been issued by the Government);

First Schedule Part II: List of mammals, reptiles and birds of Bangladesh where hunting is permissible with a special permit (problem animals and pest species);

Second Schedule: Wild animals, trophies or meat for which a certificate is required for lawful possession, transfer or import; and

Third Schedule: Protected animals i.e. those species that are not to be hunted, killed or captured.

The GOB, under the provisions of the Act, has established three categories of protected areas being National Parks, Wildlife Sanctuaries and Game Reserves. In addition to these, the GoB has declared

14 protected areas and is considering declaring more. Further, the GoB has recently declared 7 areas as ECA's under the ECA, 1995. These are Hakaluki Haor, Sonadia Island, St. Martin's Island, and Teknaf Peninsula (including the Cox's Bazar Sea Beach but not the buffer zones), Tanguar Haor, Marjat Baor and outside of Sundarbans Reserved Forest to an extent of 10 km.

2.1.2.8 The Protection and Conservation of Fish Rules, 1985

The Protection and Conservation of Fish Rules 1985 are a set of rules in line with the overall objectives of the East-Bengal Protection and Fish Conservation Act. The Rules require that *"no person* shall destroy or make any attempt to destroy any fish by explosives, gun, bow and arrow in inland *waters or within coastal waters".* Further, the Rules states *"…no person shall destroy or make any* attempt to destroy any fish by poisoning of water or the depletion of fisheries by pollution, by trade *effluents or otherwise in inland waters".*

The Project will comply with these rules by enacting appropriate mitigation measures to reduce the potential for pollution of waterways, depletion of fisheries or disturbance of fish populations within the Project area.

2.1.2.9 Wetland Policy, 1998 (draft)

The wetland policy is relevant to the existing bridge project because it seeks to:

- Conserve wetlands to sustain their ecological and socio-economic functions and further sustainable development;
- Establish key principles for wetland sustainability and unsustainable practices;
- Maintain existing levels of biodiversity;
- Maintain wetland functions and values; and
- Actively promote integration of wetland functions in resources management and economic development decision taking.

2.1.2.10 The Chittagong Hill Tracts Regulation 1900

Chittagong Hill Tracts Regulation, 1900 (Act 1 of 1900) popularly known as Chittagong Hill Tracts manual is enacted by the then British Government containing instruction as to how to administer that area. It was adopted in place of earlier manuals after the government realized that the act of 1860AD would not work satisfactorily. Since the adoption of the manual, the administration of Chittagong Hill Tracts was carried on in accrdance with the rules of the manual. The prime features of CHT manual were as follows: (i) Chittagong Hill Tracts was made out of bounds for a non-hill man unless he was in possession of a permit issued by the Deputy Commissioner(D.C) at his discretion; (ii) The DC was given the right to expel anyone who was not a native of the district (non-tribal) if he was found to be harmful/injurious to the peaceful administration of the district; (iii) No one shall in future be permitted to hold more than 25 acres (10 ha) of land in all whether under one lease or more than one lease and lease may be granted only to hill men provided that non-hill men of the cultivating classes actually residents in a village maybe given lease in that village; (iv) Registration Act 1908 is not applicable to Chittagong Hill Tracts. Rules no. 12-33 of the Regulation deal with registration of documents there; (v) The headmen were in charge of the administration of Mouza (smallest revenue unit of a district) and they were appointed by the D.C in consultation of sub-divisional officer, the chief and inhabitants of Mouza. Without

a Headman's recommendation no settlement or transfer cases of land could be processed; (vi) Nowadays this provision and other provisions of CHT manual protecting the interests of the tribes are more disregarded than followed.

2.1.2.11 The Chittagong Hill Tracts (Land Acquisition) Regulation, 1958

Under this regulation land acquisition in CHT area can be carried out. (1) When any land held on valid title, which is not resumable under the Chittagong Hill Tracts Regulation, 1900 (Regu. I of 1900) or the rules made thereunder, is required for any public purpose, the Deputy Commissioner may acquire such land by an order in writing; (2) When an order is made under sub-section (1), the Deputy Commissioner shall serve a copy of such order on the person or persons interested: Provided that if the Deputy Commissioner is of the opinion that the service of the copy of such order on each such person will cause delay in taking possession of the land, he may dispense with such service and cause a public notice of such order to be given at convenient places in the locality. (3)On and from the date of service of a copy of the order or publication of a notice under sub-section (2), the land so acquired shall vest absolutely in the Provincial Government free from all incumbrances and the Deputy Commissioner may take possession of such land by using such force as may be necessary.

2.1.2.12 The Transfer of Property Act of 1882 (Act No. IV of 1882)

The Act relates to transfer of properties. It came into force on the first day of July, 1982. The Act defined any transaction relating to immovable property is required by law to be and has been effected by registered instruments. According to the Act No. IV of 1882 donor can transfer his/their property for the benefit of the public in the advancement of religion, knowledge, commerce, health, safety, or any other object beneficial to mankind and the transfer must be effected by registration.

2.1.2.13 Acquisition and Requisition of Immovable Properties Act 2017

The basic principles behind compensation of property in Bangladesh are founded in Articles 42 and 47 of the Constitution (1972). The Government of Bangladesh used The Acquisition and Requisition of Immovable Property Ordinance (ARIPO), 1982 and amended in 1983, 1993 and 1994 as the main instrument for acquisition and requisition of immovable properties up to the enactment of Acquisition and Requisition of Immovable Properties Act 2017.

The Government of Bangladesh updated the Acquisition and Requisition of immovable properties Ordinance, 1982 as The Acquisition and Requisition of Immovable Properties Act, 2017. The Act defines the process to claim compensation and established the right of objection to acquisition. Both the Ordinance of 1982 and Act of 2017 provide the Deputy Commissioner (DC) with the power to initiate the acquisition of any property in any locality within his district that is likely to be needed for a public purpose or in the public interest.

The ARIPO 1982 updated as ARIPA 2017 with a significant change in the amount of compensation for affected properties. The Act defines in case of acquisition of private immovable property by government the affected persons will get compensation of three times market price of the affected property. If government acquires land or other property for private organizations on the ground of public interest the affected persons will get compensation of four times market price of the land. Market price of the affected land will be fixed on the average registration value of land of that area for last 12 months. The Law also specified the term “Public interest”.

There is provision in the Act that, for acquiring land of worships like mosques, temples, graveyards, for 'indispensable public interest' on condition of relocate in a suitable place by government.

The requiring body (the organizations concerned willing to acquire land) will get 120 days timeframe instead of 60 days to the concerned DC Office for paying compensation amount assessed by the DC Office.

2.1.2.14 Property (Emergency) Acquisition Act, 1989

The Act was formulated to expedite the emergency acquisition of land to enable the Government 'to control inundation, flood and upsurge caused by natural calamity and to prevent river erosion. The 1989 Act was not meant to replace the 1982 Ordinance, but to complement it for special circumstances. Normally, acquisition of land for development purposes would not come under the 1989 Act. Use of this Act to acquire land for development would require extremely compelling reasons.

2.1.2.15 Framework for leasing of Government (Khas) agricultural land

The rules for managing and leasing Government-owned (Khas) land are notified through two Bangladesh Gazette notifications i.e.: (1) Notification: Bhumo/Sha-8/Kha-jo-bo/46/84/261, Bangladesh Gazette Extra Edition dated May 12, 1997, pp 1527-1536; and (2) Notification:

Shuno/Sha-4/Kri-kha-jo--bo-1/98-264, Bangladesh Gazette, September 15, 1998.

Under these regulations, the Government leases cultivable agricultural land in the rural areas to landless farming households. The allotments cannot be more than one acre, except in the southern districts where up to 1.5 acres of char land can be allotted.

The regulation further defines structure and responsibilities for management and leasing of Khas Lands at the National, District, and Thana levels.

2.1.3 The GoB Seventh Five Year Plan 2016-2020

The GoB approved 7th Five Year Plan (2016-20) in October 2015 aiming to empower people by creating employment and skill development opportunities, supplying credit for SME development and many other ways for people to be more productive. Along with growth, the Plan will emphasize social

protection, urban transition and a sustainable development pathway resilient to disaster and climate change.

The Seventh five year plan has also adopted following major policies and policy actions for environment sustainability:

- Increase productive forest coverage to 20 percent;
- Improve air quality in Dhaka and other large cities and enact Clean Air Act;
- Promote Zero discharge of industrial effluents;
- Urban wetlands are restored and protected in line with Wetland Conservation Act;
- At least 15% of the wetland in peak dry season is protected as aquatic sanctuary;
- 500 meter wide permanent green belt established and protected along the coast;
- Land zoning for sustainable land/water use completed;

- Environmental, Climate Change and disaster risk reduction considerations are integrated into project design, budgetary allocations and implementation process; and
- Canals and natural water flows of Dhaka and other major cities restored.

2.1.4 Relevant Sectoral Policies and Guidelines

2.1.4.1 National Water Policy (NWP), 1999

The NWP promulgated in 1999 with the intension of guiding both public and private actions in the future for ensuring optimal development and management of water that benefit both individuals and the society at large. The policy aims to ensure progress towards fulfilling national goals of economic developments, poverty alleviation, food security, public health and safety, decent standard of living for the people and protection of natural environment. According to the policy, all agencies and departments entrusted with water resource management responsibilities (regulation, planning, construction, operation, and maintenance) will have to enhance environmental amenities and ensure that environmental resources are protected and restored in executing their tasks. Environmental needs and objectives will be treated equally with the resources management needs.

The policy has several clauses related to the protection and prevention of the natural environment for ensuring sustainable development. Some of the relevant clauses are:

Clause 4.5b: Planning and feasibility studies of all projects will follow the Guidelines for Project Assessment, the Guidelines for People's Participation (GPP), the Guidelines for EIA and all other instructions that may be issued from time to time by the Government.

Clause 4.9b: Measures will be taken to minimize disruption to the natural aquatic environment in streams and water channels.

Clause 4.9e: Water development plans will not interrupt fish movement and will make adequate provisions in control structures for allowing fish migration and breeding.

Clause 4.10a: Water development projects should cause minimal disruption to navigation and, where necessary, adequate mitigation measures should be taken.

Clause 4.12a: Give full consideration to environmental protection, restoration and enhancement measures consistent with NEMAP and the NWMP.

Clause 4.12c: Ensure adequate upland flow in water channels to preserve the coastal estuary ecosystem threatened by intrusion of salinity from the sea.

2.1.4.2 National Water Management Plan (NWMP), 2001 (approved in 2004)

The National Water Resources Council approved on March 31, 2004 a 25-year National Water Management Plan. The plan provides a framework within which all concerned with the development, management and use of water resources water services in Bangladesh can plan and implement their own activities in a coordinated and integrated manner. The planned activity programs have been

presented in the eight sub-sectoral clusters: i) Institutional Development, ii) Enabling Environment, iii) Main River, iv) Towns and Rural Areas, v) Major Cities; vi) Disaster Management; vii) Agriculture and Water Management, and viii) Environment and Aquatic Resources. Each cluster comprises of a number of individual programs. WARPO was assigned to monitor the NWMP.

2.1.4.3 National Forest Policy, 1994

The National Forestry Policy of 1994 is the revised version of the National Forest Policy of 1977 in the light of the National Forestry Master Plan. The major targets of the Policy are to conserve the existing forest areas; bring about 20% of the country's land area under the afforestation program, and increase the reserve forestland by 10% by the year 2015 through coordinated efforts of GO-NGOs and active participation of the people.

The need of amendments of the existing forestry sector related laws and adoption of new laws for sectoral activities have been recognized as important conditions for achieving the policy goals and objectives. The Forest Policy also recognizes the importance of fulfilling the responsibilities and commitments under international multilateral environmental agreements.

2.1.4.4 National Fisheries Policy, 1999

The National Fisheries Policy, 1999 was formulated following review and intent of the East-Bengal Protection and Conservation of Fish Act 1950, which was updated by the Protection and Conservation of Fish (Amendment) Ordinance 1982 and further refined by the Protection and Conservation of Fish (Amendment) Act 1995. These Acts and ordinance provide provisions for the protection and conservation of fish in fresh water and brackish water bodies.

The Fisheries Policy highlights the need to conserve fish breeding grounds and habitats. It intends to promote fisheries development and conservation in all water bodies. The project should consider these policies to protect the habitats, migration and connectivity of fish and fisheries resources around the project area. Measures to reduce any potential negative impacts on local fish populations will be incorporated into all stages of the Project.

2.1.4.5 National Agricultural Policy, 1999

The overall objective of the National Agriculture Policy is to make the nation self-sufficient in food through increasing production of all crops including cereals and ensure a dependable food security system for all. One of the specific objectives of National Agricultural Policy is to take necessary steps to ensure environmental protection as well as environment-friendly sustainable agriculture. Through increased use of organic manure and strengthening of the integrated pest management program. The policy also suggests creating awareness so that the chemical fertilizers and pesticides used for increased crop production do not turn out to be responsible for environmental pollution. Water logging and salinity are identified as one of the serious problem in some parts of the country including the coastal areas for agricultural activities and environmental damage. The policy recommends for crop rotation and salt tolerant crop varieties.

2.1.4.6 National Land Use Policy, 2001

The National Land Use Policy was enacted in 2001, aims at managing land use effectively to support trends in accelerated urbanization, industrialization and diversification of development activities. The policy urges that increasing the land area of the country may be not possible through artificial land reclamation process, which is cost-effective only in the long run. Major content of this policy are following:

- Stopping the high conversion rate of agricultural land to non-agricultural purposes;

- Utilizing agro-ecological zones to determine maximum land-use efficiency;
- Adopting measures to discourage the conversion of agricultural land for urban or development purposes;
- Improving the environmental sustainability of land-use practice

2.1.4.7 Coastal Zone Policy, 2005

Coastal zone policy initiated as a harmonized policy that transcends beyond sectoral perspectives. The policy provides general guidance so that the coastal people can pursue their livelihoods under secured conditions in a sustainable manner without impairing the integrity of the natural environment. The policy framework underscores sustainable management of natural resources like inland fisheries & shrimp, marine fisheries, marine fisheries, mangrove and other forests, land, livestock, salt, minerals, sources of renewable energy like tide, wind and solar energy. It also emphasis on conservation and enhancement of critical ecosystem- necessary measures will be taken to conserve and develop aquatic and terrestrial including all the ecosystems of importance identified by the Bangladesh National Conservation Strategy (Mangrove, coral reef, tidal wetland, sea grass bed, barrier island, estuary, closed water body, etc.).

2.1.4.8 Coastal Development Strategy, 2006

Coastal Development Strategy has been approved by the Inter-Ministerial Steering Committee on ICZMP project on February 13, 2006. The strategy is based on the Coastal Zone Policy and takes into account the emerging trends: increasing urbanization, changing pattern of land use, declining land and water resources, unemployment and visible climate change impacts. The strategy has 9 strategic priorities and the following 3 are relevant priorities with proposed type of interventions:

- Safety from man-made and natural hazards;
- Sustainable management of natural resources;
- Environmental conservation.

2.1.4.9 National Strategy for Waste Management

The strategy for solid waste management is essential in order to minimize the environmental, social and economic problems. To minimize these problems, recently the GoB has taken some initiatives and accordingly in December 2010, the DoE under MOEF has formulated a national '3R' strategy for waste management in a draft form. It is the latest strategy which will take time to implement globally. For the proposed project, the '3R' strategy shall be followed to minimize the waste impact on environment.

The concept of this strategy is minimizing waste impacts in terms of quantity or ill-effects, by reducing the quantity of waste products with simple treatments and recycling the wastes by using it as resources to produce same or modified products. The principle of '3R' is stated as reducing waste, reusing and recycling resources and products.

- Reducing means choosing to use with items with care to reduce the amount of waste generated.
- Reusing involves the repeated use of items or parts of items which still have usable aspects
- Recycling means the use of waste itself as resources.

2.1.4.10 The Embankment and Drainage Act, 1952

The East Bangle Act No. 1, 1953 was amended in 1953 which has been adapted by the People Republic of Bangladesh, by the Bangladesh Order (adaptation of Existing Laws), 1972 (President's Order No. 48 of 1972). The Act consolidates the laws relating to embankments and drainage providing provision for the construction, maintenance, management, removal and control of embankments and water courses for the better drainage of lands and for their protection from floods, erosion or other damage by water.

The specific Sections and Articles relevant to the project are mentioned below:

- **Section 4 (1)** of the Act states that the embankment, water-course, and tow-path, earth, pathways, gates, berms and hedges of the embankments shall vest in the Government of the Authority (BWDB).
- **Section 56 (1)** states that, person will be subject to penalty (500 taka or imprisonment… if he erects, or causes of willfully permits to be erected, any new embankment, or any existing embankment, or obstructs of diverts, or causes or willfully permits to be obstructed or diverted, any water course).
- **Section 15** allows for the engineer (engineer in charge of Divisional level BWDB) for constructing new embankment or enlarging, lengthening or repairing existing embankments.
- The other sections of the Act give powers and access to the Government or Authority or Engineers to commence necessary project activities, for land acquisition (through the DC), and site clearing activities including removal of trees or houses (if necessary).

2.1.4.11 Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009

The GOB also prepared the BCCSAP in 2008 and revised in 2009. This is a comprehensive strategy to address Climate Change (CC) challenges in Bangladesh. BCCSAP built on and expanded the NAPA. It is built around the following six themes:

- **Food security, social protection and health** to ensure that the poorest and most vulnerable in society, including women and children, are protected from CC and that all programs focus on the needs of this group for food security, safe housing, employment and access to basic services, including health.
- **Comprehensive disaster management** to further strengthen the country's already proven disaster management systems to deal with increasingly frequent and severe natural calamities.
- **Infrastructure** to ensure that existing assets (e.g., coastal and river embankments) are well maintained and fit for purpose and that urgently needed infrastructure (cyclone shelters and urban drainage) is put in place to deal with the likely impacts of climate change.
- **Research and Knowledge management** to predict that the likely scale and timing of CC impacts on different sectors of economy and socio-economic groups; to underpin future investment strategies; and to ensure that Bangladesh is networked into the latest global thinking on climate change.
- **Mitigation and low carbon development** to evolve low carbon development options and implement these as the country's economy grows over the coming decades.
- **Capacity building and Institutional strengthening** to enhance the capacity govt. ministries, civil society and private sector to meet the challenge of CC.

2.1.4.12 Bangladesh Labor Act, 2006

This Act pertains to the occupational rights and safety of workers and the provision of a comfortable work environment and reasonable working conditions. In the chapter VI of this law safety precaution regarding explosive or inflammable dust/gas, protection of eyes, protection against fire, works with cranes and other lifting machinery, lifting of excessive weights are described. And in the Chapter VIII provision safety measure like as appliances of first aid, maintenance of safety record book, rooms for children, housing facilities, medical care, group insurance etc. are illustrated.

2.1.4.13 National Land Transport Policy (NLTP), 2004

The government approved the NLTP in April 2004, which introduced the concept of long-term network planning and integration of transport policy, planning and appraisal across land transport modes. Each sub-sector undertakes physical and institutional improvement in line with its long-term policy provided in the NLTP with each sub-sector master plan. Major issues by sub-sector include (i) maintenance financing, quality, safety and overloading in major roads; (ii) better planning in rural roads; (iii) restructuring Bangladesh Railways into a commercially oriented organization in conjunction

with substantial investment in infrastructure, rolling stocks and wagons, equipment, and technical modernization; (iv) efficient dredging and tariff regulation in inland waterways; and (v) operation efficiency improvements in ports. As indicated in the NLTP, environmental adaptation needs to be taken into account in project assessment, which will help mitigate climate change.

2.1.4.14 Vehicle Act, 1927, the Motor Vehicle Ordinance 1983

Key features of the vehicle act, 1927, the motor vehicle ordinance 1983 is as follows:

- Exhaust emission;
- Vehicular air and noise pollution;
- Road/traffic safety;
- Vehicle Licensing and Registration;
- Fitness of Motor Vehicles;
- Parking by laws.

2.1.4.15 The Brick Burning (control) Act, 1989

This Act has been promulgated to control the process of brick burning. This requires operators to obtain a license from the appropriate authority (DC) before the commencement of brick burning. The Act restricts brick burning with fuel wood and categorically mentions that no one is permitted to use fuel wood for brick burning. The Act has a provision of punitive measures of imprisonment for six months or a fine of Taka Fifty thousand only or both. The Act also provides for inspection of the brick fields to check the use of fuel wood and the inspecting authority has the right to confiscate all the bricks and fuel wood found on the particular brickfield.

2.1.4.16 Brick Burning (control) (Amendment) Act 1992

This Act was promulgated in July 1992 and was intended to amend certain elements of the Act of 1989. The two major issues requiring special mention in this regard is the shifting of authority from the

UP Chairman to the DC and the re-definition of fuel. In this Act the definition of fuel is any floral based fuel other than the dead (motha) of the bamboo. The Act replaces the definition of fuel wood enunciated in the earlier act with this fuel.

2.1.4.17 The National Biodiversity Strategy & Action Plan (NBSAP), 2004

NBSAP for Bangladesh, 2004 provides a framework for conservation, sustainable use and sharing the benefits of Biodiversity of the country. A major focus of the NBSAP, 2004 is the need for cross–sectoral linkages, reflecting the fact that in Bangladesh, biodiversity conservation is closely inter-woven with social and economic development. Thus, the NBSAP also provides a framework for securing the necessary environmental conditions to reduce poverty, ensure sustainable development and respond to the implementation of elements of the country's PRSP.

2.2 Donor Agencies

2.2.1 Relevant Policies and Guidelines of World Bank

2.2.1.1 Environmental Assessment (OP/BP 4.01)

The Bank requires Environmental Assessment of projects proposed for Bank support to ensure that they are environmentally sound and sustainable and thus to improve decision making. The EA is a process whose breadth, depth and type of analysis depend on the nature, scale and potential environmental impact of the proposed project. The EA evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design and implementation by preventing, minimizing, mitigating orcompensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. EA takes into account the natural environment (Air, Water and Land); human health and safety; social aspects (involuntary resettlement, indigenous peoples and physical cultural resources); and transboundary and global environmental aspects. The borrower is responsible for carrying out the EA and the Bank advises the borrower on the Bank's EA requirements.

The Bank classifies the proposed project into three major categories, depending on the type, location, sensitivity and scale of the project and the nature and magnitude of its potential environmental impacts. These are follows:

Project Category	Significance and nature of impacts
Category A	The proposed project is likely to have significant adverse environmental impacts that are sensitive, diverse or unprecedented. These impacts may affect an area broader than the sites or facilities subject to physical works.
Category B	The proposed project's potential adverse environmental impacts on human population or environmentally important areas-including wetlands, forests, grasslands, or other natural habitats-are less adverse than those of Category-A

	projects. These impacts are site specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than Category-A projects.
Category C	The proposed project is likely to have minimal or no adverse environmental impacts.

2.2.1.2 Natural Habitats (OP/BP 4.04)

The conservation of natural habitats, like other measures that protect and enhance the environment, is essential for long-term sustainable development. The Bank therefore supports the protection, maintenance and rehabilitation of natural habitats and their functions in its economic and sector work, project financing, and policy dialogue. The Bank supports and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development. The Bank promotes and supports natural habitat conservation and improved land use by financing projects designed to integrate into national and regional development the conservation of natural habitats and the maintenance of ecological functions. Furthermore, the Bank promotes the rehabilitation of degraded natural habitats. The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats.

2.2.1.3 Indigenous Peoples (OP 4.10)

This policy contributes to the Bank's mission of poverty reduction and sustainable development by ensuring that the development process fully respects the dignity, human rights, economies, and cultures of Indigenous Peoples. For all projects that are proposed for Bank financing and affect Indigenous Peoples, the Bank requires the borrower to engage in a process of free, prior, and informed consultation. The Bank provides project financing only where free, prior, and informed consultation results in broad community support to the project by the affected Indigenous Peoples.

Such Bank-financed projects include measures to (a) avoid potentially adverse effects on the Indigenous Peoples' communities; or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.

The Bank recognizes that the identities and cultures of Indigenous Peoples are inextricably linked to *the lands on which they live* and the natural resources on which they depend. These distinct circumstances expose Indigenous Peoples to different types of risks and levels of impacts from development projects, including loss of identity, culture, and customary livelihoods, as well as exposure to disease. Gender and intergenerational issues among indigenous Peoples also is complex. As social groups with identities that are often distinct from dominant groups in their national societies, Indigenous Peoples are frequently among the most marginalized and vulnerable segments of the population. As a result, their economic, social, and legal status often limits their capacity to defend their interests in and rights to lands, territories, and other productive resources, and/or restricts their ability to participate in and benefit from development. At the same time, the Bank recognizes that Indigenous Peoples play a vital role in sustainable development and that their rights are increasingly being addressed under both domestic and international law.

2.2.1.4 Physical Cultural Resources (OP/BP 4.11)

Physical cultural resources are defined as movable or immovable objects, sites, structures, groups of structures and natural features and landscapes that have archaeological, paleontological, historical, architectural, religious, aesthetic, or other cultural significance. Their cultural interest may be at the local, provincial or national level, or within the international community. Physical cultural resources are important as sources of valuable scientific and historical information, as assets for economic and social development, and as integral parts of a people's cultural identity and practices. The Bank assists countries to avoid or mitigate adverse impacts on physical cultural resources from development projects that it finances. The impacts on physical cultural resources resulting from project activities, including mitigating measures, may not contravene either the borrower's national legislation, or its obligations under relevant international environmental treaties and agreements. The borrower addresses impacts on physical cultural resources in projects proposed for Bank financing, as an integral part of the EA process. The following projects are classified during the environmental screening process as Category A or B, and are subject to the provisions of this policy: (a) any project involving significant excavations, demolition, movement of earth, flooding, or other environmental changes; and (b) any project located in, or in the vicinity of, a physical cultural resources site recognized by the borrower. Projects specifically designed to support the management or conservation of physical cultural resources are individually reviewed, and are normally classified as Category A or B. When the project is likely to have adverse impacts on physical cultural resources, the borrower identifies appropriate measures for avoiding or mitigating these impacts as part of the EA process. These measures may range from full site protection to selective mitigation, including salvage and documentation, in cases where a portion or all of the physical cultural resources may be lost.

2.2.1.5 Involuntary Resettlement (OP /BP 4.12)

This Policy is based on assisting the displaced persons in their efforts to improve or at least restore their standards of living. The impetus of this Policy is that development undertakings should not cause the impoverishment of the people who are within the area of influence of the undertakings. In cases where resettlement of people is inevitable, or in cases where loss of assets and impacts on the livelihood of the PAPs is experienced, a proper action plan should be undertaken to at least restore, as stated above, their standard of life prior to the undertakings.

Concerning public consultation, resettles as well as the host communities should be consulted for the successful implementation of the resettlement process. The views of the consulted resettles and the host communities should be incorporated into the RAP including the list of their choices.

2.2.1.6 Forestry (OP/BP 4.36)

The Policy envisages the protection of forests through consideration of forest-related impact of all investment operations, ensuring restrictions for operations affecting critical forest conservation areas and improving commercial forest practice through the use of modern certification systems.

In the process of forest conservation interventions, especially the local people, the private sector and other pertinent stakeholders should be consulted. In general, the Policy aims at reducing deforestation and enhancing the environmental and social contribution of forested areas. Experience with the Bank reveals that the Bank does not support commercial logging in primary tropical moist forest.

2.2.2 Policies and Guidelines of Asian Development Bank (ADB)

The ADB Safeguard Policy Statement ('the SPS') 2009 set out the requirements for ADB's operations to undertake an environmental assessment for projects funded by the bank. The goal of the SPS is to promote the sustainability of project outcomes through protecting the environment and people from potential adverse impacts. The overall objectives of the SPS are to:

a) Avoid adverse impacts of projects on the environment and affected people, where possible;

b) Minimize, mitigate, and/or compensate for adverse project impacts on the environment and affected people when avoidance is impossible; and

c) Help borrowers/clients strengthen their safeguard systems and develop the capacity to manage environmental and social risks.

The SPS sets out the ADB policy objectives, scope and triggers and principles for following three key safeguard areas:

a) Environmental Safeguards;

b) Involuntary Resettlement Safeguards along with those vis-à-vis Land Acquisition; and

c) Indigenous Peoples Safeguards.

2.2.2.1 ADB Safeguard Categories

2.2.2.1.1 Environment

Proposed projects are screened according to type, location, scale and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced and cumulative impacts. Projects are classified into the following four categories:

Project Category	Significance and nature of impacts
Category A	A proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An EIA including an EMP is required.
Category B	The proposed project's potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases, mitigation measures can be designed more readily than for category "A" projects. An IEE including an EMP is required.
Category C	A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed..

Category FI	A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system unless all of the financial intermediary's business activities have minimal or no environmental impacts or risks.

2.2.2.1.2 Involuntary Resettlement

The involuntary resettlement impacts of an ADB-supported project are considered significant if 200 or more persons will be physically displaced from home or lose 10% or more of their productive or income-generating assets. Projects are classified into the following four categories:

Project Category	Significance and nature of impacts
Category A	A proposed project is likely to have significant involuntary resettlement impacts. A resettlement plan, which includes assessment of social impacts, is required.
Category B	A proposed project includes involuntary resettlement impacts that are not deemed significant. A resettlement plan, which includes assessment of social impacts, is required.
Category C	A proposed project has no involuntary resettlement impacts. No further actionis required.
Category FI	A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system unless all of the financial intermediary's business activities are unlikely to generate involuntary impacts.

2.2.2.1.3 Indigenous Peoples

The impacts of an ADB supported project on indigenous peoples are determined by assessing:

the magnitude of impact in terms of

- customary rights of use and access to land and natural resources;
- socio-economic status;
- cultural and communal integrity;
- health, education, livelihood and social security status; and
- the recognition of indigenous knowledge; and
- The level of vulnerability of the affected Indigenous Peoples community. Projects are classified into the following four categories:

Project Category	Significance and nature of impacts

Category A	A proposed project is likely to have significant impacts on indigenous peoples. An indigenous peoples plan (IPP), including assessment of social impacts, is required.
Category B	A proposed project is likely to have limited impacts on indigenous peoples. An IPP, including assessment of social impacts, is required.
Category C	A proposed project is not expected to have impacts on indigenous peoples. No further action is required.
Category FI	A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system unless all of the financial intermediary's business activities unlikely to have impacts on indigenous peoples.

2.2.3 JICA Guidelines for Environmental and Social considerations

2.2.3.1 Overview of Guidelines

JICA has prepared "Guidelines for Environmental and Social Considerations, April 2010" as thereferential guidelines for environmental and social considerations. The objectives of the guidelinesare to encourage project proponents etc. to have appropriate consideration for environmental and social impacts, as well as to ensure that JICA's support for and examination of environmental and social considerations are conducted accordingly. The guidelines outline JICA's responsibilities and procedures, along with its requirements for project proponents etc., in order to facilitate the achievement of these objectives. In doing so, JICA endeavors to ensure transparency, predictability, and accountability in its support by considering environmental and social issues.

JICA guidelines support EIA that incorporates social assessment on a par with environmental assessment. JICA identifies seven principles to guide the assessment process:

a) A wide range of impacts must be addressed;
b) Measures for environmental and social considerations must be implemented from an early stage to a monitoring stage;
c) JICA is responsible for accountability when implementing cooperation projects;
d) JICA asks stakeholders for their participation;
e) JICA discloses information;
f) JICA enhances organizational capacity; and
g) JICA makes serious attempts at promptness

2.2.3.2 JICA Project Categorization

JICA categorizes projects in a way that does not materially differ from the methods of other international and national agencies. JICA classifies projects into four categories according to the extent of environmental and social impacts, taking into account an outline of project, scale, site condition, etc. The four categories are as follows:

Project Category	Significance and nature of impacts

Category A	Proposed projects are classified as Category A if they are likely to have significant adverse impacts on the environment and society.
Category B	Proposed projects are classified as Category B if their potential adverse impacts on the environment and society are less adverse than those of Category A projects.
Category C	Proposed projects are classified as Category C if they are likely to have minimal or little adverse impact on the environment and society.
Category FI	A proposed project is classified as Category FI if it satisfies all of the followings: • JICA's funding of the project is provided to a financial intermediary or executing agency; • The selection and appraisal of the components is substantially undertaken by such an institution only after JICA's approval of the funding, so that the components cannot be specified prior to JICA's approval of funding (or project appraisal); and • Those components are expected to have a potential impact on the environment.

Over a certain period of time, JICA confirms with project proponents etc. the result s of monitoring the items that have significant environmental impacts. This is done in order to confirm that project proponents etc. are undertaking environmental and social considerations for projects that fall under Categories A, B, and FI.

Table 2-1: IFC Performance Standards

Performance Standard	Specific Areas
Performance Standard 1	Assessment and Management of Environmental and Social Risks and Impacts
Performance Standard 2	Labour and Working Conditions
Performance Standard 3	Resource Efficiency and Pollution
Performance Standard 4	Community Health, Safety and Security
Performance Standard 5	Land Acquisition and Involuntary Resettlement
Performance Standard 6	Biodiversity Conservation & Sustainable Management of Living Natural Resources
Performance Standard 7	Indigenous
Performance Standard 8	Cultural Heritage

These performance Standards and guidelines provide ways and means to identify impacts and affected stakeholders and lay down processes for management and mitigation of adverse impacts. A brief on the requirements as laid down in the performance standards is described in the following subsections.

Following sub-section tries to provide the requirements of the specific PS, so as to set up the context for matching the requirements of these PS during the various stages of the life cycle of the Project.

2.2.4 Assessment and management of environmental and social risks

2.2.4.1 Assessment & Management of Environmental & Social Risks & Impacts (PS-1)

The PS-1 requires Social and Environmental Assessment and Management Systems for managing social and environmental performance throughout the lifecycle of this Project and runs through all subsequent PSs. The main elements of PS-1 include:

- A Social and Environmental Assessment to understand the social and environmental impacts and risks;
- A Management Program for mitigating the impacts and minimizing the risks identified in the assessment;
- Establishing and ensuring organizational capacity and requisite training to the staff to implement the Management Programme;
- Identification and engagement with range of stakeholders that may be interested in their actions;
- Development and implementation of stakeholder engagement plan that is scaled to the project risks and impacts and development stage and tailored to the characteristics and interests of the affected community;
- Engagement and consultation with the affected communities, subject to identified risks and adverse impacts from a project;
- Informed Consultation and Participation (ICP) process for projects with potentials significant adverse impacts on affected communities;
- For projects with adverse impacts to Indigenous Peoples, requirement to engage them in a process of ICP and in certain circumstances requirement to obtain their Free, Prior and Informed Consent (FPIC);
- Implementation and maintenance of procedure for external communications to receive and register external communications from the Public and their Redress;
- Adequate monitoring and reporting systems to measure and report the effectiveness of the Management Programs.

The social and environmental performance is a continuous process to be initiated by the management and would involve communication between the organization, its workers and local communities directly affected by the Project. The PS requires that Project proponent initiate a regular assessment of the potential social and environmental risks and impacts and consistently tries to mitigate and manage strategy on an ongoing basis.

2.2.4.2 Labour and Working Conditions (PS-2)

The economic growth through employment creation and income generation is recognized and balanced protecting the basic rights of workers. PS-2 is guided by the various conventions of ILO and outlines the minimum requirements of working conditions, protection to the workforce (including issues of child and forced labor) and ensuring occupational health and safety of both its 'employees' as well as 'non employees' working through contractors. The PS requires:

- Establishment of a sound worker-management relationship;
- Encouraging equal opportunity and fair treatment of workers;
- Promoting compliance with national labor and employment laws;
- Management of accommodation services with provision of basic services;
- Promoting healthy and safe working conditions for workers; and
- Analysis of alternatives for retrenchment prior to implementing any collective dismissals.

PS-2 requires project proponents to conduct its activities in a manner consistent with the four core labor standards (child labor, forced labor, non-discrimination, and freedom of association and collective bargaining). In addition, PS-2 also addresses other areas such as working conditions and terms of employment, retrenchment, and occupational health and safety issues.

Some of these requirements refer to the applicable national law. Whereas national law establishes standards that are less stringent than those in PS-2 or are silent, the project proponent is expected to meet the requirements of PS-2.

2.2.4.3 Resource Efficiency and Pollution Prevention (PS-3)

PS-3 outline a project level approach to resource efficiency and pollution prevention and control in line with internationally disseminated technologies and practices with objectives to:

- avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from activities;
- Promote more sustainable use of resources, including energy and water; and
- Reduce project-related GHG emissions.

Key requirements of PS-3 are to consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention principles and techniques that are best suited to avoid or where avoidance is not possible, minimize adverse impacts on human health and the environment during the entire project lifecycle. In addition, a project needs to follow Good International Industry Practice (GIIP), as reflected in various internationally recognized sources including the World Bank Group Environmental, Health and Safety Guidelines.

2.2.4.4 Community, Health, Safety and Security (PS-4)

PS-4 concentrates on the responsibility that must be undertaken by the client to avoid or minimize the risks and impacts to the community's health, safety and security that may arise from project activities. PS-4 requires a project to evaluate risks and impacts to the health and safety of the affected community during the Project life cycle and establish measures to avoid minimize and reduce risks and impacts from the Project.

A project needs to evaluate the risks and impacts to the health and safety of the Affected Communities during the Project life-cycle and require establishing preventive and controlling asures consistent with GIIP, such as in the World Bank Group EHS Guidelines or other internationally recognized sources.

PS-4 recognizes that project activities, equipment, and infrastructure often bring benefits to communities including employment, services and opportunities for economic development. However, projects can also increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures, and releases of hazardous materials.

The performance standard details out project proponents responsibility to avoid or minimize the possible risks and impacts to community health, safety and security that may arise from project activities.

2.2.4.5 Land Acquisition and Involuntary Resettlement (PS-5)

The objectives of this PS are to:

- Avoid or at least minimize the involuntary resettlement wherever feasible by exploring alternative project designs;
- Avoid forced eviction;
- Anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on affected the land use of land by:
  a) Providing compensation for loss of assets at replacement cost; and
  b) Ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected.
- Improve or at least restore the livelihoods and standards of living of displaced persons; and
- Improve living conditions among displaced persons through provision of adequate housing with security of tenure at resettlement sites.

PS-5 requires a project to consider various processes and systems to avoid/minimize social and economic impacts related to land acquisition and resettlement.

- This PS applies to physical or economic displacement resulting from the following types of land transactions:
- Land rights or land use rights acquired through expropriation or other compulsory procedures in accordance with the legal system of the host country;
- Land rights or land us rights acquired through negotiated settlements with property owners or those with legal rights to the land if failure to reach settlement would have resulted in expropriation or other compulsory procedures;
- Project situations where involuntary restrictions on land use and access to natural resources cause a community or groups within a community to lose access to resource usage where they have traditional or recognizable usage rights;
- Certain project situation requiring evictions of people occupying land without formal, traditional or recognizable usage rights; or
- Restriction on access to land or use of other resources including communal property and natural resources such as marine and aquatic resources, timber and non-timber forest products, freshwater, medicinal plants, hunting and gathering grounds and

grazing and cropping areas.

- This PS does not apply to resettlement resulting from voluntary land transactions (i.e., market transactions in which the seller is not obliged to sell and the buyer cannot resort to expropriation or other compulsory procedures sanctioned by the legal system of the host country of the host country if negotiations fail). It also does not apply to impacts on livelihoods where the project is not changing the land use of the affected groups or communities.

2.2.4.6 Biodiversity Conservation and Sustainable Management of Living Natural Resources (PS-6)

PS-6 aims at protecting and conserving biodiversity, the variety of life in all its forms, including genetic, species and ecosystem diversity and its ability to change and evolve, is fundamental to sustainable development. The objectives of this PS are to:

- Project and conserve biodiversity
- Maintain the benefits from ecosystem services; and
- Promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.

The components of biodiversity, as defined in the Convention on Biological Diversity, include ecosystems and habitats, species and communities, and genes and genomes, all of which have social, economic, cultural and scientific importance. This PS addresses how clients can avoid or mitigate threats to biodiversity arising from their operations as well as incorporate sustainable management of renewable natural resources.

PS-6 recognizes that protecting and conserving biodiversity-the variety of life in all its forms, including genetic, species and ecosystem diversity and its ability to change and evolve, is fundamental to sustainable development. It reflects the objectives of the Convention on Biological Diversity to conserve biological diversity and promote use of renewable natural resources in a sustainable manner.

2.2.4.7 Indigenous Peoples (PS-7)

PS-7 acknowledges the possibility of the vulnerability of indigenous people owing to their culture, beliefs, institutions and living standards, and that it may further get compromised by one or other project activity throughout the life cycle of the project. The PS underlines the requirement of avoiding/minimizing adverse impacts on indigenous people in a project area, respecting the local culture and customs, fostering good relationship and ensuring that development benefits are provided to improve their standard of living and livelihoods.

PS-7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalized and vulnerable segments of the population. The term “indigenous people” is more clearly defined in the IFC Guidance Note for PS-7.

Objectives of PS-7 underscore the need to avoid adverse project impacts on Indigenous Peoples’ communities living in the project’s area of influence, or where avoidance is not feasible, to minimize, mitigate or compensate for such impacts through mechanisms that are tailored to their specific

cultural characteristics and expressed needs of the Indigenous Peoples, in a manner commensurate with the scale of project risks and impacts.

2.2.4.8 Cultural Heritage (PS-8)

PS-8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. In addition, the requirements of this PS on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.

PS-8 recognizes the importance of cultural heritage with an objective to:

- Protect cultural heritage from the adverse impacts of project activities;
- Support its preservation; and
- Promote the equitable sharing of benefits from the use of cultural heritage in business activities.

PS requires the project proponent to comply with relevant national law on the protection of cultural heritage, including national law implementing the host country's obligations under the Convention Concerning the Protection of the World Cultural and Natural Heritage and other relevant international law.

2.2.5 Administrative Setup related to Environment in Bangladesh

The MoEF is the nodal agency in the administrative structure of the GOB, for overseeing all environmental matters relating to national environmental policy and regulatory issues in the country. The MoEF oversees the activities of the following technical/implementing agencies:

- Department of Environment (DOE);
- Forest Department (FD);
- Bangladesh Forest Industries Development Corporation (BFIDC);
- Bangladesh Forest Research Institute (BFRI);
- Bangladesh National Herbarium (BNH);
- Water Resources and Planning Organization (WARPO);
- Bangladesh Inland Water Transport Authority (BIWTA);
- Department of Fisheries (DOF);
- Bangladesh Water Development Board (BWDB),
- Local Government Engineering Department (LGED);
- Roads & Highways Department (RHD);
- Bangladesh Agricultural Extension (BAE),
- Bangladesh Road Transportation Authority (BRTA);
- Bangladesh Metrological Department (BMD)
- Union Parishad.

2.2.5.1 Department of Environment (DoE)

The DOE has been placed under the MoEF as its technical wing and is statutorily responsible for the implementation of the ECA, 1995. The principal activities of the DoE are:

- Defining EIA procedures and issuing environmental clearance permits the latter being the legal requirement before the proposed Project can be implemented;
- Providing advice or taking direct action to prevent degradation of the environment;
- Pollution control, including the monitoring of effluent sources and ensuring mitigation of environmental pollution;
- Setting the Quality Standards for environmental parameters;
- Declaring ECAs, where the ecosystem has been degraded to a critical state; and
- Review and evaluation of IEEs and EIAs prepared for projects in Bangladesh.

2.2.5.2 Procedure for obtaining Environmental Clearance from DoE, Bangladesh

The ECR 1997 has classified projects to be assessed by the DoE in four categories based on the severity of impacts on IECs:

- Green: Nil;
- Orange A: minor;
- Orange B: medium; and
- Red: severe.

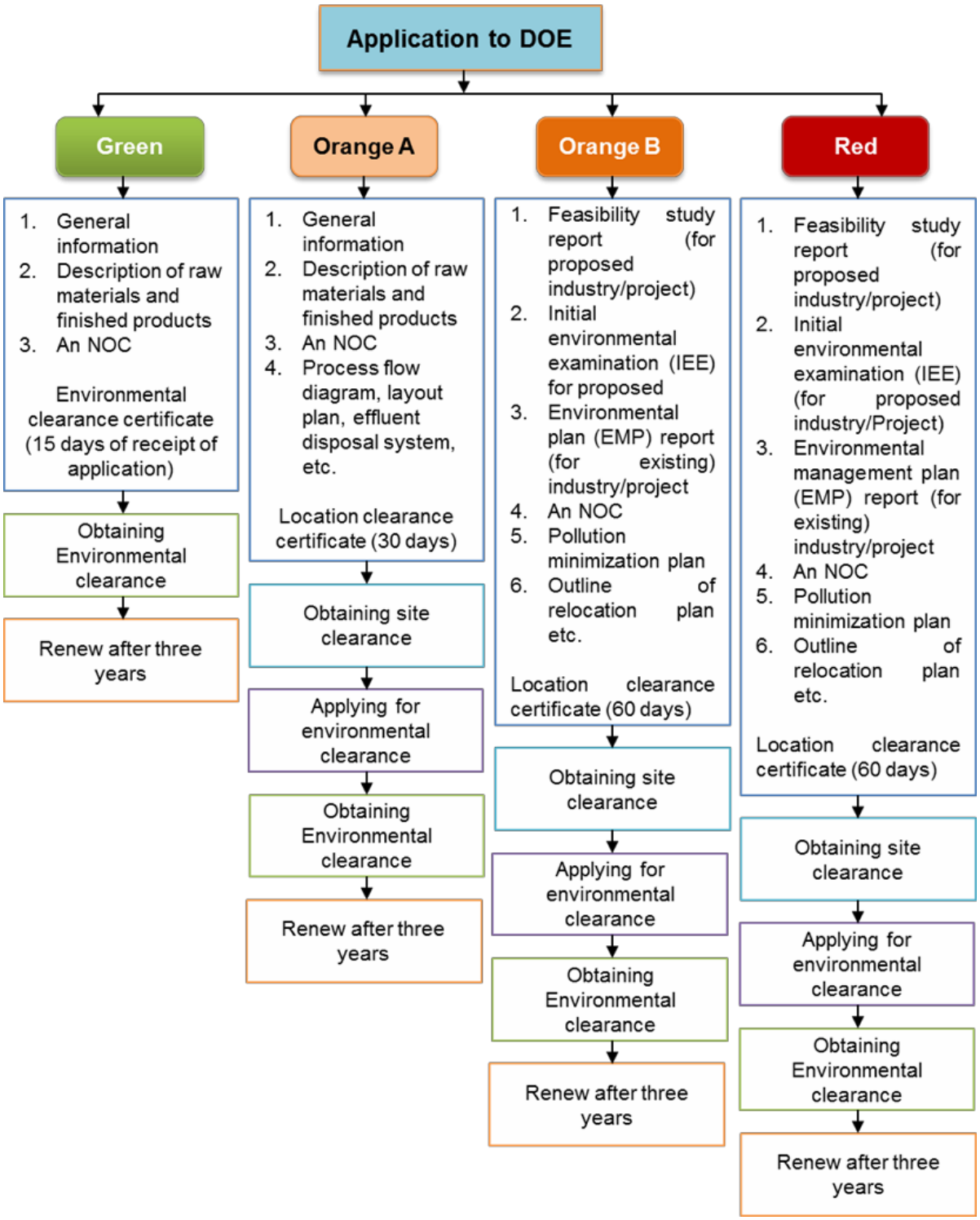
The applicability of environmental clearance and the process in Bangladesh is described in Figure 3-1. The EIA process consists of three stages, screening, IEE and detailed EIA:

- Projects categorized as Green and Orange-A requires no IEE or EIA for environmental clearance however, the proponent has to submit an application in a prescribed format along with specified documents;

- Projects categorized as Orange-B require an IEE to be submitted to the DOE along with an application in a prescribed format and other specified documents; and

- Red category projects require both IEE and EIA. An IEE is required for the location clearance and an EIA is required for the environmental clearance.

Figure 2-1: DOE Environmental Clearance Applicability and Procedure



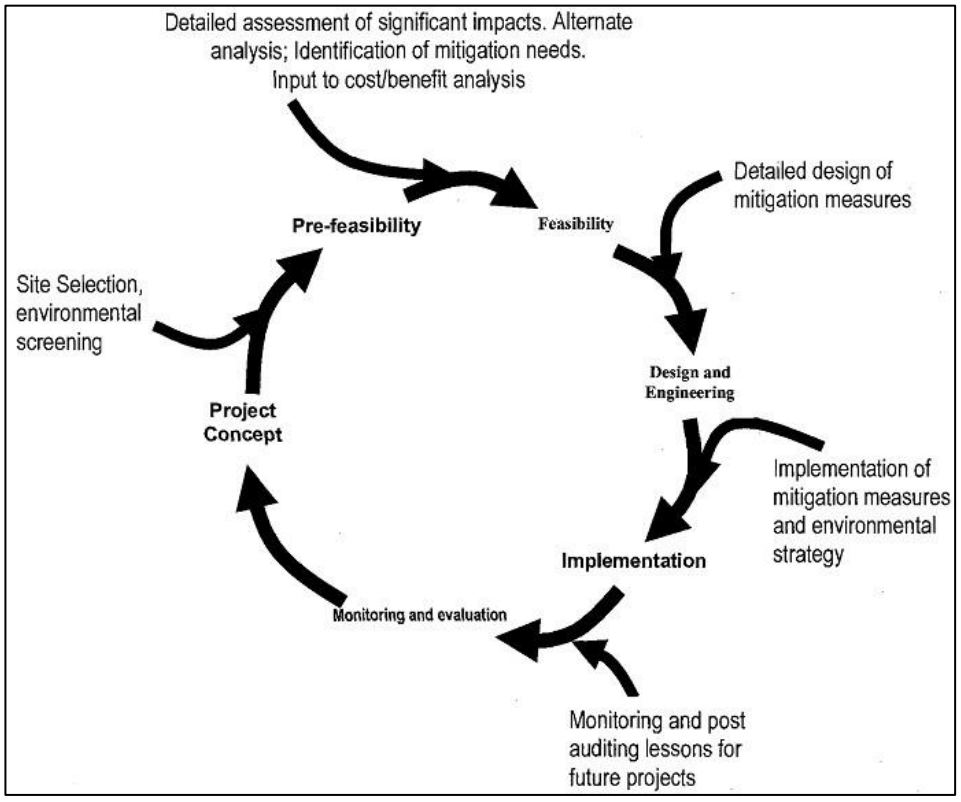
Source: DoE, Bangladesh

CHAPTER THREE : METHODOLOGICAL FRAMEWORK FOR BRIDGE RELATED ENVIRONMENTAL AND SOCIAL ASSESSMENT

3.1 Environmental Assessment Studies in LGED Bridge Projects

This chapter provides an overview of the sequential methodological steps that are to be followed in each assessment exercise that bears relevance to the environmental impacts that are likely to occur in the construction, rehabilitation and maintenance of the bridge program/projects under the LGED. The process is in line with the current guidelines provided by DoE Bangladesh for environmental aspects that require the integration of the environmental assessment process in any project cycles (Figure 3-1)

Figure 3-1: Integration of the environmental assessment process in bridge projects



Source: GoN, 2007

The proposed methodology outlined in this chapter is intended to assist the IEE and EIA consultant as well as the designers, engineers, supervision and monitoring personnel involved in the projects. It gives practical guidance on the process required by the legal provisions (given in Chapter-3 from field identification, preparation of assessment reports, submission and approval, to the implementation of the prescribed management options. The assessment process is summarized in the following Table 3-1.

Table 3-1: Environmental assessment and management steps

Steps in Project Life cycle	Steps in the Environmental Assessment Process
Project Identification	**Environmental Screening:** Need to decide on further needs for an Initial Environmental Examination or a full Environmental Impact Assessment.
	Environmental Scoping: identify significant potential impacts and project alternatives and propose ToR for the identified type of Environmental Assessment
	Terms of Reference (ToR) for the intended IEE/EIA Study
	Initial Environmental Examination (IEE): basic impact assessment, its findings and recommendations to be incorporated into design.
Feasibility Study	**Baseline Data Collection:** Collect measurement of different environmental parameters to identify current environmental conditions related to the proposed project and predict for the future condition
	Environmental Impacts Identification: Predict and identify impacts in terms of characteristics such as magnitude, extent and duration in quantitative terms; include the analysis of potential cumulative/induced impacts. Assess also alternatives including preferred and 'no action' options.
Environmental Assessment	**Develop Management & Mitigation Measures:** Identifies how to avoid, reduce and minimize adverse impacts and enhance beneficial impacts (prepare an EMP matrix and cost proposed actions).
	Public Consultation and Participation: to be conducted at various stages in the assessment process to ensure quality, comprehensiveness and effectiveness and that stakeholders' views are adequately-followed up.
	Environmental Assessment Report: Summarizes all information obtained, analysed and interpreted in a report form suggested by the approving authorities (DoE, Bangladesh). The report should contain a non-technical summary including methods used, results, interpretations and conclusion.
Project Appraisal/ Approval	**Review and Approval of the Report:** Review by DoE, Bangladesh for IEE and EIA of the report to assess if all possible issues have been adequately addressed and to facilitate the decision-making process; decide if project should proceed or if further alternatives must be explored
Implementation Plan	**Environmental Management Plan:** determines specific actions to take during engineering design, construction and operational and maintenance stages to minimize or mitigate impacts and to address cumulative/induced impacts
Engineering Design and Construction of works	**Environmental Monitoring:** determines compliance with EMP and of impacts. Monitoring includes also effect monitoring on the physical, biological and social environment, to be measured by objectively verifiable indicators as described in the EMP. This section must define schedules and respective responsibilities for monitoring and supervision activities.
Post construction activities and audit	**Environmental Audit:** conducted by an independent/third party/consulting firm immediately after construction and two years later, to come forward with recommendations that have to be followed up by pre-identified line agencies.

3.2 Specific Activities and Responsibilities in the Environmental Assessment Process

In Bangladesh, the environmental assessment procedure will pass through three tiers in order to optimize the resources required for conduction environmental assessment studies, these three tiers are: A) Screening, B) Initial Environmental Examination (IEE), and C) Detailed Environmental Impact Assessment (EIA). Screening decides whether the EIA process should be applied to a development project and if it is required, its type, that is, IEE or EIA. The major activities and the relating responsibilities for each sub-activity are shown in Table 3-2:

Table 3-2: Major activities and responsibilities during different project stages for conducting bridge environmental assessment studies in Bangladesh

Project Stage	Steps/ Activities	Description	Responsibility
Step-1: Screening			
Planning and Pre-feasibility	Undertak Screening	Prepare a document containing environmental information covering potential environmental impacts, mitigation measures, evidence of public consultation etc. Take no further action for projects, which do no require environmental assessment.	LGED as proponent or qualified professionals/ Consultants
Step-2: Scoping to identify types of environmental assessment study			
Pre-feasibility/ planning	Scoping Exercise	Identify, by using checklists and based on preliminary field examination the necessity to conduct an IEE or an EIA, as per ECR, 1997. Produce environment related document to competent authority for approval.	LGED as proponent assisted by qualified professionals/ Consultants
Step-3: Terms of Reference (ToR) for environmental assessment study			
Pre-feasibility/ planning	Preparation of ToR	Define the main environmental concerns and issues related to any bridge program, which must be addressed by environmental assessment.	LGED assisted by professional environmental assessment team/consultant
	Approval of ToR	Review, comment and approve ToR	DoE, Bangladesh
Step-4: Preparatory work for environmental assessment study			
Pre-feasibility and planning	Assigning the work	Determine whether to conduct environment assessment using in-house staff or whether to outsource it.	LGED assisted by professional environmental assessment

Project Stage	Steps/ Activities	Description	Responsibility
			team/consultant
	Environmental Assessment team formation	Form team as per approved ToR.	Environmental Assessment Team
	Prepare Work Plan	Establish a work plan that gives appropriate weight to all activities.	
Step-5: Undertake environmental assessment study			
Step-5.1: Desk Studies			
Planning and design	Secondary data	Collect and review relevant and appropriate published data, such as maps, reports etc.	Environmental Assessment Team
	Initiation, interaction and consultation	Discuss the proposed bridge and its potential environmental impacts with knowledgeable persons and concerned stakeholders.	
	Preparation of information summary	Draft a summary of the information that is relevant to the project and its possible environmental effects.	
	Methods and techniques	Determine the methods by which the field work for Environmental Assessment will be conducted.	
	Work Plan	Revise the work plan on basis of desk studies	
Step-5.2: Field Work			
Planning and design	Field equipment	Collect and arrange fiels equipment required for Environmental Assessment Studies	Environmental Assessment Team
	Field survey for collection of baseline information	Survey at project location, interaction with the local community and investigate ihe issues identified during desk study; collect baseline (physical, biological and socioeconomic aspects)	
Step-5.3: Data Analysis and Interpretation			
Planning and design	Impacts Identification	Establish what environmental impacts will be occurred as result of interaction of environmental setting and bridge construction, rehabilitation and maintenance activities.	Environmental Assessment Team
	Impact Prediction	Establish the extent of environmental consequences of the proposed bridge construction	

Project Stage	Steps/ Activities	Description	Responsibility
		and operation.	
	Impact assessment	Judge whether the consequences are significant enough to require action to be taken.	
	Mitigation Measures	Design mitigation measures to avoid, reduce, minimize & compensate for adverse impacts & maximize beneficial impacts.	
	Environmental Management Plan	Prepare EMP covering monitoring and project management to ensure the implementation of mitigation measures.	
	Stakeholder/ Public Consultation	Occurs at various stages in the assessment process to ensure quality, comprehensiveness and effectiveness and that stakeholders' views are adequately addressed.	Environmental Assessment Team/LGED
Review and Approval	Review & approval of environmental assessment report	Check completeness, edequacy, credibility, facilitate the decision-making process; decide if project should proceed or if further alternatives must be examined.	LGED will review and forward to DoE for approval of IEE/EIA report
		Approval of environmental assessment report or rejection.	DoE, Bangladesh
Design Implementation	Implementation of EMP, Monitoring	Determines compliance with EMP.	LGED or appointed professionals
Step-6: Undertake environmental assessment Study			
Environmental Audit	Auditing	Environmental audit: immediately after construction and two years after project completion.	LGED or appointed professionals

Source: Modified from GoN, 2007

3.2.1 The procedural steps in IEE and EIA

The following section describes in more details the single steps outlined in the previous Table 3-2:

3.2.1.1 Step-1: Environmental Screening

The screening in GoB is based on project type that are already defined in the ECR, 1997 and its subsequent amendments, whether most of the donors approach is screening on the basis of the potential environmental consideration. According to the ECR 1997 of Bangladesh, IEE is required for the "below 100 meters bridge" and EIA is required for "more than 100 meter bridge". However, the common

approach proposed in donor's guidelines is to deal on case by case basis. The LGED will follow the legal provision given by the DoE/GoB guidelines in order to obtain approval of IEE/EIA study.

Environmental screening identifies the consequence of the proposed projects in broader sense based on similar project experiences, stakeholder's perceptions and expert judgment, without having very much detailed investigation. Critical issues are also identified through the screening which needs detailed investigation. Based on the extent of environmental impacts, obtained from the environmental screening, the decision for further environment impact assessment will be taken.

The environmental screening is usually carried out with the help of simple screening checklist that includes a set of check list to identify the baseline status and proposed potential impacts of the project intervention. A sample checklist was developed based on the extensive literature review, previous experience of similar projects and expert consultation during the EMF study is given in Annex-B.

3.2.1.2 Step-2: Project Scoping

In Bangladesh, projects to be considered for application of IEE and EIA are listed in the Schedule-1 (Classification of industrial units or projects based on its location and impact on environment.) related to Rule-7(2) of ECR, 1997 of GoB. The legal criteria are shown in Table 3-3.

Table 3-3: Legal criteria of GoB for selecting an IEE or EIA in bridge project

Types of Project	Category	Environmental Assesment Required
Construction, re-construction and extension of bridge (length below 100 meters)	Orange-B	IEE
Construction/reconstruction/expansion of bridge (length 100 meter and above)	RED	IEE and EIA

Source: ECR, 1997 (Schedule-1)

The objectives for conducting scoping are:

- Provide an opportunity for the project proponents (LGED), consultants, relevant authorities and affected parties to exchange information and express their views and concerns regarding a proposal before an IEE/EIA is undertaken; and
- Focus the study in reasonable alternatives and relevant issues, to ensure that the resulting IEE/EIA is useful to the decision maker and addresses the concerns of interested and APs, as well as to facilitate an efficient environmental assessment process that saves time and resources while reducing the risk of costly delays.

3.2.1.3 Step-3: Terms of Reference (ToR) for environmental assessment study

As per ECR, 1997 there is no mandatory requirement for the approval of ToR from DoE for conducting IEE study. However, it is mandatory to approve the ToR from DoE before conducting the EIA study. For conducting the IEE study for a projects, the Project Director/LGED will prepare a ToR for the consultants/firms and submit, should contain adequate information on:

- Absolute and geographical location of the proposed project;

- Background of the proposed project including the beneficiaries;
- Proposed project activities;
- Organization of working procedures;
- Establishing of the proposed environmental assessment study into the context of existing policies, rules and administrative procedures;
- Time frame and requirement of expert manpower; and
- Technical guidance to the consultants.

3.2.1.4 Step-4: Preparatory work for environmental assessment study

Before field mobilization preparatory works (logistics for carrying out the field studies, identifying the personnel for the environmental assessment and providing contractual arrangements) will be required for the environmental assessment team after obtaining the approval from the DoE, Bangladesh to go ahead with the environmental assessment study as per approved ToR.

3.2.1.5 Step-5: Undertake the environmental assessment

The field survey teams are well advised to utilize all forms of documentation techniques that will facilitate further works, for example taking (digital camera) photos, GPS, geo-reference map of the proposed project site and consult reference literature/data on physical, biological, social and cultural elements in the proposed project area. It is also recommendable to define for certain aspects the extend of potential impacts, the so-called zone of impact or Project influence area (PIA). This may vary from few meters next to the bridge and approach road construction (e.g. accident risks, roadside vegetation clearing, encroachment) to few and dozens of kilometers (e.g. water pollution, impacts on aquatic life, fish migration, effects by migrant workers and land values).

3.2.2 Environmental Auditing

As per the legal provision in Bangladesh it is not mandatory to conduct an environmental auditing. For the sustainable environmental management in LGED bridge projects it can be carried out an environmental audit during the construction phase and two years after the project comes into in operation. Information from baseline data and data on monitoring should be utilized for carrying out the environmental auditing. The responsible agency for carrying out the environmental audit is the LGED or they can hire experience consultant/firm. The environmental auditing should gather information on the following areas:

- The condition of natural/social/economic resources prior to the project implementation and after project construction is completed;
- Whether impacts forecasted by IEE/EIA occurred and, if so, the extent of these impacts;
- Whether or not the mitigation measures implemented are effective to control adverse impacts or enhance beneficial impacts;
- Whether or not all landscape degraded due to project implementation have been restored to their original/better conditions;

- Long-lasting and residual environmental impacts resulting from the work forces at the time of construction;
- The overall effect on the local economy of project implementation;
- Have land acquisition compensation and resettlement been achieved according to RAP principle, and are there any resettlement related outstanding disputes?

Specifically, the following activities, and others as deemed necessary, need to be addressed for environmental auditing:

- How have the environmental conditions changed from the baseline conditions?
- Are there any bare or degraded areas around the project?
- What is the condition of the quarry sites, borrow areas, and spoil disposal areas?
- What are the conditions of local forest?
- How slope stability and erosion control measures adopted by the project been effective in minimizing slope stability and erosion?
- How are the families resettled by project adapting to their new host communities?
- How the local construction workers adapted to the loss of their jobs following the end of construction activities?
- What is the attitude of the local people towards the project?
- What has been the impact of the project on local and national economy?
- Were compensation payments sufficient to replace lost assets?
- Did transfer and relocation payments cover the costs?
- Have vulnerable groups been provided income earning opportunities? Are these effective and sustainable?
- Are jobs (e.g. maintenance, planting, slope protection) provided to PAPS to restore pre-project income levels and maintain their original living standards?

3.2.3 Initial Environmental Examination (IEE) studies

A. Collection of Baseline Information

Most relevant baseline information on physical, biological, and socio-economic environment will be required to be collected from available secondary sources (literature review, published journals,

reports, maps etc.) and conduct reconnaissance field study using the checklist. At the same time, public consultation at the proposed bridge sites will play an important role to collect primary baseline information. The main purposes for collecting required information are follows:

- Examine the existing status of the environment condition and trends of environmental factors against which predicted changes can be compared and evaluated in terms of importance; and
- Environmental condition change detection by monitoring once a project has been initiated.

B. Identification and Analysis of Potential Impacts

A checklist which will be prepared before field mobilization will be provided among the team members of environmental assessment team as basis to identify potential impacts that are linked to the proposed bridge project activities and shows the different natural and human sectors being potentially affected. At this stage, all the potential long term and short term environmental impacts should be identified. The impacts can be categorized qualitatively (e.g. high, medium, low) in order to identify major impacts and relevant components. In addition, cumulative and residual impacts of the project interventions required to be clearly addressed here.

There are several methodologies have been developed for assessing the impacts of development activities on the environment. These are: a) Ad-hoc, b) Checklist, c) Matrices, d) Networks, e) Overlays, f) Environmental index using factor analysis, g) Cost/Benefit analysis, and h) Simulation modelling workshops. At the current status of development in Bangladesh the three of the above methods, viz. Checklist, Matrices and cost/benefit may be adopted for the bridge projects.

C. Analysis of Alternatives

The potential impacts of alternative analysis will be evaluated, it may include:

- Project alternative;
- Alternative location of new bridge and alignment of approach road;
- Alternative design and construction methods;
- Alternative resources (alternative construction materials);
- With or without the project; and
- Do nothing alternative.

D. Preparation of Environmental Management Plan

Environmental Management Plan (EMP) for the proposed bridge projects should be prepared mentioning the impact mitigation measures with institutional responsibilities (Supervision and monitoring). From the extensive literature review and applying expert judgment and based on impacts assessment, a list of possible mitigating measures for positive and negative impacts should be prepared. It should be consider the following consideration during the preparation of mitigation measures:

a. Project alternatives;
b. Preventive and remedial measures; and
c. Compensatory measures to restore or replace damaged resources.

Also, environmental monitoring plan should be prepared that will include monitoring parameters, location, frequency, method and responsible agencies. Monitoring plan will be helpful to identify whether the proposed mitigation measures are sufficient to alleviate or set off the anticipated negative impacts and to enhance beneficial impacts. The monitoring will also provide feedback to improve the infrastructure quality and/or to modify some mitigation measures.

E. IEE Report Preparation, Submission and Approval

The IEE report will be followed a standard format is recommended by the DoE (Table 2-4) in the "EIA guidelines for industries, 1997". This table of contents for the IEE report preparation is very general. The following information can be included during the IEE report preparation: project proponent, project description, basic information about the bio-physical and socio-economic conditions and the likely nature and scale of impacts that could be expected with the proposed project. Accordingly, the report shall also identify the management options (personnel, type if measures, required technologies, implementation, supervision monitoring and monitoring responsibilities) for a set of feasible and credible mitigation measures. The environmental management options shall be documented with sufficient data, maps and other sources of verification.

The DoE under the MOEF is the concerned agency and is authorized to review and approve the IEE Report and issue the site clearance certificate. Finally the IEE study should recommend as to whether a full scale EIA study is required or not. In case the IEE recommends further EIA study to be undertaken, the proponent has to carry out the full scale EIA which comes under the jurisdiction of DoE/MoEF.

Table 3-4: Table of Contents of an IEE Report

Chapter	Sub-chapters required in IEE report
Chapter-1	Introduction
Chapter-2	Description of the project
Chapter-3	Description of the existing background environment in around the project site (Generally this should cover an area of 1 km. Radius)
Chapter-4	Potential significant impacts (during Pre-construction, Construction and Operation Phases)
Chapter-5	Mitigative and abatement Measures
Chapter-6	Residual impacts if any (these may have to be studied at the detailed assessment stage)
Chapter-7	Monitoring Program
Chapter-8	Summary and Conclusions

Source: EIA guidelines for industries, 1997, DoE, Bangladesh

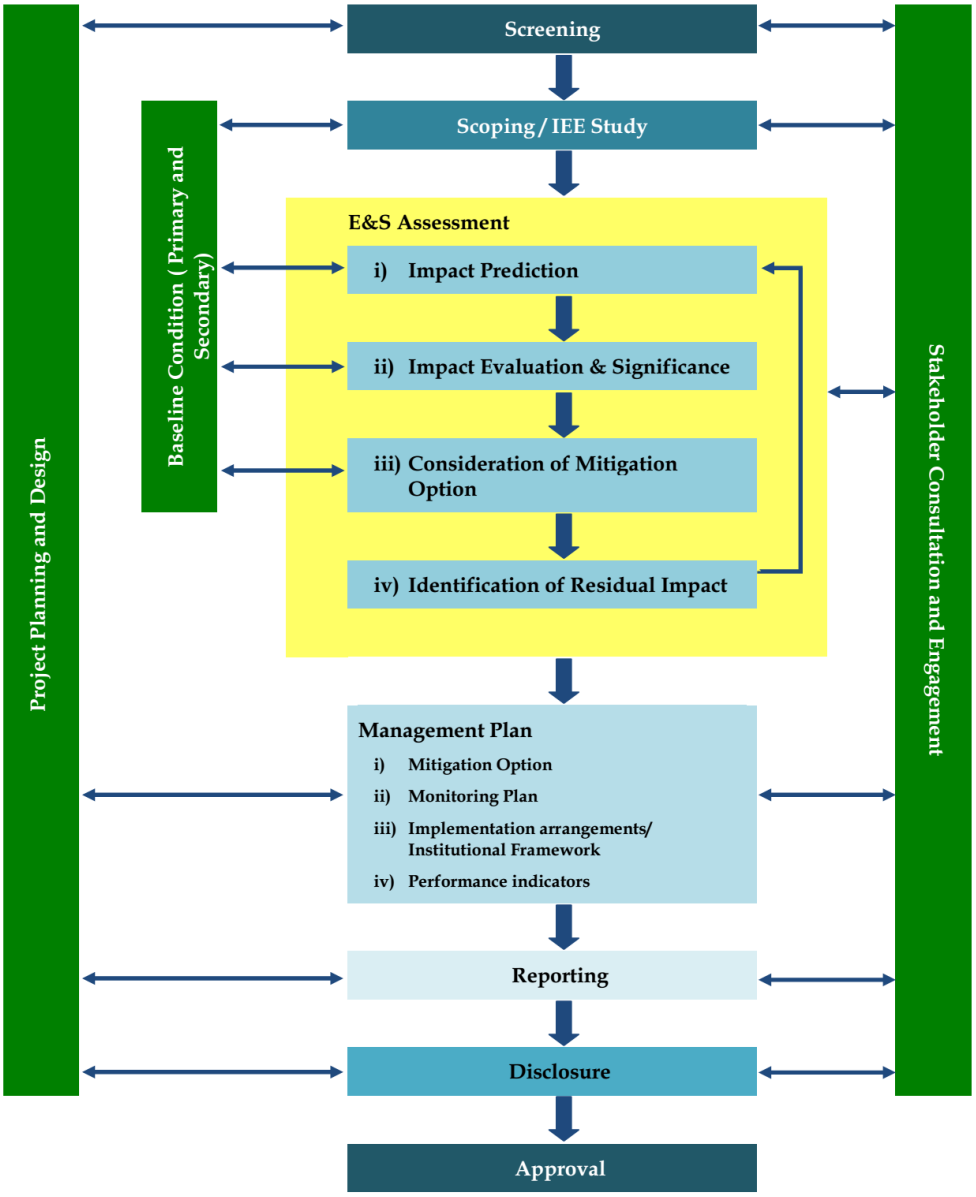
3.2.4 Environmental Impact Assessment (EIA) studies

The EIA is a planning tool now generally accepted as an integral component of sound decision making. The EIA, where applicable, will be used by the implementing agency as a decision making tool to ensure that the project activities and design are environmentally sound and sustainable. The purpose of the EIA is to give the environment its due importance in the decision making process by clearly evaluating the environmental consequences of the proposed study before action is taken. In the preparation phase, the EIA shall achieve the following objectives:

- To establish the environmental baseline in the project area and to identify any significant environmental issues;
- To assess the impacts and provide for measures to address the negative impacts by the provision of the requisite avoidance, mitigation and compensation measures;
- To integrate the environmental issues in the project planning and design;
- To develop appropriate management plans for implementing, monitoring and reporting of the environmental mitigation and enhancement measures suggested.

Considering the nature (importance and emergency) of the project, the implementing agency should start dialogue with DoE, Bangladesh and agree on the environmental clearance procedure. For simplify the procedure, implementation agency can propose to prepare EIA on “Procurement Package” basis, if necessary, consisting of few numbers of projects. However, EIA report should clearly spell out the site specific environmental impacts/issues and their mitigation measures. The approach for the EIA study in Bangladesh is presented in following Figure 3-2.

Figure 3-3: Approach for the Environmental Impact Assessment study


Project Planning and Design
Screening
Scoping / IEE Study
Baseline Condition (Primary and Secondary)
E&S Assessment
i) Impact Prediction
ii) Impact Evaluation & Significance
iii) Consideration of Mitigation Option
iv) Identification of Residual Impact
Stakeholder Consultation and Engagement
Management Plan
i) Mitigation Option
ii) Monitoring Plan
iii) Implementation arrangements/ Institutional Framework
iv) Performance indicators
Reporting
Disclosure
Approval

A) Screening and Scoping

The screening process is similar to the procedures described above for IEE studies. However, the scoping exercise for EIA involves the presentation of more detailed background data and a comprehensive public consultation and notification process that should also include a workshop to be held at that stage.
The results of the scoping should provide an opportunity for the project proponents, consultants, relevant authorities and interested and affected parties to exchange information and express their views and concerns regarding a proposal before an EIA is undertaken. The scoping will focus on feasible, credible and cost-effective alternatives for the proposed project and identify means to ensure that the resulting EIA is useful to the decision maker and addresses the concerns of interested and affected parties, as well as to facilitate an efficient EIA process that saves time and resources while reducing the risk of costly delays. The scoping exercise for EIA includes the following activities:

- Presentation of background material for the proposal;
- Involvement-identification and notification;
- Participation in scoping;
- Public Meeting(s); and
- Site reconnaissance.

As per the DoE guidelines, it is not essential to prepare and submit the scoping report to the DoE.

B) Project Influence Area (PIA)

It is very important to identify the projects influence area before starting the baseline survey. During the screening and scoping stage, the project influence area will be broadly demarcated. In order to establish a project influence area, it requires considering and evaluating the activities to be carried out and processes that would take place during pre-construction, construction and operational phase.

The PIA spreads over four levels to justifiably defining the safeguard boundaries. The four tiers of PIA are (i) immediate area of impacts (footprint); (ii) direct project influence, where project is key impact factor; (iii) area where direct project impact is less intensive; and (iv) induced, indirect (or perceived impacts), often reputation risk. The LGED needs to identify the impact zones clearly during project location identification as the first step of environmental assessment. The baseline analysis and impacts identification should be carried out in the direct and indirect impact zones.

Influence area depends on the types of structures, size, construction methods, types of raw materials used and area where the projects will be implemented. For example: implementation of bridge projects, areas on either side of the river/khal/canal covering areas about 0.5 km upstream and 1 km downstream of bridge/khal/canal location could experience impacts (e.g., drainage congestion, surface water pollution, air and noise pollution, traffic congestion, navigation blockage, bank erosion etc.) of project activities. For special cases like larger width of the river, bridge length more than 100m, tidal influenced river, perennial waterbodies, movement of boat round the year, such types of bridge projects, areas and communities within about 1 km of upstream and downstream of the proposed bridge projects location may be considered as the project influence area.

C) Baseline Information/Data Collection

The baseline information on physical, biological and socio-economic environment is more detailed and complex than the one required for an IEE. Basic data are not collected from secondary sources but extensively from observations and public consultation events during the field investigations. Tabulated data should always indicate the source and be incorporated as annexes to the EIA Report.

Following baseline information/data will be required from various aspects:

- **Physical Environment**: climate/meteorology, physiography, topography, geology, geomorphology, soil type and quality, sediment quality, land use, ambient air quality, noise level, vibration level, surface and groundwater quality, seismicity, drainage and hydrology, flood pattern, cyclone pattern, unstable and erosion-prone areas, siltation etc.

- **Biological Environment:** bioecological zones of Bangladesh, ecologically sensitive areas (protected areas, reserve forests, eco-parks, wetlands), flora and faunal species diversity, rare and threatened species, human uses of natural resources.

- **Socio-economic Environment:** demographic features, infrastructure, utilities, business, trade, community properties, agricultural and other livelihood, gender issues, indigenous and vulnerable groups, current forms of settlement and trade structures.

The information is required for the following purposes:

- Evaluate existing status of the environmental conditions of the proposed bridge project area;
- Identification of potential resources likely to be affected by the proposed project activities;
- Develop important reference points for environmental monitoring; and
- Provide relevant information for the decision making process.

Before environmental impacts assessment (identification, prediction and evaluation) collected baseline information/data should be properly analyzed. One of the most useful instruments while processing these baseline data is the creation of thematic/GIS maps that refer to the most important factors being investigated for likely project induced impacts. Thematic maps and photographs are among the best sources of later verification and monitoring the project's effects.

D) Project Description

A list of project activities for construction and operational period needs to be prepared referring to the list of impacts that are likely to be induced by the proposed bridge project. The list should ideally follow the chronological and logical sequence of the planned activities. The following information related to project description for impact identification of bridge project needs to be compiled:

- Nature of the Project and its geographic location (including maps, GPS location etc.);
- Construction equipment's, machineries and technology (machine, labor based, mixed, etc.);
- Resources requirement and possible sources (community land, utilities, water, sand, gravel, clay, timber, bitumen, etc.);
- Manpower requirement during different phase (engineer, officer, administrative, environmental, support staff, laborers etc.)
- Implementation mechanism (through local institutions, users' committee, contractors, mixed);

- Description of the environmental assessment team carrying out the environmental planning, design and implementation arrangements;
- Institutions involved in project implementation (roles, strength and weakness) at different project stages, as well as supervision and monitoring arrangements; and
- Maintenance approach (fund, institutional mechanism, human resources).

E) Identification and Analysis of Project Alternatives

The primary objective of the "alternatives analysis" is to identify the location/route/design/technology for a particular bridge project that would generate the least adverse impact and maximize the negative impacts of the proposed project. It should be carried out at two different levels:

A) During formulation of the projects; and

B) During carrying out of IEE/EIA or EA of projects, if needed (e.g., by the consultant engaged for this purpose).

The nature of the alternatives analysis would be different for the different bridges projects. For bridges projects, analysis of alternative location is of primary importance. With respect to "location of the bridge", important considerations include availability of land (Government/public owned land), proximity to sensitive installations (e.g., hospitals, educational institutions, graveyard, temple etc.), connectivity (e.g., surrounding road network), environmental characteristics (Hazards and Disaster prone, land/ soil type, climate, geomorphology, physiography etc.), etc. For example, for an approach road, alternative route and alternative design (e.g., bituminous road versus RCC road) are important considerations.

This part of the EIA report consists of a comprehensive discussion of pros and cons for alternative location, approach road alignment of the proposed bridge (in map and description). It has to provide the explanation and argumentation for choice of options, taking into account the respective environmental, socio-economic and cost considerations. For each alternative, the potential impact on the environmental and social setting needs to be discussed. Alternative assessment may include:

- Project Alternative;
- Alternative Location and Alignment;
- Alternative Design and Construction Methods;
- Alternative Resources (alternative construction materials);
- With or without the project; and
- Do nothing Alternative.

F) Impacts Identification and Assessment

The key issues identified during the scoping phase using the checklist have been analyzed upon the baseline information. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project. In the EIA the significance of the potential impacts will be considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term.

3.3 SOCIAL ASSESSMENT GUIDELINES FOR THE PROGRAM

3.3.1 Basic Principles

In consideration of the potential adverse impacts associated with land acquisition and displacement of authorized and unauthorized private activities from its own (and other public) lands, LGED will select, design and implement all subprojects in accordance with the following principles:

- Prior to selection of specific bridges/subprojects, LGED will undertake community and stakeholder consultations about their objectives, scopes, and social safeguard implications, especially with respect to land acquisition and displacement of businesses, trading and other activities from its own lands (and other public lands, if they are also likely to be used by the project). Consultations will inter alia include:
- all formal/informal local entities, such as Union Parishads, Local Market Management Committees, local women's groups and others with direct and indirect stakes in the project who are deemed key actors to influence project design and implementation;
- The persons, such as landowners, business owners, traders, and the like, who would be directly affected by the subprojects;
- The persons who would be indirectly affected in terms of loss of livelihood and/or loss of access to common property resources;
- Unless absolutely required, LGED will avoid private land acquisition and keep the improvement and rehabilitation works limited, to the extent feasible, to the existing right-of-way to minimize displacement of economic and other activities from private and public lands, including its own.
- LGED will avoid, to the extent feasible, subproject activities that will threaten the cultural way of life of TPs; severely restrict their access to common property resources and livelihood activities; and affect places/objects of cultural and religious significance (places of worship, ancestral burial grounds, etc.).
- LGED will undertake social screening of all subprojects to identify potential social safeguard issues, and adopt and implement impact mitigation measures consistent with the donor operational policy.

3.3.2 Social Assessment in Project Cycle

Under the project social assessment has to be carried out for: a. assessing the degree of impact; b. assessing the types of impacts; c. assessing the possible alternatives; d. risks and adverse impacts likely to be there; e. assessing the needs for preparation of RAP/ abbreviated RAP; and f. resettlement cost.

3.3.3 Social Screening

LGED will screen each subproject under each phase to identify potential safeguards compliance issues and social impacts associated with construction of new bridges and reconstruction, rehabilitation or maintenance of existing bridges, in order to determine applicability of the OP 4.12 and OP 4.10 and the required Social Management Plans (a screening format is provided in Annex). Where adverse impacts cannot be avoided entirely, LGED will select, design and implement the individual subprojects in accordance with the following guidelines:

- Guidelines for Land Acquisition & Resettlement. Contains principles , policies and guidelines for private land acquisition and use of public lands and adverse impact mitigation; mitigation measures; and implementation and monitoring arrangements for mitigation plans;

- Framework for Tribal People's Plan. Contains principles and guidelines to identify and deal with adverse impacts on TPs, and a consultation framework for adoption of mitigation and development measures, where subprojects would adversely affect them; and
- Guidelines on Gender Actions: Contains principles and guidelines to identify and deal with gender sensitive project issues including participation, benefit sharing, empowerment and vulnerability management.
  (Format for social screening attached as annexure-A-3)

3.3.4 Social Impact Assessment

Social impact assessment including land acquisition, resettlement and social concerns will primarily be identified during the initial social screening of subprojects. Once social impacts are noted, census of affected persons and assets will be conducted following bridges design and land acquisition plan in compliance with the SMF guidelines on land acquisition and resettlement (section B), on tribal peoples (section C) and on gender actions (section D). The affected persons and their communities will be consulted during the census survey to understand the risks and options and devising mitigation of social impacts. Land acquisition process will be initiated by LGED well ahead of time so that assessment of social impacts and risks can be done for preparation and approval of RPs and TPPs before award of civil works contract and implementation of the same before displacement of people. The screening and assessment of resettlement impacts will be done using Annex A and valuation of assets will be done following the methods in Annex B2. Land acquisition proposal for respective subprojects will provide information on land and the census (by LGED) and joint verification (jointly by DC and LGED) will provide data on inventory of losses and risks recognized in the SMF.

LGED will prepare and submit to the Bank for safeguards review, clearance and public disclosure of social impact assessment (SIA) including RP and TPP for all site specific bridges and waterways for the first year and subsequent years. A social screening report will be prepared for all specific bridges and waterways component based on the SMF. A comprehensive SIA has to be prepared for the waterway component following the Bank safeguards policies and procedures. All subprojects' SIA and RP/TPP will be disclosed locally and in Bank Info shop prior to mobilization of the civil works contract.

3.3.5 Construction Related Impacts

Construction-related activities resulting from the proposed action are not expected to have any significant adverse impacts on historic resources, natural resources, infrastructure, traffic, or hazardous materials conditions.

3.3.6 Social Audit

Under the present project social audit to be carried out as that will ensure good governance, target and actual social achievements, creating awareness among beneficiaries and service providers, increasing efficacy and effectiveness of bridge development programmes, scrutiny of various design options, stakeholder interests and priorities particularly of rural poor and estimation of the opportunity cost for stakeholders of not getting timely access to services.

CHAPTER FOUR : IDENTIFICATION OF POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

The key issues identified during the scoping phase using the checklist have been analyzed upon the baseline information. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project. In the EIA the significance of the potential impacts will be considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term.

4.1 Environmental Impacts Identification and Assessment

The following criteria will be used to evaluate impact **Significance:**

4.1.1 Nature of Impacts

This is an assessment of the type of effect that the activity is likely to have on the surrounding affected environment. The description includes what is being affected and its magnitude. The nature of the impact will be classified as **direct, indirect or induced (given in Table-4-1).**

Table 4-1: Nature of Impacts

Extent	Description
Direct	**Potential/possible impacts will be generated directly from the bridge projects activities and its associated facilities which are directly linked with**
Indirect	**Potential/possible impacts will be generated from secondary sources which are induced by the project activities. (e.g. loss of any species habitat)**
Induced	**Potential/possible impacts will be generated (which are not part of the Project) due to effect/consequence/outcome of the Project (e.g. influx of**

4.1.2 Extent and Location of Impacts

This indicates the spatial area that may be affected by the proposed project activities or its associated facilities **(given in Table 4-2).**

Table 4-2: Geographical extent of impact

Extent	Description
Project Site	**Potential/possible impacts area only at or within the project site/project**
Local	**Potential/possible impacts area is not only limited to the site but also its immediate surrounding areas/receptors**
Regional	**Potential/possible impacts area extends to the immediate surrounding areas along with adjacent areas**

National	**Potential/possible impacts area considered of national level**
Trans Boundary	**Impact considered not only within national level but also neighboring country/global level**

4.1.3 Duration of Impacts

This measures the lifetime/existence/continuation of the impact **(given in Table 4-3).**

Table 4-3: Duration of Impacts

Duration	Description
Short Term	**Potential/possible impact duration is very limited time or length of**
Medium Term	**Potential/possible impact duration will continue after construction rehabilitation period but stop/ discontinue/cease within a tenure of 10**
Long Term	**Potential/possible impact duration will continue more than 10 years, or entire operational life of the bridge program/project**
Permanent – Mitigated	**Potential/possible impact will remain after operational life of the bridge but appropriate mitigation measures reduce the impact**
Permanent – No mitigation	• Potential/possible impact will remain after operational life of project. • No mitigation measures will reduce impact after implementation

4.1.4 Intensity/Severity of Impacts

This is the degree to which the any bridge project/program affects or changes the environment; it includes a measure of the reversibility of impacts **(given in Table 4-4).**

Table 4-4: Intensity/Severity of Impacts

Intensity	Description
Insignificant	**Changes due to Potential/possible impacts are minor, not visible/noticeable, natural functioning of environment not affected**
Low	• Natural functioning of environment is minimally affected • Natural, cultural and social functions and processes can be reversed to their original state if mitigation measure taken
Medium	• Environment remarkably distorted/disturbed/impacted, still functions, if in modified way • Negative impacts cannot be fully reversed
High	• Cultural and social functions and processes distorted/disturbed/impacted • Potentially ceasing to Environmental function temporarily • Negative impacts cannot be fully reversed

Very High	• Natural, cultural and social functions and processes permanently cease and valued, important, sensitive or vulnerable systems or communities are substantially affected • Negative impacts cannot be reversed

4.1.5 Potential for Irreplaceable Loss of Resources

This is the degree to which the proposed project will cause loss of resources that are irreplaceable (given in Table4-5).

Table4-5: Potential for Irreplaceable Loss of Resources

Potential for irreplaceable loss of resources	Description
Low	**Replaceable/unique resources will be impacted**
Medium	**Irreplaceable/unique resources can be replaced, with mitigation measure/effort and will be replaced after**
High	**Potential/possible impacts replace a particular/vulnerable**

4.1.6 Probability of Impacts

This is the likelihood or the chances that the impact will occur **(given in Table 4-6).**

Table 4-6: Probability of Impacts

Probability	Description
Unlikely	**Under normal conditions, no potential/possible impact expected**
Low	**The probability of the impact to occur is low due to its design or historic**
Medium	**There is a distinct probability of the impact occurring**
High	**It is most likely that the impact will occur**
Definite	**The impact will occur regardless of any prevention measures**

4.1.7 Magnitude of Impacts

This is calculated as **extent + duration + intensity + potential impact** on irreplaceable resources.

Magnitude essentially describes the intensity of the change that has the potential to occur in the resource/receptor as a result of the potential impact. The magnitude designations themselves are universally consistent, but the definitions for these designations vary depending on the resource/ receptor. The universal magnitude designations are: **Positive; Insignificant; Low; Medium-low; Medium– high; High and Very High.**

In the case of a potential positive impact, no magnitude designation (aside from "positive") is assigned. It is considered sufficient for the purpose of the EIA to indicate that the project has the

potential to result in a potential positive impact, without characterizing the exact degree of positive change that may occur.

4.1.8 Significance of Environmental Impacts

The significance will be rated by combining the consequence of the impact and the probability of occurrence (i.e. Magnitude x Probability = Significance).

Table 4-7: Probability of Impacts

		Probability of Impact				
		Unlikely	Low	Medium	High	Definite
Magnitude of Impact	Insignificant	**Very Low**	**Very Low**	**Very Low**	**Low**	**Low**
	Low	**Very Low**	**Very Low**	**Low**	**Low**	**Medium-**
	Medium – Low	**Very Low**	**Low**	**Low**	**Medium-**	**Medium-**
	Medium – High	**Very Low**	**Low**	**Medium-**	**Medium-**	**High**
	High	**Low**	**Medium**	**Medium-**	**High**	**High**
	Very High	**Low**	**Medium**	**High**	**High**	**Very High**

Table 4-8: Significance of issues (Based on Environmental Parameters)

Significance	Description
Positive Impact	**Potential/possible impacts that have a beneficial impact to affected media**
Very Low	**No action required**
Low	• Impacts are within the acceptable range. • Potential/possible impacts such as localized or short-term effects on habitat, species or environmental media.
Medium-Low	• Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible. • Potential/possible impacts such as localized, long-term degradation of sensitive habitat or widespread, short-term impacts to habitat, species, or environmental media.
Medium-High	• Potential/ possible impacts are significant and require attention; • mitigation is required to reduce the negative impacts to acceptable levels; • Potential/ possible impacts such as localized but irreversible habitat loss or widespread, long-term effects on habitat, species, or environmental media.
High	• Impacts are of great importance, mitigation is crucial. • Potential impacts such as significant, widespread, and persistent changes in habitat, species, or environmental media. • Potential impacts such as persistent reduction in ecosystem function on a landscape scale or significant disruption of a sensitive species.

Very High	• Impacts are unacceptable. • Potential impacts such as loss of a significant portion of a valued species or loss of effective ecosystem function on a landscape scale.

4.2 Social Impacts identification

Social impacts can be identified from Social Impact assessment (SIA), social screening of the subproject. During SIA and Social screening structured and non structured questionnaires are used to collect information on potential impacts. Focus Group Discussion (FGD), Participatory Rural Appraisal, Key Informants Interview conducted during SIA and social screening as part of meaningful public consultation. SIA and social screening will be done prior to select any bridge project. (Format for Social screening is annexed at Annex-A-3)

4.2.1 Beneficial Impacts

Road and Bridge Projects are generally intended to improve the economic and social welfare of people. The development efforts of the LGED, particularly the development of a strategic transportation network will have multifold beneficial impacts. The majority of the communities receiving new or improved roads and bridges believe that improved accessibility resulting from the project will improve their standard of living, give access to nearby markets and resources, education and health facilities. Unanimously the consulted communities are willing to provide assistance and to provide / donate voluntarily land for the project development works.

A) Generation of Employment

One of the major direct beneficial impacts is the creation of employment. The sub-projects would require a large number of skilled and unskilled manpower. As the road upgrading and bridge construction works require labourers, it is likely that they will prefer to work in these projects to stay close to their families.

B) Opportunities of New Income Generating Activities (IGAs)

The construction activities will not only increase the income sources of the local people, but will open opportunities for additional business opportunities such as the establishment of local tea stalls and *grocerry* shops. As a result, a significant amount of cash from the project works will be channeled into the local economy and will generally foster the development off other micro-enterprises.

C) Increase in Land Values

Road and Bridge construction leads to appreciation of land values in many places, particularly along the road corridor, which directly contributes to increased property value of the households. The value of land increases sharply as soon as the road link is developed ensuring reliable transportation. Development of transportation also contributes to rapid commercialization of agriculture which is also a major factor to raise the land value as a result of which many villagers are in a position to initiate modern farming and diversify their production. Increased land values also enhance farmers' capability for borrowing loans on collaterals.

D) Enhancement in Technical Skills and Know-How

The underlying policy of the LGED to propose maximum use of local people for construction works lies in the unique chances for the transfer of skills and technical know-how in construction and related technical sectors. Considerable number employed work forces will convert themselves into fully skilled labourers

E) Gender-Specific Benefits

Improved road transportation will benefit local women by providing improved access to market facilities. Mobility will considerably increase while more efficient road transportation systems will be in place. Women, in specific, may therefore get into a better position to attend various service agencies such as hospitals, health clinics, training institutes, women development programs etc. More frequent visit to such organizations will increase women's knowledge and awareness level. Girl students will be encouraged to go to schools that will become easier accessible.

4.2.2 Adverse Impacts

A) Public/private property.

The sub-project may, partly or fully, encroach upon agriculture land or seize houses, schools, health-posts, temples, etc.

B) Public health and safety.

Poorly managed sub-project interventions may lead to the proliferation of disease vectors and incidence of water-related infectious diseases.

C) Common pool resources.

For construction and operations of sub-project activities, there could be either temporary or long-term impact on common pool resources such as canal, water mills, and *haat-bazar*. The facilities may need to be relocated if the impacts are unavoidable.

D) Impacts on livelihoods and employment.

Construction of new facilities or sub-projects may have impacts on the livelihoods or employment of individuals (e.g., a road sub-project could take away jobs from porters).

E) Cultural/historical sites.

Cultural and historic sites (temples, shrines, religious sites, festival sites, caves, graveyards, forts, palaces, etc.) may be threatened by sub-project activities and associated works (such as extraction of construction materials, etc.).

F) Vulnerable and excluded social groups.

Some sub-projects may have adverse impacts on some population groups .

G) Cultural norms, social values, traditional practices, rituals

Cultural norms, social values, traditional practices, rituals of some communities may be affected from project works.

CHAPTER FIVE : PUBLIC CONSULTATION FRAMEWORK

5.1 Socio-economic Development and Participation Issues

Public participation, consultation and information dissemination in a project must be an integral part in all environmental and social impact assessment activities during the initial phases of project preparation. Concerned stakeholders will be regularly provided with information on the proposed project prior to and during the process of IEE or EIA and SIA, respectively while the consultants prepare the EMP and RAP documents as applicable. Established mechanisms of public participation include:

- Representatives of responsible organization for environmental, social, economic, agriculture, forestry, livestock, land-use planning in the project area;
- Consultation with experienced and well-established NGOs working in the project area;
- Consultation with the researchers and KII with the knowledgeable person in the project area;
- Formation of committees and/or groups comprising of stakeholders and consultation with management committee members;
- Interviews with PAPs to identify issues for resettlement, compensation and GRM;
- Organization of seminaries, workshops and conduct FGD;
- Consultation with the concerned public.

Specific public participation and consultation activities that should take in the project cycle with respect to PAPs are summarized in the following Table 5-1:

Table 5-1: Project stage and nature of participation of PAPs in the consultation process

Project Stage	Participation of PAPs and target beneficiaries
Project Identification	– Find out the community problems; – Participate in public consultation meetings; – Identify alternatives to minimize resettlement;
Feasibility study and resettlement planning	– Help to choose resettlement site; – Participate in survey; – Participate in meetings with host population; – Provide suggestions to entitlement provisions; – Provide inputs in RAP preparation; – Suggest mechanism for grievance redress and conflict resolution.
Project implementation	– Participate in implementation process; – Join local decision making committee; – Decide on management of common property; – Use established mechanisms for grievance redress; – Participation in bridge construction, rehabilitation and maintenance.
Monitoring and evaluation	– Ensure quality of the project and activities; – Participate in the monitoring team.
Maintenance	– Participation in maintenance as employee.

5.2 Identification of Project Stakeholders and Integration of their Perspectives in the Planning and Management Process

A stakeholder is defined as "a person, group or organization that has direct or indirect stake in a project/organization because it can affect or be affected by the Project or its Proponent's actions, objectives and policies". Stakeholders vary in terms of degree of interest, influence and control they have over the project or the proponent. All the stakeholders have been primarily categorized into two categories that have been identified as:

- **Primary Stakeholders:** include people, groups, institutions that either have a direct influence on the project or are directly impacted (positively or adversely) by the project and its activities; and
- **Secondary Stakeholders:** are those that have a bearing on the project and its activities by the virtue of their being closely linked or associated with the primary stakeholders and due to the influence they have on the primary stakeholder groups.
- Apart from categorization, the stakeholders have also been classified in accordance with the level of influence they have over the project as well as their priority to the project proponent in terms of importance.
- The influence and priority have both been primarily rates as:
  - **High Influence/Priority (Manage Closely):** People who have high power and interest are grouped in this category. They always must be managed closely. This implies a high degree of influence of the stakeholder on the project in terms of participation and decision making or high priority for project proponent to engage that stakeholder.
  - **Medium Influence/Priority (Keep Satisfied/Keep Informed):** People who have high power but low interest as well as who have high interest but low power should be kept satisfied or informed. This implies a moderate level of influence and participation of the stakeholder in the project as well as a priority level for project proponent to engage the stakeholder who are neither highly critical nor are insignificant in terms of influence.
  - **Low Influence/Priority (Monitor with minimum effort):** This implies a low degree of influence or interest of the stakeholder on the project in terms of participation and decision making or low priority for project proponent to engage that stakeholder.

Figure 5-1: Power/Interest Grid for Stakeholder Prioritization

Based on the above attributes, the following Table 5-2 delineates the stakeholders identified for the

proposed bridge projects under LGED and their analysis.

Table 5-2: Stakeholder mapping for projects

Stakeholders	Category of Stakeholder	Brief profile	Overall influence on the project	Basic of influence rating
		Project Management		
Local Government Engineering Department (LGED)	Primary	LGED is the primary project proponent own a controlling stake of 100% in the project	Highest	- Are the primary project proponents; - Responsible for establishment and operation of this project; - Primary financial beneficiaries; - Responsible for the entire project related risks and impact liabilities.
		Community		
Vulnerable groups (poor, old aged and destitute)	Primary	The marginal groups within the project area primarily comprises of landless households as a result of acquisition, households belowpoverty threshold, women headed households, old aged & destitute	Low	– Employment opportunity during construction; – Job/business prospect for their children; – Compensation paid to male member of family; – Little control over compensation amount.
Fisherman	Secondary	Fisherman in the area are primarily engaging in small scale fishing in the river	Low	- Low scale for self-consumption.
Local Community	Primary	Primarily includes adjacent community to the project site	Medium	– Project will bring development to the area; – Increase in employment opportunities and preference in job and business; – Improvement in infrastructure in the area.

Stakeholders	Category of Stakeholder	Brief profile	Overall influence on the project	Basic of influence rating
Regulatory/Administrative authorities and agencies				
Department of Environment, Bangladesh	Primary	The Department of Environment is the primary government regulatory authority for Environmental protection in Bangladesh	High	– Government Regulatory agency to provide EC to the project based on evaluation and approval of EIA study; – Responsible for monitoring project's – Environmental compliance throughout the project lifecycle.
Department of Social Welfare	Secondary	Local governmental agency responsible for implementation of governmental social welfare schemes	Low	- No major influence on project related activities; - However participation level and influence may increase in case community welfare activities proposed by the project proponent are implemented in coordination with this agency.
Other Regulatory & Permitting Authorities	Primary	-	High	- Agencies required for obtaining permits for establishment and operation of the project; - Primary involvement during pre- construction and operation phases.
Political Administration				
Upazila (sub-	Secondary	Elected representative of people at sub-	Medium	- Key linkage between the community and the project

Stakeholders	Category of Stakeholder	Brief profile	Overall influence on the project	Basic of influence rating
district level) Political Administration		district level for a fixed tenure		proponent
Ward leaders & local representatives	Secondary	Elected representative at ward level i.e. village level for a fixed tenure	Medium	- Plays important role in providing public opinion and sentiment on the project - Empowered to provide consent and authorization for establishment of project on behalf of the community
Other institutional groups				
Local NGOs and Community & Social Welfare Groups	Secondary	Microfinance agencies, social welfare groups and charitable organizations working in the area	Low	- No major involvement in the project as per today; - Possible inclusion during future stages of the project with respect to project related community welfare activities.

5.3 Screening Framework involving Participatory Approach

Social screening will be able to identify the potential for loss of land, livelihoods, income generation activities, assets, housing and commercial structures and other significant social impacts. To ensure consistency in the application criteria, standard formats will be used for environmental and social aspects. As for the screening format for environmental impacts reference is given in Chapter-2 of this ESMF report. Social screening will also enable the categorization of any projects based on their level of social impacts. Where the extent of adverse social impacts is minor and no displacement or loss of assets or livelihoods is expected, no further action is required. However, where the social screening indicates that land acquisition and or loss of assets is unavoidable, and there is adverse impact on PAPs including vulnerable communities, then appropriate resettlement action plans as well as vulnerable communities' development plan will be prepared in accordance with the provisions of the framework for resettlement and for vulnerable group's development. During the social screening process, information will be shared on preliminary project design and resettlement related impacts. Furthermore, alternatives will be explored through consultations to minimize resettlement and adverse social impacts on PAPs and vulnerable groups.

5.4 Public Disclosure of Information

The project management team must share all information relevant about the activities and their expected results with the affected and interested public for the successfully implementation of the projects. Information dissemination in a project begins with environment and social impact assessment activities during the initial phases of project preparation. Through respective local authorities, affected persons and NGOs should be regularly provided with information on the project and the resettlement process prior to and during the RAP preparation and implementation stage.

For the any bridge program/ projects in LGED, following methodological approach can be adopted for disseminating project-relevant information to the affected persons and interested public:

Workshops: a series of workshops on environmental issues will be held in the proposed project sites for information sharing with the stakeholders and concern beneficiaries. Representative of implementing authority, the study team, government officials from different departments, representatives from NGOs, local communities in different occupation, journalist and civil society may attend the workshop. In the workshop participants will share their observations, views and remarks with the study team.

Publication in Electronic and Print Media: information on program interventions and the findings of environmental assessment can also be disclosed through newspapers and electronic media (internet, TV, radio etc.).

Website: LGED together with the donor agency will develop and update a website and put the findings of the EIA and SIA report (both the English and Bengali version) and project relevant information in the website. Hard copy of the report will also be available at LGED offices of the project area.

Project document distribution: project related information in Bengali will be distributed prior to each construction, rehabilitation and maintenance work in the proposed projects to local officials, affected persons, beneficiaries, stakeholders and other concerned.

5.5 Public Consultation throughout Project Cycle

Consultations with the key stakeholders will need to be carried out throughout the project life cycle. These will include consultations and liaison with communities and other stakeholders during the construction phase and also extensive consultations with the grass root as well as institutional stakeholders during the EIA studies.

Any project affected communities should be continuously consulted by the responsible project management (supervision and monitoring team to identify needs, constraints and priorities and what kind of environmental and social corrective measures need to be pursue in different phases of the bridge project activities. This consultation is a sustainable instrument to addressing affected persons anxieties and to secure their support. A consultation framework for the bridge project is given in the following Table 5-3.

Table 5-3: Consultation framework

Consultations with communities and other stakeholders	Dissemination of information on program and its key impacts and proposed mitigation measures, views, comments, concerns and recommendation of stakeholders	LGED and EIA & SIA team	During or prior to start EIA/SIA study After preparation of Draft EIA/SIA
	Sharing EIA/SIA TOR	LGED and EIA/ SIA team	During scoping stage of EIA/SIA study
Consultation with local communities and other stakeholders	Information dissemination; public relation, awareness about risk and impacts, minimize conflicts and frictions	LGED, Contractor	During construction phase
Consultation with communities	Liaison with communities and project beneficiaries	LGED	O&M phase

CHAPTER SIX : ENVIRONMENTAL AND SOCIAL IMPACTS MITIGATION MEASURES

6.1 Introduction

This chapter represents a set of technical aspects to guide bridge project proponent and contractors to manage with environmental and social impacts as they are likely to occur in the bridge improvement projects. This mitigation framework presents practical and proven methods to maximize the beneficial impacts and avoid or minimize adverse impacts. The mitigation measures basically follow common-sense approach that aims to viable, practical and cost effective solutions, which in turn would supplement its environmental and social sustainability. As such, four approaches are followed in environmental impact management: preventive measures, alternatives, corrective measures and compensation where particular impacts are unavoidable. More detailed technical discussion on environmental principles for corrective and preventive measures in improvement works are provided in Annex-C (Environmental Code of Practices). A social assessment will be carried out at the early stage of the project and during preparation of RAP or ARAP covering all the possible adverse impact that the sub-projects may cause and taking into account the all the assessment the mitigations measures to be taken will be included in the RAP/ ARAP

6.2 Mitigation Measures for Environmental Impacts

6.2.1 During Pre-construction Phase

Possible environmental impacts during pre-construction phase from construction, rehabilitation and maintenance activities have been already identified and discussed in the chapter-4 in this ESMF report. For mitigating the possible environmental and social impacts mitigation measures for pre-construction phase is proposed in the following Table 6-1.

Table 6-1: Mitigation/Enhancement measures during pre-construction phase of construction, rehabilitation and maintenance bridge program under LGED*

Land Acquisition/Requisition	• Encroachment of gricultural land, cultural sites, fish habitat etc. • Loss of agricultural production, fish resources; • Loss of income and livelihoods; • Social conflict.	– Avoid agricultural land, social/religious institutes, fish habitat during finalization of the alignment of the approach road and location of the bridge; – Prior to start construction adequate compensation should be given to the PAPs in-time according to RAP. – Adequate compensation should be given for standing crops; – Avoid agricultural land, if possible; – Create job opportunities for the PAPs.	LGED	LGED
Housing and Commercial Structures	• Loss of housing and commercial structures; • Dust pollution; • Loss of income and livelihoods.	– Avoid the housing and commercial structure during the finalization of the alignment and location of the bridge; – Proper compensation should be given before starting the removal or dismantling works; – Create job opportunities for the PAPs. – Water spraying on the bear surface or dust pollution source;	Contractor	LGED
Loss of vegetation/tree	• Accident risk during removalof trees/vegetation's in the project sites;	– Prior to start construction, all vegetation should be removed from the proposed construction sites with the consultation of the local relevant authorities;	Contractor	LGED

	• Birds and others species can migrate from the trees/vegetation's; • Impacts on the local climatic condition.	– Avoid disturbance and careful during construction vehicle and equipment movement; – Proper H&S measures (use of appropriate PPE such as hand gloves, safety shoes and helmet) for the workers should be taken during removal of trees, bushes & crops; – To mitigate the ecological impact, tree plantation plan can be considered in the design & accordingly tree plantation will be done in an appropriate location to be determined by the LGED after consultation with the concern authority; – Proper H&S measures (use of appropriate PPE such as hand gloves, safety shoes and helmet) for the workers should be taken during removal of trees, bushes & crops; – To mitigate the ecological impact, tree plantation plan can be considered in the design & accordingly tree plantation will be done in an appropriate location to be determined by the LGED after consultation with the concern authority; – The engineer shall approved such felling; only when the proponent secures receive a "clearance" for such felling from the DoF, as applicable; – Tree felling, if unavoidable, shall be done only after compensatory plantation of at least two saplings for the every tree cut is done; – During the tree removal from the bridges and approaches construction sites diameter at brest height (DBH) of the trees is 6 inch, only such trees should be considered by the contractor for compensation and plantation; – Tree plantation at the suitable locations after completion	

			of the construction activities.		
Removal of Utilities	• Vulnerable for workers health and safety; • During movement of heavy Construction machineries equipment's can damage the utility services if not previously removed; • Due to carelessness or incautiousness death from sudden electric shocks may occur.		– Prior to start construction, the utility services (electrical cables, telephone line, water supply pipeline, gas supply pipeline and internet line) should be shifted with the consultation of the relevant organizations; – Onform to the local community before starting removal or demolishing work; – Carefully remove the utilities that are connected with the bridge and its approach road; – Proper Health and safety measures for the workers should be taken during shifting of these lines to avoid any incidents.	Contractor	LGED
Dismantling	• Dust pollution in the construction site; • Health hazard for the workers and community during bridge dismantling; • Noise level increase; • Vibration effects on the structures on the surrounding of the project area; • Surface water ontamination, blockage of navigation and drainage, impacts on aquatic animal; • A detail of the bridge		– Notify the adjacent community before starting the demolishing work; – During the removal or demolition of existing structures if required will be fully removed by the contractor; – Spraying of water in the dry land or from where there is a possibility to generate dust; – Banned fishing, swimming, boat movement activities in the construction sites, if applicable; – Proper H&S measures for the workers such as using of appropriate PPE (helmet, Earplug, musk, safety shoes, hand gloves etc.) should be taken to avoid any accidents; – Construct noise barrier around the dismantling site;	Contractor	LGED

		dismantling plan is also given in the Annex-C.	– Stop the engine when it is not required; – Monitor Noise level as per DoE guidelines; – Impact wise mitigation measures are given.		
Archaeological/ Hist orical/Social/Cult ura l/Religious Sites	• Encroachment of Archaeological/Historical/Social /Cultural/Religious sites • Air and dust pollution; • Noise level may create uncomfort for the local community; • Vibration can effect on social/ cultural/religious site.		– Avoid Archaeological/Historical/Social/Cultural/ Religious sites during the site selection and improvement of bridge approaches; – Spraying water on the dry surface to reduce dust pollution; – Vehicles transporting construction material to be covered; – Create noise barrier around the construction sites; – Limit the speed of vehicles; – Stop the demolish work for sort time like prayer time. – Realignment of bridge approach road if required.	Contractor	LGED
Setting up labour camps	• Land encroachment; • Solid and liquid waste from the labour camp		– Labour camp should be constructed at a distance from the waterbodies; – Avoid productive land and away from the settlement during the selection of land for the setup of labour camp; – No solid and liquid waste discharge into the water bodies; – Instruct workers to maintain clean environment in the camps.	Contractor	LGED

***Mitigation/enhancement measures cost will be determined during the environmental assessment of individual bridge projects base on its location, types of construction, implementation schedule, cost for project implementation and requirement of mitigation/enhancement activities.**

6.2.2 During Construction Phase

Possible environmental impacts during construction phase from the project construction, rehabilitation and maintenance activities have been already identified and discussed in the chapter-4 in this EMF report. For mitigating the possible environmental impacts during construction phase mitigation measures are given in the following Table 6-2.

Table 6-2: Mitigation/Enhancement measures during Construction phase of project construction, rehabilitation and maintenance program under LGED*

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
Air Pollution	• Construction vehicular traffic: Air quality can be affected by vehicle exhaust emissions and combustion of fuels • Construction equipment: Air quality can be adversely affected by emissions from construction machineries and combustion of fuels; • Construction activities: Dust generation from earth excavation, earth & sand stockpiles during dry period.	– Fit vehicles with appropriate exhaust systems and emission control devices; – Maintain vehicles and construction equipment in good working condition including regular servicing; – Operate the vehicles in a fuel efficient manner; – Impose speed limits at 30 km/hour on vehicle movement at the worksite to reduce dust emissions; – Control the movement of construction traffic in the access road; – Focus special attention on containing the emissions from generators; – Construction equipment causing excess pollution (e.g. visible smoke) will be banned from construction sites immediately prior to usage; – Water spray to the dry earth/material stockpiles, access roads and bare soils as and when required to minimize the potential for environmental nuisance due to dust; – Increase the watering frequency during periods of high risk (eg.high winds); – Stored materials such as: excavated earth, dredged soil, gravel and sand shall be covered and confined to avoid their wind drifted; – Restore disturbed areas as soon as possible by vegetation;	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
		– Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations; – The Air quality monitoring should be carried out by the contractor following the National Air Quality Standard (Schedule-2: Standards for Air Quality, ECR, 1997 and Amendment in 2005).		
Noise Pollution	• Construction vehicular traffic: Vibration and Noise quality will be deteriorated due to vehicular traffic. • Construction equipment: Noise and vibration will have an impact on adjacent surrounding residents. • Construction activity: Noise will have an impact on adjacent residents.	– Strict measures for noise pollution control need to be undertaken during construction activities; – Create noise barrier and consider the minimum noise levels at sensitive receptor sites (e.g. dense residential area, schools, mosques, health centers etc.); – Stone breaking machine should be confined within a temporary shed so that noise pollution could be kept minimum; – Protection devices (ear plugs or ear muffs) shall be provided to the workers operating in the vicinity of high noise generating machines during construction; – Construction equipment and vehicles shall be fitted with silencers and maintained properly; – Instruction to the drivers to avoid unnecessary horn; – The Noise level monitoring should be carried out by the contractor following the National Noise Quality Standard (Schedule-4: Standards for Sound, ECR, 1997 and Noise Pollution (control) rules 2006). – Vibration monitoring should be carried out by the contractor.	Contractor	LGED
Ground Water Pollution	• Contamination of groundwater due to Pollution lack of septic tanks or mobile toilets; • Accidental spillage of hazardous liquid from the construction camps.	– The contractor will make arrangement for water required for construction in such a way that the water availability and supply to nearby communities remain unaffected; – Handling and storage of the potential contaminants has to be organized under strict condition to avoid water pollution during construction;	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
		– Handling of hazardous liquid should be done carefully by the designated experienced person; – Handling and storage of the potential contaminants should be done by the experienced workers. Proper monitoring should be done by the experienced person; – The Ground water quality monitoring should be carried out by the contractor following the National Water Quality Standard (Schedule-3: Standards for Water, ECR, 1997).		
Surface Water Pollution	• Construction & general wastes from the construction sites; • Oil spill from the construction vehicles and construction camp can effect on fishes and aquatic wildlife (such as snakes, frogs etc.)	– Contractor should prepare Waste Management Plan and follow it properly during the construction period; – Any wastes should not be throwing into the river/khal/canal other than dump into the designated waste dumping area; – Store the oil and petroleum product in a separate location cover by a concrete structures; – Handling of hazardous liquid should be done carefully by the designated experienced person; – Monitor the surface water by testing in designated laboratory should be done by the Contractor following the National Water Quality Standard (Schedule-3: Standards for Water, ECR, 1997).	Contractor	LGED
Land/Soil Pollution	• Decrease the production capacity of agricultural land; • Land or soil erosion from water or wind; • Sediment pollution and increase the turbidity; • Reduction the microorganism.	– Avoid the productive land, agricultural land, archaeological sites, protected area, forest area, natural habitat etc.; – Land/soil quality should be ensured by the contractor to fill the abutment area and approach road; – Soil from fallow land should be used in earthwork in approach road; – Re-vegetation the exposed area as early as possible to reduce the soil erosion; – Create barrier for reducing the sedimentation into the water bodies; – The Land or soil quality test should be carried out by the contractor.	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
Waste (Solid, Liquid and Hazardous) Pollution Organic waste: remaining foods, leafs, papers, straw, fruit cover etc. Inorganic waste: Polythene, Glasses, Synthetic paper, plastic etc. Hazardous waste: Paint, fuel, chemicals, oil, petroleum products, bitumen etc.	• Improper storage and handling of construction & general liquid waste such as fuels, lubricants, chemicals and hazardous liquid onsite, and potential spills from these liquid materials may harm the environment and health of construction workers. • Improper storage and handling of construction & general solid wastes.	– The contractor will minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes); – Any wastes should not be throwing into the river/khal/canal other than dump in to the designated waste dumping area; – Handling of hazardous liquid should be done carefully by the designated experienced person; – Organic waste should be managed by composting method. A concrete chamber with 3 rooms is needed to be provided. In one room organic waste should be dumped and another room inorganic waste will be dumped. When the room will be filled then covered by earth. Then dump to the third room. After 6 month organic waste will be converted into fertilizer and will be used by the farmers; – Inorganic waste should be given to the authorized vendor for free of cost for recycling; – Accidental spillage of hazardous waste should be managed by spreading wood powder on the surface of the oil and this powder mixed with oil must store in a designated concrete room; – Provide appropriate PPE to the construction personnel for handle construction materials; – Make sure all containers, drums and tanks that are used for storage are in good condition; – Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution; – Waste water monitoring should be carried out by the contractor, following the national standard (Schedule-10: Standard for waste from Industrial units or Projects waste).	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
Disturbance of Boat Communication	• Temporary disturbance from construction activities on the water bodies.	– Inform local community about the temporary disturbance during construction, rehabilitation and maintenance activities; – Restrict the boat movement during construction and dismantling work ongoing; – Carefully remove all the debris and construction wastes from the project sites; – Preference of working schedule will be given during winter/dry season; – Work should be continued only in day time.	Contractor	LGED
Hydrological Regime	• Drainage congestion and flood in the bridge site; • Erosion and siltation at the bridge site.	– A detailed hydrological and morphological study of the bridge site should be conducted; – Proper design of bridges on the river to accommodate design flows; – Provision of sufficient sizes of drains to take design flows; – Wastes should not be disposed near any water body. All waste depending on its characteristics, should be disposed of in a controlled manner.	Contractor	LGED
Drainage Congestion	• Construction of diversion road on the river/Khal/canal create drainage congestion; • Stockpiling of construction materials in the river/khal/canal also create drainage congestion.	– Pier of the existing bridge structures and other construction waste should be clearly removed from the construction site during dismantling of existing structure; – Construct diversion road on the river/khal/canal by keeping provision of open space so that water flow cannot hamper by the construction activities; – Immediately remove all the construction debris from the construction site as well as from the water bodies in a planned way; – Duration of stockpiling should be minimized as much as possible; – Avoid the encroachment of the water bodies; – Protect water bodies from sediment loads by silt screen or bubble curtains or other barrier; – Construction activity should be recommended during the dry season;	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
		– Construction workers shall be instructed to protect water resources;		
Erosion and Siltation	• Bank erosion at the bridge site will loss of lands; • Vulnerable for the bridge structures; • Increase turbidity and impact on aquatic life; • Loss of productive land, structures, resources.	– Introduce bank protection activities; – Use of geo-bag, stone and concrete to construct the protection wall; – Plantation more vegetation to reduce surface soil erosion and enhancement of the soil compactness and stability; – Diversion road should be removed properly as soon as possible; – Before site selection for new bridge construction detailed hydrological study is essential.	Contractor	LGED
Road Traffic and Accidents	• Increased traffic use of narrow access road by construction vehicle will affect the movement of normal road traffics and the safety of the road users specially the students	– Proper Traffic Management Plan (TMP) should be prepared by the contractor during starting of construction & follow it strictly; – In this TMP, the road safety measures such as speed breakers, warning signs/lights, road safety signs, flagman etc. should be included to ensure uninterrupted traffic; – Movement specially at nearby the educational (Schools, colleges, Madrasha etc.), community infrastructure (mosques, graveyards, Prayer Ground etc.) and health complex; – In addition, BRTA traffic rules and regulations should be strictly followed; – Divert traffic to follow alternative routes to avoid traffic jams; – Avoid talking with mobile during driving.	Contractor	LGED
Quarries and Borrow Pits	• Increase noise level caused by blasting, movement of construction vehicles; • Increase noise level will be impacted on the local community; • Air pollution due to diesel fumes	– Create noise barrier around the construction site; – Stop unnecessary engine operation in the construction site; – Maintain vehicles and construction equipment in good working condition including regular servicing; – Control the movement of construction traffic in the access road; – Construction equipment causing excess pollution (e.g. visible smoke) will be banned from construction sites immediately prior to usage;	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
	and dust generation resulting from the presence of construction machinery and site cleaning activities.	– Water spray to the dry earth/material stockpiles, access roads and bare soils as and when required to minimize the potential for environmental nuisance due to dust; – Stored materials such as: excavated earth, dredged soil, gravel and sand shall be covered and confined to avoid their wind drifted; – Restore disturbed areas as soon as possible by vegetation.		
Landscape and Aesthetics	• Excavation of borrow pits, stock piling of construction materials, placing of construction equipment and parking of construction vehicles; • Presence of construction camps, equipment and their activities; • Movement of construction vehicles on the existing road network and temporary haul roads; • Closure of existing bridges by construction of diversion road.	– Parking of construction vehicles and stockpiling of construction materials/excavated earth should be done in systematic way to avoid the damaging of aesthetics of the site; – Duration of stockpiling should be minimized as much as possible; – Vegetation plantation after complete of the construction work; – Completely remove the construction camp facilities, equipment's and their activities; – Limit the speed of the vehicles and cover the vehicles during the movement or transportation of materials on the existing road network and temporary haul road; – Plantation of trees at the construction site after completion of the construction activities immediately.	Contractor	LGED
Occupational Health and Safety	• Campsites for construction workers and Safety are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities.	– Construction workers camp shall be located at least 500 m away from the nearest habitation; – Consider the location of construction camps away from communities in order to avoid social conflicts; – Create awareness among the camp users on health and safety requirements to be maintained and code of conduct.	Contractor	LGED
	• Lack of proper infrastructure facilities, such as housing, water supply and sanitation	– Adequate housing for all workers should be provided avoiding over crowing; – Safe and reliable water supply; – Hygienic sanitary facilities and sewerage system.	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
	facilities will increase pressure on the local services and generate substandard living standards and health hazards			
	• Management of wastes is crucial to minimize impacts on the environment.	− Ensure proper collection and disposal of solid wastes within the construction camps; − Insist waste separation by source; organic wastes in one container and inorganic wastes in another container at sources; − Dispose organic wastes in a designated safe place on daily basis; − The organic wastes should be always covered with a thin layer of sand so that flies, mosquitoes, dogs, cats, rats, etc. are not attracted; − Locate the garbage pit/waste disposal site minimum 500m away from the resident area so that people are not disturbed with the odor likely to be produced from anaerobic decomposition of wastes at the waste dumping places.	Contractor	LGED
	• There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices. • There will be an increased risk of work crews spreading sexually transmitted infections and HIV/AIDS.	− Provide adequate health care and sanitation facilities within the construction sites; − Train all construction workers in basic sanitation and health care issues and safety matters and on the specific hazards of their work; − Provide HIV awareness programming, including STI (sexually transmitted infections) and HIV information, education and communication for all workers on regular basis; − Regular mosquito repellant spraying during monsoon periods.	Contractor	LGED
	• Construction work may pose health and safety risks to the construction workers and site visitors	− Provide the workers a safe and healthy work environment; − Provide appropriate PPE for workers, such as safety boots, helmets, masks, gloves, protective clothing, goggles, full-face eye shields and ear protection;	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
	leading to severe injuries and deaths.	– Maintain the PPE properly by cleaning dirty ones and replacing them with the damaged ones; – Appoint an environment, health and safety manager to look after the health and safety of the workers; – Inform the local authorities responsible for health, religious and security before commencement of civil works and establishment of construction camps so as to maintain effective surveillance over public health, social and security matters.		
	• Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victim.	– Provide health care facilities and first aid facilities are readily available; – Document and report occupational accidents, diseases, and incidents and actions taken; – Identify potential hazards to workers, particularly those that may be life threatening and provide necessary preventive and protective measures; – Provide awareness to the construction drivers to strictly follow the driving rules; – Provide adequate lighting in the construction area and along the roads in the construction site.	Contractor	LGED
Community Health and Safety	• Accidents on the approach road and construction site; • Noise and dust pollution; • Communicable diseases can spread among the local community.	– Prior to start the construction activities contractor will be informed the local community; – Instruct the drivers and limit the speed of the vehicles; – Regular health checkup of the workers and awareness training about the communicable diseases; – Ban all swimming and fishing activities in the construction site; – Proper lighting at the project site during the night time; – Avoid unnecessary noise pollution; – Spraying water in the dry surface to reduce the dust pollution	Contractor	LGED
Impacts on Archaeological/	• Air and dust pollution; • Noise level may create uncomforted;	– Create temporary barrier around the project site; – Regular spraying of water in the construction site and approach road to reduce the dust emission; – Control the speed limit about 30 km/hour in the construction	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
Historical/Social/ Cultural/ Religious Sites	• Vibration can effect social/cultural/religious sites.	site and approach road; – Construction activities should be continued during day time only; – Carefully handling of construction machineries and equipment's near the sensitive receptors near the project site.		
Housing and Commercial Structures	• Air and dust pollution; • Noise level may create uncomforted; • Loss of income and employment; • Mental stress; • Resettlement or removal due to realignment of approach road; • Vibration can effect on structures.	– Spraying water on the dry surface to reduce dust pollution; – Create noise barrier around the construction sites; – Limit the speed of vehicles in the construction site; – Prior notice to the local inhabitants for resettlement issues if required; – Compensation should be given to the PAPs in-time according to RAP; – Realignment of bridge approach road if required; – Job opportunities for the PAPS and priority should be given; – Plantation of trees in an appropriate location will be determined by the LGED after consultation with the concern authority (Forest Department).	Contractor	LGED
Flora and Fauna	• Dust will be generate during earthwork and deposited on the leaves of nearby trees, this will abduct the growth of trees. • Construction activities will increase sediment loading of streams and changes in turbidity will impact adversely upon fishes and aquatic animals. • Diversion at bridge site will act as barriers to the migration of fishes and aquatic animals.	– Proper construction management plan should be introduce in the Contractor LGED construction sites; – Regular water spraying in the dry area from where there is a possibility to dust pollution; – Proper management plan for the waste management in the construction sites; – Construction work should be preferred during dry season; – No disturbance for aquatic animal and keep provision for the fish movement; – Diversion road should be removed properly as soon as possible; – Construction activities should be continued during day time only; – Create noise barrier and avoid unnecessary machineries and equipment's operation; – Vegetation plantation after compilation of the construction	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
	• Noise generation from the construction vehicles and equipment's can create disturbance for the birds and wildlife;	work; – Construction workers shall be instructed to protect natural resources, flora and fauna, including wild animals and aquatic life, hunting and unauthorized fishing are prohibited; – Natural river/khal/canal will be reinstated after completion of construction works; – Fingerling (fish) can be released to the river/khal/canal near the bridge site to boost up the fish resources.		
Disturbance to Wildlife Movement	• Noise from construction machineries and vehicles, movement of workers likely to be disturb the movement of wildlife; • Permanent migration may occur from the area; • Increase of mortality due to collision with vehicles;	– Instruct workers and contractors to avoid harassment and Contractor LGED disturbance of wildlife; – Schedule activities to avoid disturbance of wildlife during critical periods of the day (e.g., night) or year (e.g., periods of breeding, nesting); – Turn off all unnecessary lighting at night; – Maintain noise-reduction devices (e.g., mufflers) in good working order on vehicles and construction equipment; – Temporary fencing around the construction site during construction period; – Educate workers regarding the occurrence of important resources in the area and the importance of their protection, including the appropriate regulatory requirements; – Regular monitoring of the death and disturbance of wildlife in the construction site.	Contractor	LGED
Fisheries and other Aquatic Animals	• Increase turbidity and siltation can spawning beds for fish; • Noise from pile driving activities, aquatic animals including fishes will be affected; • Turbid water can reduces the infiltration of sunlight into deep water.	– Construction activities is preferred during the dry season; – Careful handling of construction waste in the construction site; – Introduction of land/soil erosion and dust control practices in the construction site; – Provide adequate space for movement and safe passage of fishes and other aquatic animals; – Schedule activities to avoid disturbance of fish and aquatic anima during critical periods of the day (e.g., night) or year (e.g., periods of breeding); – Turn off all unnecessary lighting at night to avoid attracting	Contractor	LGED

Issues/ Activitiees	Potential Environmental Impacts	Proposed Mitiga Measures	Responsibility	
			Implementation	Supervision
		and disturbance of fishes; – Maintain noise-reduction devices (e.g., mufflers) in good working order on vehicles and construction equipment; – Regular monitoring the fish death and disturbance of fish and aquatic animals in the construction site; – Fingerling (fish) can be released to the river/khal near the bridge site to boost up the fish resources.		
Influx of construction workers	• Availability on the resources like food, housing, water resources; • Communicable diseases may also spread; • Social Conflict.	– Contractor should be ensured the availability of water for the construction activities; – Provision of clean drinking water in the construction camp in accordance with Schedule 3(b) of ECR, 1997; – Trained the workers by providing health and safety training on communicable diseases; – Educating project personnel, and area residents on risks, prevention, and available treatment for vector-borne diseases; – No child and/or forced labour will be employed by the EPC contractor; – Working conditions and terms of employment will be fully compliant to the Bangladesh labour laws.	Contractor	LGED

* Mitigation/enhancement measures cost will be determined during the environmental assessment of individual projects base on its location, types of construction, implementation schedule, cost for project implementation and requirement of mitigation/enhancement activities.

6.2.3 During Operation Phase

Possible environmental impacts during operation phase from the bridge construction, rehabilitation and maintenance activities have been already identified and discussed in the chapter-4 in this EMF report. For mitigating the possible environmental impacts during operational phase mitigation measures are proposed in the following Table 6-3.

Table 6-3: Mitigation/Enhancement measures during Operation phase of the project construction, rehabilitation and maintenance program under LGED*

Air Pollution	• Dust emission from the increasing number of vehicles in the bridge area; • Vehicular emission from burning fuels.	– Establish the speed breaker to limit he speed of the vehicle near the bridge site; – Strictly follow the BRTA rules and regulations; – Increase number of plantation by adding new species of trees on the appropriate locations after consultation with the concern authority.	LGED	LGED
Surface Water Pollution	• Remaining construction materials may be washed by the rainfall into the water sources and lead to sedimentation and increase turbidity; • Hazardous materials spilled by accidents; • Soil erosion during rainy season can contaminate nearby surface water.	– Remaining construction materials will be completely remove from the proposed project site after completing of the construction activities; – Cover the bare surface by plantation of trees/vegetation to reduce the surface soil erosion; – Speed control measures in the bridge site to reduce the occurrence of accidents; – Bank protection work can be done in the bridge site; – Avoid rainy season for continuing bridge development activities.	LGED	LGED
Ground Water Pollution	• Accidental spillage of hazardous chemicals	– Speed control measures in the bridge site to reduce the occurrence of accidents;	LGED	LGED

	and materials.	–	Inform to the concern authority to take necessary action to reduce the contamination of groundwater.		
Hydrology and Flood pattern	• Increase flood/waterlogging/drainage condition; • Encourage for erosion and siltation.	–	During the planning stage and site selection local hydrology and flooding level will be considered; – Vertical navigation clearance should be kept in design and planning; – A separate and details hydro-morphological study should be conducted before starting construction activities; – Bridge site should be clean properly after completion of the construction activities so that the natural drainage system may not hampered.	LGED	LGED
Noise Pollution	• Faulty engine and hydraulic horn may increase the noise level.	–	Necessary instruction for the drivers; – Establishment of signboard near the sensitive receptors like mosques, schools, temple, bazar etc.	LGED	LGED
Flora and Fauna	• Dust will hinder vegetation growth; • Increase number of death of wildlife and collision with the vehicles; • Avifauna will be affected by the movement of vehicles; • Fish and other aquatic animals will be affected.	–	Re-plantation of various suitable local trees can be done on the slopes of the bridge connection approach roads or the suitable locations around the project site; – Establishment of speed breaker or signboard indicating the movement route of the wildlife; – No disturbance for aquatic animal and keep provision for the fish and other aquatic animals movement; – Diversion road should be removed properly as soon as possible; – Construction workers shall be instructed to protect natural resources, flora and fauna, including wild animals; – Natural river/khal/canal will be reinstated after completion of construction works; – Fingerling (fish) can be released to the river/khal/canal near the bridge site to boost up the fish resources.	LGED	LGED
Landscape and Aesthetics	• Land use of the proposed bridge project area will be changed;	–	Tree/vegetation plantation at the suitable site in the bridge site; – Proper removal of construction camp facilities and construction wastes from the bridge site after completion of the works;	LGED	LGED

	• Improper removal of construction camp facilities and other construction waste will affect landscape and aesthetics.	– Excavated borrow pit area will be properly managed by the contractor, it will be preferred to use dredging materials after quality testing.			
Disturbance of Boat Communication	• Boat communication will be affected due to the improper vertical navigation clearance.	– A detailed hydrological study including the consideration of the local flood level before design stage; – Detailed morphological study should also be conducted; – For the existing bridges dismantling pier of the bridges will be fully removed from the channel.	LGED	LGED
Road Traffic and Accidents	• Number of vehicles movement will be increased in the area; • Encourage drivers to higher the vehicle speed and road accidents may increase.	– Establish speed breaker and road safety sign; – Keep provision of walk way both side on the bridge for the people movement; – A proper traffic management plan can be introduced and strictly follow the BRTA rules; – Keep provision of adequate lighting facilities in the bridge site; – Avoid using mobile phone during driving.	LGED	LGED

* Mitigation/enhancement measures cost will be determined during the environmental assessment of individual projects base on its location, types of construction, implementation schedule, cost for project implementation and requirement of mitigation/enhancement activities.

6.3 Social Impacts and Mitigation Measures

6.3.1 Objectives of social impact mitigation :

The purpose of Social Impact Mitigation Measures (SIMM) are to assess the project's social, economic and cultural impacts and the measures proposed to avoid, manage, mitigate or offset the predicted impacts of the project.

6.3.2 Project Management Cycle

Project management cycle includes: (i) identification of the subproject in consultation with the stakeholders; (ii) preparation of the design; (iii) sharing of the design with the stakeholders; (iv) revision and correction in the design if required; (v) formation of the GRC; (vi) formation of the implementation monitoring committee; (vii) supervision and monitoring of the implementation and (ix) operation and maintenance of the bridge.

6.3.3 Social impact mitigation

1. **Project affected population.** It is essential to identify the population who will be benefited by the services to be delivered by the sub-project and others who may be affected but are not direct beneficiaries. Active participation of the beneficiaries is essential for achieving the objectives of the sub-project and ensuring the sustainability of the sub-project. However, based on the evaluation of the sub-project affected population, compensatory measures may need to be designed and implemented.

2. **Public/private property.** Sub-project may, partly or fully, encroach upon agriculture land or seize houses, schools, health-posts, temples, etc. The precautionary principle needs to be followed to avoid such instances, however, if it is a must to occupy any property, proper compensatory measures need to be employed.

3. **Absorptive capacity.** For sub-projects which provide facilities and services to beneficiaries with low incomes, skills, and levels of literacy, it is necessary to assess the extent to which they will acquire, operate, and maintain the new facilities and services. It is also essential to know their ability to cope with the changes which will be created after the sub-project intervention. If the assessment shows that the absorptive capacity is low, it may be necessary to incorporate a component for social mobilization to assist the targeted groups in developing the capabilities to absorb the sub-project benefits.

4 **Public health and safety.** Poorly managed sub-project interventions may lead to the proliferation of disease vectors and incidence of water-related infectious diseases. Similarly, safety issues of workers, beneficiaries, and trespassers need to be addressed during the construction and operational periods of the sub-project.

5 **Common pool resources.** For construction and operations of sub-project activities, there could be either temporary or long-term impact on common pool resources such as canal, water mills, and haat-bazar. The facilities may need to be relocated if the impacts are unavoidable.

6 **Impacts on livelihoods and employment.** Construction of new facilities or sub-projects may have impacts on the livelihoods or employment of individuals (e.g., a road sub-project could take away jobs from porters). A provision of alternative livelihood or employment (either with the same project or elsewhere) will be project objective in such cases.

7 **Cultural/historical sites.** Cultural and historic sites (temples, shrines, religious sites, festival sites, caves, graveyards, forts, palaces, etc.) may be threatened by sub-project activities and associated

works (such as extraction of construction materials, etc.). So, cultural/historical sites should remain safe from project implementation works.

8 **Vulnerable and excluded social groups.** Some sub-projects may have adverse impacts on some population groups (such as squatters or ethnic minority groups/indigenous people). These impacts may be loss of livelihood, price changes, or adverse changes in social and physical environments. It is necessary to identify such vulnerable groups that may be adversely affected and formulate mitigation measures.

9 **Involuntary resettlement.** If involuntary resettlement is unavoidable, a land acquisition and resettlement plan needs to be prepared by the Executing Agency (in this case, LGED, or its field-based entity). Such document will contain: (i) information about the affected people, (ii) acquisition and resettlement issues, (iii) estimated costs to execute the plan (including by compensating, relocating, and providing resettling allowances). The extent of acquisition and resettlement needs to be reflected in an entitlement matrix based on the prevailing Land. Acquisition Act.

10 **Public participation.** To achieve meaningful participation, it is necessary that sub-project documents describe in detail the mechanisms for beneficiaries and potentially vulnerable and excluded social groups to participate during sub-project design and implementation. There could be two levels of participation:

10.1 the participation of beneficiaries is crucial to meet sub-project objectives and ensure sustainability; whereas

10.2 the participation of adversely affected groups will be useful in determining compensation and/or resettlement options and in assessing alternative livelihoods.

11 **Cultural norms, social values, traditional practices, rituals.** In Bangladesh, traditional practices in using natural resources are interlinked with numerous festivals, rituals, and group activities. This linkage has created a fabric of cultural norms and social values. Thus, an assessment in this regard is also essential to determine possible consequences of sub-project interventions.

12 The foregoing description of the impacts portrays a generic picture of the environmental and social attributes to be verified during the feasibility study of the sub-project. The information should be used to design the best environmental and engineering practices to avoid or mitigate any adverse environmental and social impacts.

6.4 Labor Influx Management

A small labour influx will be there as some specialized labours have to be mobilized at the project construction sites. They will temporarily settle there and can have interaction with the local people without developing any kind of hostility or animosity. The migrant labour will have very little chance to go in conflict with the local people as the contractor manages the work place environment.

(Guidelines on Social impact mitigation measures annexed in Annex-E-1)

6.5 Grievance Redress Mechanism (GRM)

During implementation of project development works, project beneficiaries could be affected and that may create grievances among them. Most grievances yield from acquisition of land to implement the development work. Government uses Acquisition and Requisition of Immovable Properties Ordinance 1982 (amended 1994) for acquisition of land. The Cabinet of the Parliament has approved a draft revising the Ordinance on 3 April, 2017 and it's going to be known as 'The Immovable Asset Acquisition and Requisition Law, 2017'.

At initial stage of acquisition, DC issues notice under Section- 3 and affected person can object under the ordinance. Once any objection is heard and disposed of, there is virtually no provision for the individual to bring the grievances and complaints to next stage of the process. Moreover, the ordinance does not support or there is no mechanism to listen the affected persons who have no legal titles on acquired land. The complaints and grievances may range from disputes over ownership and inheritance of the acquired lands and which may be overlooked during censuses; valuation of affected assets; payment of compensation; and so on. On the other hand, the concern people may have suggestions on the works which have merit for consideration.

The project will establish a procedure to listen and receive grievances for resolution or mitigation social safeguard impacts. The grievance redress system will help to resolve issues/conflicts amicably and quickly, saving the aggrieved persons from having to resort to expensive, time-consuming legal action. The procedure will not prevent any aggrieved person from going to the courts of law.

A Upazila Grievance Redress Committee (UGRC) will be formed for each project Upazila to ensure easy accessibility of the affected persons. The UGRC will resolve grievances risen from land acquisition, displacement and disturbances from project works.

The UGRC will receive complaints from different sources like writing complaint in presence, dropping complaint in the complaint Box, sending by post or e-mail etc. The Complaints will be acknowledged within five days, investigated and discussed in the meeting within a month of receiving of the complaint.

UGRC will also receive complaints from affected persons without title. All the complaints will be recorded in the complaint registers first. In case of receiving complaints over telephone, the complainers will be requested to send a written complaint by post or by person with their signature and addresses. The complainers will be noticed for hearing in the UGRC meeting. The complaints which cannot be resolved in the UGRC and suggestions on project works received from project beneficiaries will be referred to the the District Grievance Redress Committee (DGRC). The complaint which is under capacity of the UGRC cannot be referred to the DGRC without hearing and final decision.

Upazila Engineer will be convener of the UGRC and Community Organizer will act as Member Secretary. The UGRC will maintain its office at the office of Upazila Engineer, LGED. The nominated members of the UGRC will be from such kind of people who represents people or people consult with them first in their crisis. The project will ensure easy access of people with their complaints and grievances as well as impartial hearings, investigations, and transparent resolutions must be ensured.

Where IPs are among the affected persons, the membership composition of the UGRCs will take into account any traditional conflict resolution arrangements that IP communities may practice. If the aggrieved person is a female, LGED will ask the concerned female UP Member or Municipal Ward Councilor to participate in the hearings. The UGRC will sit at least once in a month.

The District Grievance Redress Committee (DGRC) will be headed by Executive Engineer, LGED and will sit at least once in a month. The DGRC will hear the cases referred from UGRC, complaints on tender and quality of works and suggestions received from beneficiaries. The both committee will also receive suggestions from beneficiaries. Membership of local peoples representatives and local elite persons will be ensured in the DGRC. All the complaints and suggestions will be recorded in register. The DGRC will send the unsolved complaints to the PMU.

Grievance Redress Procedures and Institutional Arrangements

UGRC will receive all complaints at the Office of the Upazila Engineer through the Community Organizer. The Convener of UGRC will review and sort the cases in terms of nature of grievance and urgency of resolution, and schedule hearings. All cases at the local level will be heard within four weeks of their receipt.

If the UGRC failed to resolve the grievance, the UGRC will refer the case to the DGRC along with report of investigation, minutes of the hearing. The DGRC will communicate with the concerned UGRC and complainers and will arrange hearing within 15 working days of receiving cases from UGRC.

If the decision of DGRC is found unacceptable by the aggrieved person, DGRC will refer the case to the PMU of the bridge program/project at LGED Head Quarter with the minutes of the hearings. LGED will try to resolve the grievance and in case of failure, LGED will refer the case to the MLGRD&C with the minutes of hearings. At the ministry level, decisions on unresolved cases, if any, will be made in no more than four weeks by an official designated by the Secretary, MLGRD&C.A decision agreed with the aggrieved person(s) at any level of hearing will be binding upon LGED.

If any member of UGRC or DGRC recommends any application to address grievances, the application will be rejected and the member who made the recommendation will be eliminated from the committee. A new member will be replaced in consultation with Project Director. LGED will take the following steps for successful implementation of grievance redress mechanism in the project area.

Grievance resolution will be a continuous process in RP implementation. The PMU will keep records of all resolved and unresolved complaints and grievances (one file for each case record) and make them available for review by any interested persons/entities. The PMU will also prepare periodic reports on the grievance resolution process and publish these on the LGED website.

CHAPTER SEVEN : RESETTLEMENT POLICY FRAMEWORK

7.1 Introduction

The Resettlement Policy Framework establishes the resettlement and compensation principles, organizational arrangements and design criteria to help the project affected persons to restore better living standard or at least restore pre-project level living standard. These affected persons may loss their shelter, agricultural lands assets or livelihoods, and/or loss access to economic resources.

During preparation of RPF, LGED follows the country's relevant laws and in case of donor assisted project, Policies of donor/s on resettlement are considered. The RPF will be applicable to all sub-projects under the study project as well as in other bridge construction, repairing and maintenance projects.

The objective of the RPF is to prepare a framework to identify project affected persons, losses of the affected persons and resettle them following project agreed documents. The RPF will guide the project to implement project activities avoiding or minimizing project impacts on beneficiaries.

Program Policy Guidelines

The project approach discourages acquisition of private lands and displacement of people for project purpose. However, it may appear that a potential investment subprojects may require land acquisition and population displacement when the specific locations of subproject activities are determined. Once it is determined through the social impact assessment that any of the planned investment subproject will lead to land acquisition, population displacement or loss of livelihoods, the LGED will prepare Resettlement Action Plan (RAP). As in the case of the Social Management Plan (SMP), the RAP is designed to ensure that impacts arising from land acquisition, displacement and relocation are compensated, resettled and livelihoods restored. While the SMP addresses all social issues and impacts, the RAP focuses on people affected by land acquisition, relocation and restriction of access, and defines a strategy for formalizing arrangements and responsibilities for mitigating impacts caused due to displacement.

7.2 GoB and donor agencies Policies on involuntary resettlement and land acquisition:

7.2.1 Common principles

Generally, both the policy of Government and the donors support the following basic principles :

- Involuntary resettlement shall be avoided or minimized to the extent possible,
- Right of objecting on notice of acquisition.
- Compensating the affected persons in highest market value. But Government Method of estimating highest market price differs from the methods of donors.
- Evacuating from affected properties after paying compensation in full.

7.2.2 Identification of Gaps and Limitation of Land acquisition Law

The main gaps and limitations of the national legal and policy framework are:

- National law makes provision for compensation to the titled landholder only and, by default, omits all other PAP, including tenants farmers without documents, landless farmers, squatters, agricultural labourers, shopkeepers. There are also no provisions to protect the interests of vulnerable groups.

- National law does not make any provision for encroachers or squatters regarding to the entitlement for compensation

- Accordingly, there is no provision for rehabilitation assistance for such vulnerable groups.

- When GoB requires assets, national law does not specify about the provision of mandatory replacement cost.

- The Land Acquisition Act, 1982 does not emphasize transparency and stakeholder participation for various decisions that directly affect the long term wellbeing of PAPs. Also, the CDC does not require participation of either the representatives of PAPs.

- There are no clear directives to look at project design options that avoid or minimize involuntary resettlement.

- Only cash compensation is considered for payment. It is the easiest mode of operation but its long- term impact on families who are not used to large cash flow can be more negative than otherwise.

- Lack of consideration of the apparent time gap between notification of acquisition and the payment of compensation is another limitation of the existing legal framework.

7.2.3 Donor Policies on Involuntary Resettlement

7.2.3.1 World Bank Resettlement Policy - Involuntary Resettlement (OP 4.12)

This policy is the principal social safeguard policies of the World Bank applying for resettlement. The key objectives of the policy on involuntary resettlement includes to

- avoid or minimize involuntary resettlement and related disruption where feasible;
- explore all viable alternatives for project design;
- provide transparent compensation procedures for the involuntary acquisition of land;
- assist the affected and displaced persons in their efforts to improve their standards of living, income earning capacity, and production level, or at least in restoring them, implemented through a resettlement action plan;
- encourage community participation in planning and implementing resettlement;
- provide assistance to affected people regardless of the legality of land tenure.

The policy covers not only physical relocation but any loss of land or other assets resulting in relocation or loss of shelter; loss of assets or access to assets; loss of income sources or means of livelihood whether or not the affected people must move to another location. When the policy is triggered, a

Resettlement Action Plan must be prepared. An abbreviated plan may be prepared when less than 200 people are affected by the project. In situations, where all the precise impacts cannot be assessed during project preparation, provision is made for preparing a Resettlement Policy Framework (RPF). The RAP/RPF must ensure that all the Bank's policy provisions detailed in OP 4.12 are addressed particularly the payment of compensation for affected assets at their replacement cost.

7.2.3.2 ADB Resettlement Policy

Land acquisition, compensation and the resettlement on the proposed project will seek to comply with the ADB's guidelines, Handbook on resettlement: A Guide to Good Practice (1998). The main objectives and principles of the ADB are as follows:

- Involuntary resettlement should be avoided where feasible.
- Where population displacement is avoidable, it should be minimized by exploring all viable project options. People unavoidably displaced should be compensated and assisted, so that their economic and social future would be generally as favorable as it would have been in the absence of the project.
- People affected should be informed fully and consulted on resettlement and compensation options. Existing social and cultural institutions of resettled persons and their hosts should be supported and used to the greatest extent possible, and resettled persons should be integrated economically and socially into host communities.
- The absence of a formal legal title to land by some affected groups should not be a bar to compensation; particular attention should be paid to households headed by women and other vulnerable groups, such as indigenous peoples and ethnic minorities, and appropriate assistance provided to help them improve their status.

- As far as possible, involuntary resettlement should be conceived and executed as a part of the project.
- The full costs of resettlement and compensation should be included in the presentation of project costs and benefits.
- Costs of resettlement and compensation may be considered for inclusion in Bank loan financing for the project.

7.2.4 Resettlement Policy for Bridge projects of LGED

Avoid involuntary resettlement and adverse impacts on people and communities, wherever feasible. Screen the project early on to identify past, present, and future involuntary resettlement impacts and risks. Determine the scope of resettlement planning through a survey and/or census of displaced persons, including a gender analysis, specifically related to resettlement impacts and risks.

Minimize Involuntary Resettlement

To minimize involuntary resettlement prepare plan for lowest volume of land. Avoid displacement from homesteads and business places at the best. If displacement is unavoidable, minimize involuntary resettlement by -

(i) exploring alternative project designs;

(ii) effective measures to minimize impact in consultation with the people who are affected.

Adverse social impacts

Do Benchmark survey at the very beginning of the project using a unique format to identify impacts and to measure achievement in different stages of project.

Try utmost to avoid displacing from homesteads and business places. Mitigate adverse impacts of construction of roads, give more stress on improving river transports.

Consultation

Disclose the project to the project beneficiaries at the early beginning of the project. Record feedbacks of the participants and report to the PMU. Ensure participation of people in planning, implementation, and monitoring and evaluation of resettlement programs.

Livelihood restoration

From early assessment prepare plan for restoration of livelihood for affected people whose livelihood will be severely affected. As far as possible Land based resettlement will be taken for the affected people whose livelihood depends on land. Affected people from LGED development works will get preference in LGED developed markets, construction works and other LGED project works. Affected peoples will be linked with capacity building trainings in LGED cost. Livelihood condition will be monitored in the influenced area.

Resettlement Plan

Prepare Resettlement Plan (RP) for the projects having resettlement issues. Prepare Resettlement for both the projects having land acquisition or not. Projects without LA may have resettlement issues like displacement of squatters, push back of encroachers. The RP will contain detail assessment on project impact, socio-economic profile of the project area, entitlement, livelihood restoration strategy, institutional arrangements, monitoring and reporting framework, budget, and time-bound implementation schedule.

For donor supported projects all the affected persons will be compensated for their losses on replacement value as described in the policy. For government funded projects affected persons if not other arrangements will be compensated in market price as decided in the law. For government funded projects affected persons without title may not be compensated financially. But LGED will prepare plan for restoration of their livelihood, like building up their capacities by training, placing them GCMs or link up with other programs.

Vulnerability

Pay particular attention to the needs of vulnerable groups, especially those below the poverty line, the landless, the elderly, women and children, and Indigenous Peoples, and those without legal title to land, and ensure their participation in consultations.

For government funded projects vulnerability also be considered. During project implementation special care will be taken to mitigate harm of the vulnerable persons and resettle them at the capacity of LGED.

Evacuation from land

Pay compensation and provide other resettlement entitlements before physical or economic displacement. If the affected person is not eligible for compensation sufficient time (at least one month) will be given for shifting.

Monitoring and Evaluation

Project Social safeguard issues will be monitored from the beginning of the project. Periodical monitoring will be conducted and properly reported.

Grievance Redress and Suggestions Committee

Form Grievance Redress and Suggestions Committee at Upazila level so that interested people can submit complaints and suggestions on project activities. The committee will sit at least once in a month and submit report to PMU. A central committee of LGE will review the reports.

7.2.4.1 Voluntary Donation:

Voluntary donation is acceptable by the project. Voluntary donation or "Gift" is the transfer of certain existing moveable or immoveable property made voluntarily and without consideration, by one person, called the donor, to another, called the donee, and accepted by or on behalf of the donee. According to The Transfer of Property Act of 1882 (Act No. IV of 1882) donor can transfer his/their property for the benefit of the public in the advancement of religion, knowledge, commerce, health, safety, or any other object beneficial to mankind. The project will bear the Stamp fees , registration charges and other government charges for the transfer.

For the purpose of making a gift of immoveable property, the transfer must be effected by a registered instrument signed by or on behalf of the donor, and attested by at least two witnesses. The Act has also defined that a gift cannot be revoked (Section: 126) .

7.3 Eligibility, Entitlement and Valuation

7.3.1 Eligibility

The Donors Policy on Involuntary Resettlement requires compensation for the lost assets at replacement costs to both titled and non-title holders (i.e. squatters, encroachers and tenants) and resettlement assistance for lost income and livelihoods. In the proposed project, the absence of formal titles will not be a bar to resettlement assistance and rehabilitation. Further, the principles adopted herein contain special measures and assistance for any vulnerable affected person (AP). Persons affected by land acquisition, and relocation and/or rehabilitation of structures/assets (businesses, houses, etc.) are entitled to a combination of compensation measures and resettlement assistance, depending on the nature of ownership rights of lost assets and scope of the impact, including social and economic vulnerability of the affected persons. Thus, the affected persons in the project will be entitled to various types of compensation and resettlement assistance that will help in the restoration of their livelihoods, at least, to the pre-project standards. The cut-off date of eligibility for entitlement is when the census survey is completed and when publicly announced. Persons who has encroached the area after the given cut-off-date are not entitled to compensation or any other form of resettlement assistance.

7.3.2 Compensation and Entitlement Policy

The following principles and standards will be used to determine compensation and assistance for persons/households in the different impact categories:

1 Acquired Lands and Other Assets

- Replacement costs for an equal amount of land of same use and quality, including the registration costs or stamp duties.
- Replacement costs of houses/structures and other immovable built items (e.g. water supply, sanitation, drainage, etc), at current market prices of the same building materials plus the current costs of labor to build them.
- Current market prices of trees and other assets which are irreplaceable. Price of fruit trees will be determined considering the maturity and harvest price of fruits.
- Current market prices of crops in the field or on trees, if the lands are used before harvest.
- If the acquired land is agricultural and amounts to 20% or more of the total productive land owned by the affected household, a transition allowance at three times the value of the crops produced in a year on the acquired land.
- Valuation principles and methods to determine the replacement costs of lands, houses/structures and other replaceable assets, and market prices of trees, crops and other irreplaceable assets are suggested in Annex B2.

2 Displacement from Homesteads

- Displaced from private lands: Relocation assistance to lands the affected households can personally arrange to buy, or to public lands arranged by LGED.
- Displaced from public lands: Relocation assistance for socio-economically vulnerable households to public lands arranged by LGED.
- Displaced from VNR lands: Relocation assistance either to lands they can personally arrange to buy, or to public lands arranged by LGED.

3 Loss of Business, Employment and Rental Income

- Temporarily Closed Businesses: Where business activities come to a complete closure during construction, the owners will be paid for income loss at rates based on average daily net income for the smaller of the number of days needed to reopen the individual businesses, or to complete the civil works.
- Partially Affected Businesses: Where business premises are partially dismantled and the remainder is structurally safe and useable, compensation, calculated as above, for the smaller of the number of days needed to repair and reopen the individual businesses, or to complete the civil works.
- Businesses Completely Displaced from Present Premises: Owners of affected business will be compensated for loss of income for 45 days based on average daily net income from the business and assisted in relocating their business in new locations.
- Loss of Employment Income from Displaced & Temporarily Closed Businesses: Persons who have been continuously employed by the displaced and temporarily closed businesses for at least six months up to the day of the PAP census (cut-off date) will be compensated for the period until their employers restart their operations, or for a maximum of 30 days. The daily rates will be based on their monthly/daily salary paid by the employers.
- Loss of Income from Rented-out Premises: Three months' rent at the current rates for loss of rental income from premises affected on private lands.

4 Vested and Non-Resident Properties

Lands and other properties that were not declared 'vested and non-resident' (VNR - previously 'enemy properties' under the Enemy Properties Act of 1965) through 1984, and are found to be 'vested and non-resident' during acquisition for any projects under RTTP-II, the following guidelines will apply:
Agricultural lands

- Present users/owners will qualify for compensation of three times the value of all crops grown in one year on the acquired lands;
- Current market prices of crops in the field or on trees, if the lands are used before harvest; and
- Where acquisitions affect the lands partially, the owners/users will be allowed to use the remainder.

Acquired homesteads (including houses/structures): To deal with partial and full acquisitions, LGED will consider the following alternatives in consultation with the present owners/users:

- Partially acquired homesteads (including houses/structures): Assistance to the present owners/users to move and rebuild the houses/structures on the remaining land.
- Fully acquired homesteads (including houses/structures): Relocation assistance either to lands they can personally arrange to buy, or to public lands arranged by LGED; or
- Six months' rent for living accommodation, comparable to the affected one, in the nearby towns where such accommodation is available for rental purposes.

5 Leasehold Lands

- Formally leased-in from any agencies of the Government: Compensation as stipulated in the lease agreement.
- Formally leased-in khas land: Compensation, if any, stipulated in the lease agreement.

6 Unforeseen Impacts

LGED will adopt and implement policies, in consultation with the affected persons/ stakeholders and the IDA, to mitigate any adverse impacts that may have remained unknown and are not covered in this SMF.

7 Cut-off Dates

These will be established to identify the non-land assets that will qualify for compensation and discourage abuse of the mitigation policies by defrauding the project. These are the dates on which censuses of the affected persons and assets are completed on particular area (Mauza/village). No person or his/her assets will qualify for compensation unless they are recorded in the census taken on the cut-off date.

7.4 Compensation and Entitlement Framework

The APs will be entitled to get the compensation as per following entitlement matrix if otherwise legal change has not been brought about in the country. LGED will consult IDA for any modifications to the guidelines as and when found necessary for better implementation of the mitigation measures.

Table 7-1: Loss of Agricultural & Other Lands

OwnershTP Type	Entitled Person	Entitlement	Responsibility
Private	Legal Owners,	Compensation-under-law (CUL) or	• CULpaidbyD

OwnershTP Type	Entitled Person	Entitlement	Responsibility
	as determined by DCs, or by courts in cases of legal disputes	replacement cost[2], whichever is higher. If applicable (subject to section 2.8) • Top-up equal to the difference between CUL and replacement cost. • Transition allowance (TA) for income loss (see Loss Category 5 below).	Cs • Top-up &TA paid byLGED
Public Lands/VNR lands under lease	Leaseholders	Three-month advance notice and contractual obligations with the public agencies (DCs if VNR), as determined by DCs	Paid by DCs
Vested &Non-Resident Property (not under lease)	Current Owners/Users (without lease)	Transition allowance for income loss (see Loss Category 5).	Paid by LGED

Table 7-2: Loss of Homestead Lands

Location	Entitled Person	Entitlement	Responsibility
Homesteads on Private Lands	Legal Owners, as determined by DCs, or by courts in cases of legal disputes	In addition to CUL& applicable top-up (as for Agricultural & Other Lands): • Relocation assistance, including land development, where households choose to relocate on their own, or developed plots if they decide to relocate in public lands arranged by LGED. • Restoration of pre-acquisition level basic utilities (water supply, sanitation, electricity, etc.).	By LGED
Homesteads on Public Lands	Vulnerable Squatters	• Relocation assistance, including developed plots on LGED or other public lands to be arranged by LGED. • Provision of water supply & sanitation facilities.	By LGED
Homesteads on VNR Lands	Present Owners/Users (without lease)	• Assistance to move and rebuild the houses in the same homestead, in cases of partial acquisitions. • Assistance to settle in developed plots on public lands arranged by LGED, where acquisition requires relocation elsewhere; or	By LGED

[2]Replacement cost includes current market price of land plus the expenditure for legalizing the land transfer including cost of stamp purchase and other duties (see Annex B2).

Location	Entitled Person	Entitlement	Responsibility
		• Six months' rent for comparable living accommodations. • Provision of water supply & sanitation facilities	
	Lessees	Contractual obligations with the public agencies(DCs), as determined by DCs	Paid by DCs

Table 7-3: Loss of Houses/Structures Used For Living, Business & Other Activities

Type& Location	Entitled Person	Entitlement	Responsibility
All Houses/ Structures on Acquired Private Lands	Legal owners, as determined by DCs, or by courts in cases of legal disputes.	• Compensation-under-law (CUL) or replacement cost, whichever is higher. • Transfer Grant (TG) to cover the carrying costs of household goods, at one-eighth (12.5%) of the replacement costs of the affected structures, in cases where a house is to be removed and constructed elsewhere. • Rental Allowance (RA) to cover 3 (three) months' rental of a comparable residential house in the Upazila town, in cases where a house is to be removed and constructed elsewhere. • Allowed to keep the salvageable materials.	• CUL paid by DCs and Top-Up paid by LGED in case replacement cost is higher than CUL. • TG and RA aid by LGED
Shiftable & Non-shiftable Structures on Acquired Public Lands	Vulnerable Squatters	• Shiftable structures[3]: Transfer and Reconstruction Grant (TRG) @ Tk 5% of reconstruction cost with a minimum of Tk 8,000 and maximum of Tk 12,000. • Non-shiftable structures4: TRG @ Tk 7% reconstruction cost with minimum of Tk 10,000 and maximum of Tk 14,000. • Allowed to keep the salvageable materials.	TRG paid by LGED
Houses/ Structures on VNR Lands	Current Owners/Users	• TRG (Amounts are to be determined in consultation with the current owners/users). • Allowed to keep the salvageable materials.	TRG paid by LGED

[3]Small structures on poles, which can be shifted without dismantling are not eligible for compensation (road side small pan-bidi shops, groceries and tea stalls

[4]Non-shiftable structures with costly materials (RCC roof or CI sheet roof with brick walls) will not be eligible for this entitlement.

Table 7-4: Loss of Trees And Crops On Acquired Private & Public Lands

Location	Entitled Person	Entitlement	Responsibility
On private Lands	Legal owners as determined by DCs, or by courts in cases of legal disputes Current cultivator of agricultural lands (including tenants)	• Current market value of trees, based on species, size and maturity. • Current market prices of fruits on trees,if they are felled before harvest. • Current market price of crops based on variety • Owners are allowed to fell the trees and harvest the crops, and keep them.	• By DCs (includedin the CUL) and/orBy LGED (included in the top-up)
On public Lands	• Squatters • Private groups, NGOs, etc.*	• As those stipulated above for trees and fruits.	By LGED
On VNR Lands	Present Owner/User	• As those stipulated above for trees and fruits.	By LGED

Table 7-5: Loss of Agricultural, Business, Employment & Rental Income

Impact Type	Entitled Person	Entitlement	Responsibility
Agricultural: • If acquisition amounts to 20%or more of the total productive land holding • If acquired VNR lands are agricultural	**Legal Owners**, as determined by DCs, or by courts in cases of legal disputes.	Transition allowance @ BDT 1500 per decimal of acquired agricultural land.	By LGED
	Present Owners/Users	Transition allowance equivalent to three times the harvest prices of one year's crops produced on the acquired agricultural lands.	By LGED
Business: Temporary closure of businesses in existing premises	Business Owners (premise/land owners &tenants)	Compensation, based on daily net income, for the actual number of days the businesses remain closed or needed to complete the civil works, whichever is smaller. As those stipulated above for trees and fruits.	By LGED
Partially affected businesses	Business Owners (premise/land owners & tenants)	Compensation, calculated as above, for the number of days needed to repair and reopen the individual businesses, or complete the civil works, whichever is smaller.	By LGED
Businesses requiring removal from the existing premises and spots	Business Owners (premise/land owners & tenants)	Compensation, calculated as above, for the number of days the business owners need to find alternative locations themselves, which will be paid for a maximum of 90 days.	By LGED
Loss of employment income	Business Employees	Compensation at current daily wage rate for the period needed to reopen the businesses which will be for a maximum of 30 days.	By LGED
Loss of income from rented-out premises	Legal Owners	Three months' rent at the current rates to the owners of the premises.	By LGED

Table 7-6: Unforeseen Losses

Impact Type	Entitled Person	Entitlement	Responsibility

Impact Type	Entitled Person	Entitlement	Responsibility
As may be identified during design & implementation	As identified	• As determined in consultation with IDA and the stakeholders.	• By LGED

Carrying out the valuation of affected assets

Affected assets will be compensated considering replacement cost. After payment of government if it has been found compensation amount paid by the government is lower than the replacement cost, the gap amount will be paid directly by LGED. Policy and method of valuation to assess replacement cost of affected properties are annexed in Annexure- E-2

7.5 Public participation, consultation and grievance redress mechanism for implementation of RP:

7.5.1 Mechanisms of Consultation and Participation of PAPS

This framework recommends a set of public consultation activities and information dissemination to affected people. Public consultation will include both local governments and civil society where the APs would be regularly provided with information on the project and the resettlement process prior to and during the preparation for resettlement actions. Mechanisms of consultation and participation will include:

(1) Public meetings in the project area
(2) Information/ awareness campaigns through engaged NGOs
(3) Interviews/surveys in project affected households
(4) Focus group discussions,
(5) Formation of committees andlor groups including stakeholders at various stages of the project.
(6) Development of grievance redresses mechanism in the Project premises.

During the process of preparing RAP, discussions will be held with the directly affected families, institutions and local people representatives . PAP as well as other stakeholders will be requested to participate in meetings of the RAP processes and express their concerns about various aspects of the project.

The information dissemination may be effected through electronic and print media,

during public consultation/LCF's meetings, and direct discussion with the affected

families and institutions.

PAPS' participation should also be ensured during final assessment of compensation, resettlement and monitoring.

Details of these consultations including dates, names of participants, issues raised and how these have been addressed will be documented in the subproject RAPS.

7.5.2 Establishment of Grievance Redress Mechanisms

For each sub-project a grievance redress mechanism will be established to allow APs to appeal any disagreeable decisions, practices and Activities arising from compensation for land, assets settlements, and technical and general project related disputes. The APs will be made fully aware of their rights and the procedures for doing so verbally and in writing during consultation, survey, and time of compensation. (more details on Grievance Redress Mechanism described in section 6.5 of Chapter 6.

7.5.3 Implementation Schedule

An indicative schedule will be prepared for RP preparation and implementation activities in relation to technical works. It will show the time schedule of all land acquisition and resettlement activities including commencement and finish dates before acquisition/demolition and procedures for implementing the key elements

7.5.4 Budget and Financing

LGED is committed to safeguarding the social effects of the various sub-projects upon the lives and livelihoods of affected peoples. Adequate provision for financing the RP from the sub-project annual budget will be made. The budget includes costs of compensation, relocation and rehabilitation, benefits-sharing, and livelihood programs, as well as costs for planning, management, supervision, monitoring, and evaluation, land taxes, and physical and price contingencies.

7.5.5 Gender Mainstreaming

1. Gender analysis with respect to Resettlement

The project will marginally negatively impact the gender particularly women folk of the intervention area where bridge will be constructed or repaired. Where the new bridges will be constructed there some land or rarely house structure or other kind of structures may be affected which may be owned by women. In the case of repair and maintenance of the old bridges such possibility is almost nil as that is not going to create any impact on any other land or structure outside the existing one. However, for depositing the construction or repair materials some spaces may require from the private land which on rental basis the contractor can arrange. Thus, only in some exceptional cases women owned land may be affected.

2. Project Benefits by Gender

The project will accrue benefits more to women as they suffer more from any geographical backwardness. It is mainly because they have to move for medical reasons, academic purposes, marketing of their agro- and homestead-based products, handicrafts, jobs, etc. For all that females need to make movement for which they need such connecting facility more than their counterpart male as male can overcome such impediments more easily than the women. Since, almost half of the population is women and in the rural area women live more than the men (men live more in urban areas) so benefits more likely to go to women. Again in reality 14.6% households (BBS 2015) in the rural area are headed by women and therefore, these households would be the exclusive beneficiary of this project. Female of these households have no choice but to move on their own for any economic and non-economic purpose. It will thus contribute to reduce the gender disparity in the rural areas where the targeted interventions will be made.

3. Participation by Gender

Women of the project area have scope of participation both in identifying the new bridge locations as well as in construction works of new and repair works of old bridges. Under the new bridges women need to be involved in design stage of the structure particularly selection of location and women friendly design of the bridge. Likewise, under the repair part, women can also participate as labourer (loading-unloading, chips making, mason, rod binding, curing, etc) where they can get some wages. Nowadays some women also work as contractors who can also participate in construction and reconstruction or repair works.

4. Gender Action Plan (GAD)

Under the project a Gender Action Plan is to be made where adverse impacts to gender, in the case of physical dislocation of any women headed household who are vulnerable and their resettlement requirement, scope of giving other benefits to women like scope of involvement of women in planning, design, working as labourer, supervisor and contractor, participating in the implementation monitoring committee, etc are to be spelt out in detail which to be followed at the field level.

7.5.6 Monitoring and Evaluation

The land acquisition and resettlement and vulnerable communities' components will be monitored both internally and externally with the objective of providing feedback to management on implementation and identifying problems and successes as early as possible to facilitate timely adjustment of implementation arrangements.

7.5.6.1 The objectives of the monitoring program are:

- to ensure that the standard of living of APs are restored or improved;
- to monitor whether the time lines for resettlement and compensation are met;
- to assess if compensation, rehabilitation measures and social development support program are sufficient;
- to identify problems or potential social, ethnic or other conflicts; and
- to identify methods of responding immediately to mitigate problems.

Monitoring will consist of an array of steps related to land acquisition, and preparation and implementation of impact mitigation plans. The LGED is to set up and operate a computerized system to monitor and report progress and performance in land acquisition and resettlement activities. LGED will provide the Donor/s with the following information for its review of performances.

- Contract-wise monthly updates indicating progress in land acquisition and CUL payment by DCs, and any issues that are to be addressed to facilitate the acquisitions;
- Contract-wise monthly updates on LGED's part of the payment: (i) top-up and other applicable entitlements to the CUL recipients; (ii) compensation/entitlements to the affected squatters; and (iii) compensation/entitlements to any other persons/groups not covered in this SMF, but found later to be affected by the project works.
- Detailed reports for Donor/s implementation support missions covering the entire resettlement program, which will include, among other information, the latest status in land acquisition and compensation payment by DCs and LGED; implementation of any other stipulations adopted in the RAP; accounts of the GRC activities; and any issues that are to be addressed to improve performance of the resettlement program.

The regular performance reporting of the project will also cover social issues and assess how effectively and efficiently land acquisition is being carried out, and how impact mitigation plans (RAPs or ARAPs) are being prepared and implemented. It will identify any problem and issue arising to be addressed by LGED in order to improve the procedure and ensure compliance with safeguard policies. The independent impact evaluation of land acquisition will focus on the adequacy of the mitigation policies, the socio-economic impact on the persons affected by land acquisition, and the extent to which the intended social development goals have been achieved. It will identify lessons to make recommendations for improving LGED land acquisition processes and subsequent other projects.

7.5.6.2 Main Monitoring mechanisms

Two main monitoring mechanisms will be applied:

(1) Internal Monitoring

This type of monitoring studies the ongoing process and the respective outputs, compared against established social indicators. The projects, will be responsible for internal monitoring of RAP implementation. The LGED will supervise the land acquisition and Resettlement components of the RAP. The Social Division of the project will prepare quarterly reports on the findings of the monitoring reports received from the sub-projects. The funding agency will receive copies of these monitoring reports.

(2) External Monitoring

If the agreed document with donor includes the provision of External monitoring, this type of monitoring will be carried out by an independent monitoring agency, will assess the extent to which resettlement and rehabilitation objectives have been met. The Project Implementing Units (with approval from Donor/s as to TOR and qualifications and experience of monitoring agency) will recruit, for the entire project, an independent external monitoring agency/consultants for independent bi-annual review of RAP implementation to determine whether intended goals are being achieved, and if not, what corrective actions are needed.

7.6 Indicators for Monitoring

7.6.1 Indicators for Monitoring Land Acquisition

The following indicators will be used to monitor status of major tasks involved in land acquisition and preparation and implementation of resettlement activities. Engineering designs are pre-requisite to starting the land acquisition activities. Once they are finalized determining the acquisition needs and their locations on the ground, the following tasks will be monitored to assess progress:

Land Acquisition	1. Date of finalization of land acquisition proposals (LAPs) 2. Date LAPs submitted to the Deputy Commissioners (DCs) 3. Date Notice-3 issued by DCs 4. Date Notice-6 issued by DCs 5. Date Compensation Estimates submitted by DCs to district level LGED

	6. Date LGED reviewed the Compensation Estimates 7. Date district level LGED placed the compensation funds with DCs 8. Date Notice-7 issued by DCs 9. Date the DCs start CUL payment 10. % of land paid compensation for 11. % of affected persons compensated

7.6.2 Indicators for Monitoring SMP/RAP

Preparation process for impact mitigation plans will begin on finalization of the engineering designs indicating the amount and ground locations of the acquisitions. The following tasks will be monitored to assess progress:

Resettlement	1. Census of project affected persons and assets, and fixing of the cut-off dates for squatters 2. Survey of replacement costs and market prices of affected lands and other assets 3. Disclosure and consultation process 4. Formation of the Grievance Redress Committees (GRCs) 5. Preparation of Compensation Budgets for squatters and others (displaced business and other activities) and top-up for titleholders 6. Preparation and submission of RAPs for IDA review and clearance 7. Preparation of the individual entitlement files for different PAP groups 8. Approval of the Compensation Budget by district level LGED 9. Development of relocation plan 10. Payment of resettlement assistance and relocation 11. Continuing monitoring and reporting progress in payment
Voluntary land donation	12. Voluntary donations executed with proper documentation
Contribution against compensation/Direct Purchase	13. Legal process is followed and documented in SMP implementation process

Any other tasks that may have remained unknown will be included in the monitoring system. Progress in land acquisition and resettlement planning and implementation activities will be reported in appropriate tabular formats and matrices.

Outlines of Resettlement Action Plan and Abbreviated Resettlement Action Plan is attached as Annex-F

CHAPTER EIGHT : TRIBAL PEOPLES DEVELOPMENT PLAN

8.1 Introduction

Applicability of the Donor/s policy on Tribal Peoples will depend on the presence of TPs in the project's impact zones where they might be affected in a manner that could threaten their culture and way of life, including present livelihood activities. Since the nature and scale of impacts will remain unknown until all bridges/subprojects are selected and screened, LGED has decided to formally adopt guidelines to address TP issues and concerns, and identify and promote development opportunities for the affected TP communities. The proposed framework outlines principles , policies, guidelines and the procedure to identify impact issues and potential risks and, if required, formulate and execute Tribal Peoples Plans (TPPs), whenever improvement and rehabilitation works are found to affect TPs under any subproject financed by the project.

8.2 Indigenous Characteristics of Tribal Peoples in Bangladesh

As TPs is found to live in varied and changing contexts, no single definition can capture their diversity. As such, PSRB will use the World Bank's guidelines to identify TPs in particular geographic areas by examining the following characteristics:

- Self-identification as members of a distinct tribal cultural group and recognition of this identity by others;
- Collective attachment to geographically distinct habitats or ancestral territories in the project area and to the natural resources in these habitats and territories;
- Customary cultural, economic, social, or political institutions that are separate from those of the dominant society and culture; and
- A tribal language, often different from the official language of the country or region.

8.3 Spatial Distribution of Tribal Peoples

There are 12 ethnicities (11 TPs and the Bengali) living in the CHT. The 11 ethnic multilingual minorities are: Bawm, Chak, Chakma, Khyang, Khumi, Lushai, Marma, Mro, Pankhua,Tangchangya, and Tripura. The largest TP groups in the CHT are the Chakma, Marma, Tripura, Mru and Tanchangya, and together they make up about 90% of the region's TP population. The other TPs of the CHT are the Bawm, Chak, Khumi, Khyang, Lushai and Pankhua.

The present ethnic and religious composition of the CHT is strikingly different from what it was a century earlier. In 1872, the CHT population had been almost entirely *Pahari*, or hill peoples, some98%. In comparison, the *non-Paharis* (mostly Bengali) accounted for a minuscule minority, only 2%. Even up to 1951-56, the various *Pahari* groups together accounted for 90% of the CHT population, with Bengalis comprising most of the remainder. However, by1991, the share of all the TP declined drastically to around half, or 51.4% of the CHT population. Correlatively, the share of Bengalis rose dramatically from around 9% in 1951-56 to48.5% in 1991. By the 2001 Census, the TPs were only 44% of the total CHT

population, only 36% of Khagrachari District's population and 48% of Bandarban District's population. Only in Rangamati District TPs still the bare majority, at 51% of the district's population.

Within the plains, there is a high concentration of ethnic groups in Naogaon, Dinajpur, Rajshahi, Rangpur and Joypurhat Districts of Rajshahi Division in northwest Bangladesh, constituting about 36% of the TP population of the country. There are some 6 TP groups identified in this part of Bangladesh, but more than half of them are Santals. The TP constitutes less than 4% of the total population of the respective districts.

The hillocks of Sylhet Division may also be included in the Plains Area. TPs here are mostly in Maulavibazar and Habiganj Districts constituting 8% Bangladesh's TP communities, with Khasia, Manipuri, and Tipra communities less than 3% of the district populations. Mymensingh, Netrokona and Tangail region commonly known as the Madhupur area of Dhaka Division contain about 7% of the nation's TP population. The majority of these belong to the Garo/Mandi group, less than 2% of the district populations. In addition, a miniscule presence of tribal groups like Rakahain are found in coastal areas of Patuakhali (Barisal Division) and Cox's Bazaar (Chittagong Division) districts. Similarly, miniscule TPs are found in Khulna Divisionin the largely uninhabited Sundarban's mangrove forest area.

8.4 Program Implications on Tribal Peoples

Since there are tribal peoples in different places of Bangladesh, the proposed project has several implications on Tribal Peoples. Under the project, therefore, preparation of Tribal Peoples Development Plan will require in some site specific cases.

8.5 Preparation of Tribal Peoples Development Plan

1. Background and Objectives

In accordance with the Bank's requirements, the project proposes the following principles, guidelines and procedure to prepare Tribal People Plan (TPPs), where improvement and rehabilitation works under the projects are found to affect TPs. To avoid or minimize adverse impacts and, at the same time, ensure culturally appropriate benefits, LGED will apply the following basic principles in selection, design and implementation of the subprojects.

Basic Principles

Where TPs is present in the impact zones of any selected roads and other subprojects and are likely to be affected, LGED will:

- Ensure that TP communities in general and their organizations are fully included in the selection of particular roads, and design and implementation of the subproject activities.
- Carefully screen the bridges/subprojects, together with TPs, for a preliminary understanding of the nature and magnitude of potential adverse impacts, and explore alternatives to avoid or minimize them.
- Where alternatives are infeasible and adverse impacts are unavoidable, immediately make an assessment of the key impact issues, together with TPs and others knowledgeable of TP culture and concerns.

- Undertake the necessary tasks to identify the impact details and the most appropriate mitigation measures, through intensive consultations with the affected TP communities, TP organizations, civil society organization like NGOs and CBOs, professionals, and the like.
- Not undertake a subproject where the TP communities remain unconvinced to offer broad support for the project.

The TPP will primarily aim at avoiding potential adverse impacts, and reinforcing and promoting any existing opportunities. The TPP will basically consist of TP profile and baseline information, consultation and Participation strategy, benefits enhancement measures, implementation arrangement including institutional and financial and a monitoring and evaluation plan The draft outline of the TPP is given below.

Baseline and TP Profile	Baseline data, including analysis of cultural characteristics, social structure and economic activities, land tenure, customary rights to common property resources, relationship with the local mainstream people, occupation, language skills, costumes, etc.
Participation Strategy	Process and timing of consultation and the participants such as TP community leaders, elders, community based TP organizations, NGOs, individuals, generational representatives, feedback
Bridge benefits and enhancement areas	Identify subproject benefits to the TP communities and the areas where the benefits can be enhanced
Enhancement measures and activities	Identify TP preferences and priorities, develop enhancement measures agreed with the communities
Implementation Arrangements	Describe responsibilities for implementation of the enhancement measures including TP communities, consultants with time schedule, costing and sources of financing
Monitoring and evaluation	Design monitoring and evaluation plan involving the TP communities, the consultants and the LGED

2. Legal and Policy Framework

Several laws pertaining to the affect to Tribal People are there which include:

- Constitution of the People's Republic of Bangladesh, 1972
- The Chittagong Hill Tracts Regulation, 1900
- The Chittagong Hill Tracts (Land Acquisition) Regulation, 1958
- The Acquisition and Requisition of Immovable Property Ordinance, 1982
- Chittagong Hill Tracts Peace Accord, 1997
- Right to Information Act 2009.

In addition to that also follow the TPDP and RAP wherever applicable.

3. Approach and Methodology

The TPP will primarily aim at mitigating adverse impacts, and reinforcing and promoting any existing development opportunities in the project areas, with particular emphasis on the TPs who would be directly affected. In order to prepare a TPP, the following steps will be taken:

- Social screening to establish the presence of tribes in the bridge area or have collective attachment to the bridge area
- Based on a detailed social assessment establish a socioeconomic baseline data on the tribal people in the bridge area
- Review laws and policy guidelines applicable to the tribal communities
- Demonstrate measures to avoid negative impacts to the tribal people
- Identify areas for improvement of tribal settlement and extending benefits of the bridge to them
- Disclose the TPP locally and in Bank Infoshop before award of civil works contract.

4. Social Screening and Scoping

A standard checklist for social screening has to be used which has been given in the C-2 & C-4 Using that checklist social screening to be carried out. Based on that, if detail TPDP to be prepared that will be decided.

5. Disclosure and Consultation

Participation of TPs in selection, design and implementation of the bridges will largely determine the extent to which the TPP objectives will be achieved. Where adverse impacts on TPs are likely, LGED will undertake free, prior and informed consultations with the affected TP communities and those who work with and/or are knowledgeable of TP development issues and concerns. To facilitate effective Participation, LGED will follow a time-table to consult the would-be affected TP communities at different stages of the project cycle. The primary objectives are to examine whether there is broad community consensus in support of the subproject and to seek community inputs/feedback to avoid or minimize the adverse impacts associated with the chosen subproject activities; identify the impact mitigation measures; and assess and adopt economic opportunities which LGED could promote to complement the measures required to mitigate the adverse impacts.

Consultations will be broadly divided into two parts. Prior to selection of a bridge located in an area predominantly inhabited by TPs, LGED will consult the TP communities about the need for, and the probable positive and negative impacts of, the bridge construction/rehabilitation and other civil works. Prior to detailed assessment of the impacts at household and community levels, the main objectives of consultation at this stage would be to ascertain (i) how the TP communities in general perceive of the need for undertaking the subproject in question and any inputs/feedback theymight offer for better outcomes; (ii) whether or not the communities broadly support the works proposed under the subproject; and (iii) any conditions based on which the TP communities may have provided broad support to the bridge construction, which are to be addressed in the TPP and bridge design. To ensure free, prior and informed consultation, LGED will:

- Ensure widespread Participation of TP communities with adequate gender and generational representation; customary/traditional TP organizations; community elders/leaders; and civil society organizations like NGOs and CBOs; and groups knowledgeable of TP development issues and concerns.
- Provide them with all relevant information about the subproject, including that on potential adverse impacts, organize and conduct these consultations in a manner to ensure full coverage of TPs in the project areas and free expression of their views and preferences.
- Document and share with the Bank the details of all community consultation meetings, with TP perceptions of the proposed works and the associated impacts, especially the adverse ones; any inputs/feedbacks offered by TPs; and the minutes stating the conditions that have been

agreed during the consultations and provided the basis for broad-based community support for the subproject.

6. Social Impact Assessment

A social impact assessment will be carried out about the possible impacts of the proposed subproject. Once broad-based community consensus is established in favour of the subproject, LGED will assess the impact details at the household and community levels, with particular focus on the adverse impacts perceived by the TPs and the probable (and feasible) mitigation and community development measures. To ensure continuing informed Participation and more focused discussions, LGED will provide TPs with the impact details, both positive and adverse, of the proposed subproject activities. The disclosure of TPPs will be done in local language through face to face meetings and involving inter-generational representations. Times for disclosure and consultation will be set in line with the available time of the tribes. Other than those that are technical in nature, consultations will cover topics/areas suggested under paragraph 8.4 (below) and those the TPs consider important. Beginning with those for broad-based support for the subproject, community consultations will continue throughout the preparation and implementation period, with increasing focus on the households which would be directly affected. Consultation timing, probable participants, methods, and expected outcomes.

7. Livelihoods and Community Enhancement Measures

Displaced people will be compensated and assisted for livelihood restoration, and demolished physical structures will be replaced or compensated commensurate to ground situations.Mitigate adverse impacts associated with private land acquisition; displacement from public lands; use of common property resources; and temporary displacement/closure of businesses and livelihood activities during implementation of civil works. People squatting public lands/properties (without any legal agreement for right to use the land) will qualify for financial or any other form of assistance provided the acquisition affects significantly on their livelihood (lose more than 30% of their income) and cannot survive without income from the affected land/property.

8.6 Implementation Arrangement

1. Institutional Responsibilities

It will be responsibility of the LGED to carry out the screening, social impact assessment, preparing Tribal Peoples Development Plan and making disclosure of the same.

2. Grievance Redress Process

Upon the clearance of the RAP and TPDP by the Bank a GRC will be formed at the union level through notification from PIO to the District Project Management Office (DPMO). The DPMO will be the Convener of the GRC. The DS will be Member Secretary. The Headman/Union Parishad Chairman will be a member. The GRC will include two representatives of APs (at least one woman).

The GRC will have the power to resolve resettlement and compensation issues preemptive to their being addressed through the legal system. The GRC will receive grievance cases from the APs through the CO/DS. The DS will follow initiate a public procedure and also through individual contact with APs under the jurisdiction of the GRC. It will operate through village consultation meetings and will undertake the distribution of booklets explaining due process for AP grievances.

The CO/DS will assist the APs in lodging their resettlement claims in a format acceptable to the GRC. This will be done after the APs get ID cards from the DPMO and are informed about their losses and entitlements. All AP complaints will be received at the office of the UZE/DPMO, or by the GRC's secretary, with a copy to the Union Parishad representative.

The DS, as the member secretary of the GRC, upon receipt of complaints, will organize a GRC hearing. The GRC will pass a verdict which will be formally conveyed to the concerned APs through the DS. The GRC will settle the disputes within 15 days of receiving the complaints from the AP. If not resolved at the GRC level, the matter will be referred to a court of law. The GRC will accept and record grievances arising from that and refer them to be resolved by the BRM.

3. Budget and Financing

For each subproject where TPs will be affected a subproject specific TPDP with a separate budget to be prepared covering their compensation for acquired land, crops, infrastructures, livelihood loss, cultural property loss and restoration of their livelihood and replacement of their cultural properties.

8.7 Monitoring and Evaluation

The PD of the project will establish a monitoring system involving the project staff for collecting, analyzing and preparing quarterly progress reports on the progress of TPDP implementation.

The TPDP monitoring will be done both internally and externally to provide feedback to LGED and WB and to assess implementation effectiveness. A periodic review drawing upon monitoring and evaluation reports and other relevant data will identify any action needed to improve resettlement performance. Evaluation the LARP implementation will assess whether there settlement objectives were appropriate and whether they were met, specifically, whether livelihoods and living standards were restored or enhanced. The evaluation will also assess resettlement efficiency, effectiveness, impact and sustainability, drawing upon lessons learned as a guide to future resettlement planning.

Monitoring will be carried out by the PMO. The district sociologist (DS),assisted by the CO of LGED, will establish a monthly monitoring system and prepare a monthly progress report on all aspects of TPDP implementation. The initial Census and SES will provide the benchmark data, and periodic surveys will be carried out to measure changes against this baseline data, using monitoring indicators. They (DS and CO) will be assisted by district and Upazila engineers. The resettlement specialist of PD-PMO will monitor land acquisition and resettlement.

CHAPTER NINE : INSTITUTIONAL FRAMEWORK FOR IMPLEMENTING THE ESMF

9.1 Key Players involved in the Implementation of the ESMF

9.1.1 Governmental and Non-Governmental Organizations

The success of the proposed environmental assessment depends on the clear identification and allocation of responsibilities and functions, as well as the capability of the project management team in collaboration with other agencies, to take proper actions throughout the various stages of the proposed project activities. The following organizations may involve during the implementation of bridge projects (new bridge construction, rehabilitation and maintenance) under LGED:

- Environmental Unit of Local Government and Engineering Department (LGED);
- Department of Environment (DoE);
- Forest Department(FD);
- Department of Fisheries (DOF);
- Bangladesh Water Development Board (BWDB),
- Roads & Highways Department (RHD);
- Bangladesh Agricultural Extension (BAE),
- Bangladesh Road Transportation Authority (BRTA);
- Bangladesh Inland Water Transport Authority (BIWTA);
- Local Administration (District/Upazila/Union);
- Community based organizations;
- Non-government organizations.

For the successful implementation of the ESMF the key institutions have the following responsibilities:

A. Ministry of Local Government, Rural Development and Cooperatives

Ministry of Local Government, Rural Development and Cooperatives is the umbrella agency in Bangladesh undertaking the planning and development, maintenance and management of roads including bridges and culverts as allocated by the government. The overall responsibility of the ministry comprises the coordination with the other ministry for finalization including budget allocation for the project implementation.

B. Local Government and Engineering Department (LGED)

The LGED, being the project proponent for construction, rehabilitation and maintenance works and has primary responsibility for planning, surveying and supervision of the program. The LGED is also responsible for all feasibility study relating to the selected projects. The other responsibilities of the LGED will be as follows:

- Awareness creation (by workshops & training courses both in-house and in the upazila/district level offices) of LGED personnel involved in construction, rehabilitation and maintenance programs with regard to environment safeguard aspects;
- Participation in the environmenta and social assessment screening and scoping processes by the LGED officials (environment management unit);
- Initial Environmental Examination (IEE) and Baseline report preparation for selected bridge projects;
- Environmental Impact Assessment (EIA) and Social Impact Assessment report preparation for bridge projects (e.g. new bridge construction larger than 100m length);
- Review, accept or reject recommendations submitted by the FS for new bridge projects, covering for example, alternative analysis, specific mitigation measures, environmentally sound techniques in construction & maintenance works, monitoring parameters & schedules;
- Provide/verify/modify budget estimates for environmental safeguard measures;
- Review the draft ToR for the environmental study and forward them to DoE for approval;
- Preparation of contract specification, ensure specific environmental safeguard clauses are duly incorporated in the bidding documents, the BOQs and in the construction contracts;
- Performing (or outsourcing) supervision and monitoring for compliance;
- Monitor compliance with EMP and SMP as stipulated by the respective IEE ,EIA and SIA report;
- Monitor compliance with RAP as applicable coordinating with other agencies for implementing the EMP and RAP; and
- Conduct Environmental Audit of bridge projects as required and scheduled.

C. Department of Environment (DoE)

The DoE has been placed under the MoEF as its technical wing and is statutorily responsible for the implementation of the ECA, 1995. The principal activities of the DoE are:

- Defining EIA procedures and issuing environmental clearance permits the latter being the legal requirement before the proposed Project can be implemented;
- Providing advice or taking direct action to prevent degradation of the environment;
- Pollution control, including the monitoring of effluent sources and ensuring mitigation of environmental pollution;
- Setting the Quality Standards for environmental parameters;
- Declaring ECAs, where the ecosystem has been degraded to a critical state; and
- Review and evaluation of IEE and EIA prepared for projects in Bangladesh.

9.1.2 Consultants

There are many well experienced environmental consultancy firms in Bangladesh working with environment aspects in different development projects. LGED can appoint a qualified consultancy firm or individual consultant to carryout environmental assessment studies. Individual expert consultants can also be engaged to carryout environmental monitoring of the EMP. The consultant will be responsible for supervising all environmental safeguard measures that outlined in the EMP. They also responsible to verify all safeguards are reflected correctly and clear in the bidding documents, in the BOQs and in the works contracts.

9.1.3 Contractors

There are many well reputed constructions firm in Bangladesh, LGED can appoint other local construction firm for the implementation of the bridge development projects. The main responsibilities of contractors during the implementation of bridge projects include new bridge construction, rehabilitation and maintenance of existing bridges construction works in accordance with the bidding documents, including compliance with the EMP, prepared during IEE/EIA studies. The contractors will be responsible for implementing community and occupational health and safety measures.

9.2 Interactions and arrangements between the key institutions

The process of EIA as well as the monitoring of the EMP involves substantial linkage and coordination between various line agencies. The LGED (Environment Unit) will be played a vital in coordinating and managing this process given in following Figure 7-1.

This organizational integration and cooperation is very important for environmental assessment, reporting, management and the monitoring process for the large number of upcoming bridge projects under the LGED. The LGED will also liaise with the local NGOs, for grassroots level work with project affected communities. These NGOs are instrumental in supporting the implementation of the EMF.

9.3 Institutional strengthening of the Environment Unit of LGED

9.3.1 Profile of the Local Government Engineering Department

The LGED under the Ministry of Local Government, Rural Development and Cooperatives is one of the largest public sector organizations in Bangladesh entrusted for planning and implementation of road, bridges and culverts and other sectors programs. It works closely with the local stakeholders to ensure people's participation and bottom-up planning in all stages of project implementation cycle. The Chief Engineer is the head of the LGED.

The broad objectives of the LGED's development activities are:

- To improve the socio-economic condition of the country through supply of infrastructure at local level and capacity building of the stakeholders;
- Promotes labour-based technology to create employment opportunity at local level and uses local materials in construction and maintenance to optimize the project implementation cost with preserving the desired quality; and
- Works in a wide range of diversified programs like construction of roads, bridges/culverts and growth centers/markets to social mobilization, empowerment and environmental protection.

9.3.2 Mission and Vision of the LGED

The prime mission of the LGED is to development and management of local infrastructure for increasing farm/non-farm production, generating employment, improving socio-economic condition, promoting local governance, reducing poverty and acting as agent of change at the local level.

The LGED follows the following vision:

- Developing, maintaining and managing transport, trading and small scale water resources infrastructure at the local level by ensuring LGI and community participation and taking care of environmental and social issues; and
- Providing technical and institutional support to strengthen the local government institutions and serving local communities and other stakeholders.

9.4 Findings on the institutional and organizational capacity

9.4.1 Assessment of the institutional limitations and weaknesses

Currently, LGED is handling a huge number of projects in road, bridges, culverts and other sectors programs. They also consider the environmental and social issues in their project planning (including feasibility study), implementation, monitoring and evaluation stages. Unfortunate matter is that, at the present organogram of the LGED there is no provision for a permanent and well organized environmental management unit. In the existing organigram of the LGED given in following Figure 8-1, there are two temporary positions for the Environmental Engineer (Executive Engineer) and Assistant Engineer (Electrical) in headquarter based. Currently, LGED is undertaking environmental assessment and monitoring with limited capacity under the Integrated Water Resources Management (IWRM) Unit and through consultant support in project to project basis. There is also lacking's of dedicated environmental professionals including the environmental background in the organization.

9.4.2 Specific Issues identified at Institutional Level

The following key issues were identified that relate to institutional arrangements and coordination:

- Lack of clear allocation of responsibilities for environmental issues between the relevant institutions/organizations;
- Long process of clearance and approval of projects involving ministries and departments delay project implementation;
- There are weak internal or self evaluation mechanisms in place that could be used as reference (lessons learned) from former project implementations and offer opportunities for corrective measures in the ongoing processes, leading to more efficient solutions and minimizing environmental damages in the field.

9.4.3 Specific Issues Identified at Staff and Logistic Level

- There is no permanent leadership in environment sector in LGED only one executive engineer is partially engaged;
- There are few number of engineers have received training in country and abroad and professional degree (MS/MSc) in environmental issues but not retained them dedicatedly;
- With the increase of bridge construction, rehabilitation and maintenance activities, the demand for increased volume of environmental tasks will also be increased, without provision of permanent environmental management unit setup and dedicated environmental expert there will be severe shortcomings in implementing the EMF; in institutionalizing the process from planning to monitoring phases and there will be no successful internalization of the lessons learned and documented from ongoing and past projects;
- The existing environmental experts are in workload to review or evaluate projects documents (environmental assessment studies) prepared by consultants;

- In the present setup, there is no separate M&E Desk or section that could be effectively used in improving its operations and/or providing suggestions for procurement of external consulting and contract services.

9.4.4 Specific Issues Identified at Procedural Level

- Lackings of systematic environmental data management and dissemination;
- Most of the environmental assessment is conducted by the appointed consultant due to shortage of environmental expert, its takes a long time in processing project proposals, IEE /EIA reports etc.;
- There have environmental Guidelines/Manuals/Handbooks etc. at LGED but these are prepared in earlier project experience and required to update;
- Environmental auditing is not done by lack of funds, logistics and expertise in the field.

9.5 Requirements to establish an Environmental Management Unit

Environmental management and consideration of environmental issues are very important for any development works in all over the world. The GoB also considers and prioritizes the issues in all of its development activities planning and implementation stages. Now all over the world sustainable development is widely accepted concept and its three pillars are: A) Economic Development; B) Social Development; and C) Environmental Protection.

In our country perspective the rapid economic growth coupled with a rising population is putting a high toll on the environment, ecology and natural resources. In order to ensure the best possible opportunities for a productive and healthy life for the people however maintaining the balance in nature and ensuring sustainability for future generations, the country has to have “human-centred” sustainable development. The key priorities for Bangladesh for sustainable development are agriculture and food security, water, energy, climate change and disaster risk reduction and disaster management.

In our constitutions, the environmental issues also highlight the environmental protection and biodiversity conservation issues. In the Article 18 A : Protection and Improvement of Environment and Biodiversity; of the Constitution of the People’s Republic of Bangladesh states that, “The state shall

ndeavor to protect and improve the environment and to preserve and safeguard the natural resources, biodiversity, wetlands, forest and wildlife for the present and future citizens”.In recognition of the long term development challenge, the government has set development targets in its “Vision 2021” which are aimed at achieving a transformation in the socio-economic and environmental areas that will help Bangladesh to graduate to a middle income country by 2021.

The LGED can take the opportunities and challenges to meet the target of the GoB by reducing the stress on land and water for ensuring sustainable environment. They can introduce an environmentally sustainable development process in its entire development works through conservation of natural resources, reduction of air and water pollution and recouping of encroached rivers, water bodies and forest areas. To ensure the environmental sustainability, the LGED needs to establish an Environmental Management Unit.

9.5.1 Responsibilities of the EMU

The main responsibilities of the Environmental Management Unit include the follows:

- Clearly define the role and responsibilities of the staffs in the project implementation of the environmental and social aspects;
- Preparation of Terms of Reference for the project incorporating the environmental issues;
- Provide suggestions in different stages of the project such as: project planning, site selection, feasibility study, design and implementation;
- Evaluation of construction related environmental impacts and monitoring;
- Prepare and implementation of environmental management plan (such as evaluation of construction related environmental impacts and monitoring, implementation of monitoring such as: hydrology and drainage, navigation, riverbank erosion and siltation, traffic congestion, environmental quality monitoring, tree plantation, landscaping, wildlife, cultural sites monitoring) during construction and maintenance stages of the projects;
- Ensure incorporation of appropriate environmental specifications into the respective bidder and contract documents;
- Appoint appropriate environmental consultants for successfully environmentally friendly implementation of the project;
- Supervision and monitoring of the progress of environmental activities of the consultant for implementation of projects;
- Assist implementing agencies engineers at site by providing appropriate environmental advice and developing appropriate environmental mitigation measures or the bridge sub-projects;
- Monitoring of occupational health and safety of the project workers (such as: pure drinking water, sanitation, personal protective equipment etc.);
- Carryout participatory consultation during planning, design and implementation of the bridge sub-projects;
- Resolve the grievance issues during the different stage of the project implementation;
- Update the environmental code of practices of LGED and other practices suitable for different projects; and
- Maintain liaison with other government and non-government organizations, donors, stakeholders and other institutes regarding environmental and social management of the project implementation efficiently.

9.5.2 Proposed organization arrangement of the EMU

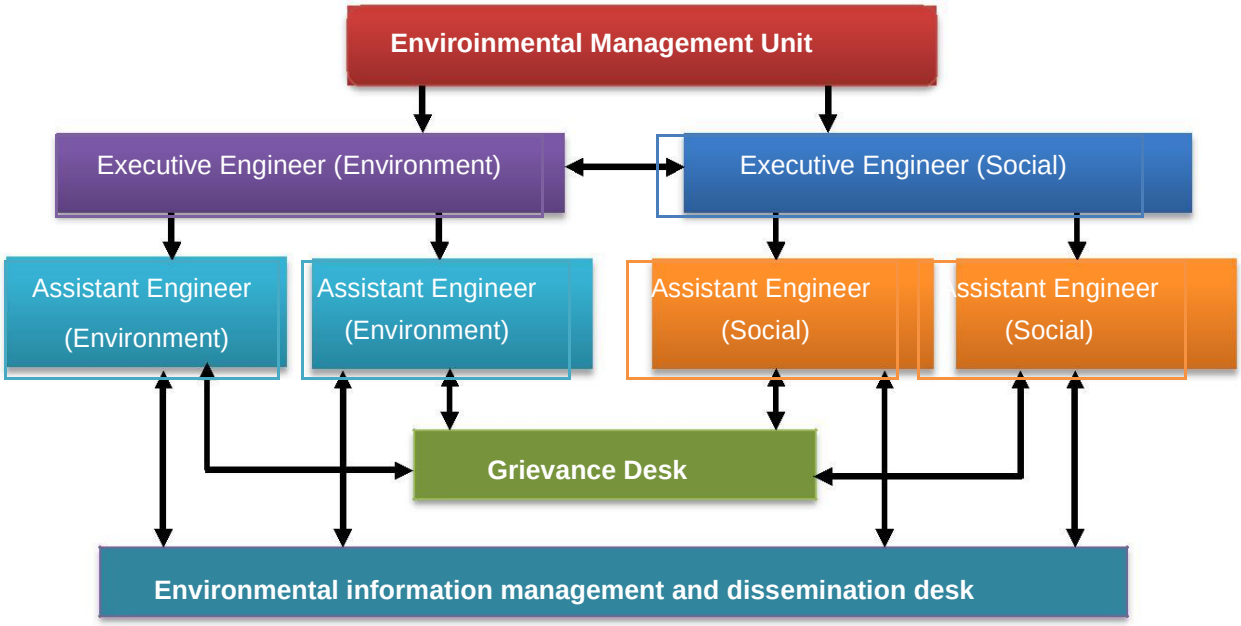
In order to structure the EMU in LGED and fulfill its responsibilities efficiently and effectively following recommendations are made. The EMU should be structured as shown in following Figure 8-2.

In order to ensure full compliance with the environmental requirements, the LGED will nominate a qualified Environmental (Civil) Engineer of the rank of a Superintending Engineer to act as the focal point/head in the EMU with a minimum tenure of three years. During the selection procedure, it is recommended that manager should have the combined qualification of both technical and an environmental engineer. Further, he may be developed as an expert by providing various environmental courses or training in the home and abroad. It should be better to nominate those people who are interested to work with the environment and social issues and previous knowledge on the issues.

The LGED will be nominated two Executive Engineers to help the focal person of EMU to act separate in environmental and social sections. Under each section two Assistant Engineers will be nominated for helping the Executive Engineers. They will be the officially responsible for ensuring environmental and social consideration in all of the project activities of the LGED. All of the engineers will be trained on different environmental and social issues for capacity building.

In light of the above, the following organizational chart may be proposed for establishing an environmental unit at LGED (see Figure 8-2).

Figure 9-1: Proposed organizational structure of the EMU



9.5.3 Functions and the staffing responsibilities of EMU

Staffs will be appointed and extensive training and exposure will be provided during the project implementation period to be able to undertake the assigned responsibilities effectively. Functions and the staffing responsibilities of EMU are given below:

9.5.3.1 Superintending Engineer/Head of the EMU

- Assist the Project Directors of the Bridge construction, rehabilitation and maintenance programme at LGED in conducting environmental screening and categorization of the bridge sub-projects;
- Assist the Project Director of the Bridge construction, rehabilitation and maintenance programme in the preparation of the environmental assessment and implementation of the EMF during the project implementation period;

- Ensure integration of the environmental and social assessment and resulting environmental and social management plan into the bridge sub-projects design and implementation plans (contract documents);
- Ensure compliance of the mitigation measures by the Contractors;
- Ensure incorporation of appropriate environmental specifications (on the basis of screening and ECoP) into the respective bidding and contract documents;
- Assist the LGED Engineers at site by providing appropriate environmental advice and developing appropriate environmental mitigation measures for the bridges sub-projects;
- Documenting the experience in the implementation of the environmental process;

- Assist Management Support/Design Support consultant's and LGED community organizer to carryout participatory consultation during planning, design and implementation of the bridge sub-projects;
- In collaboration with the Environmental Specialist, prepare and conduct training programs for the LGED Engineers and Contractors by incorporating standard construction practices and sound environmental management of the bridges sub-projects; and
- Prepare periodic progress reports on the implementation of the EMF for transmission to the donors throughout the project implementation period.

9.5.3.2 Executive Engineers (Environment and Social)

- Assist the Project Directors of the bridge construction, rehabilitation and maintenance programme at LGED in the proper and timely implementation of EMF of the project;
- Assist the PD in screening and categorization process of the bridge sub-projects;
- Preparation of the environmental and social assessment and finalization of the same in close co-ordination with the consultants and donors;
- Ensure compliance of the respective ECOP, environmental and social management plan during bridge sub-projects design and implementation including post construction;
- Assist the PD in obtaining Environmental Clearance certificate from the Department of Environment;
- Assist in arranging and development of training programme for the key stakeholders like LGED, contractors, public representatives and local government institutions/ NGOs, in collaboration with the Environmental Specialist;
- Review and approve the Contractor's Implementation Plan for the environmental and social measures, as per the environmental and social management plan;
- Liase with the Contractors, Consultants for the implementation of the environmental and social management plan;
- Liase with the Department of Environment on environmental and other regulatory matters;
- Interact with the NGOs and Community based organizations to be involved in the project for environmental and social management plan implementation;
- Dialogue with the PAPs and ensure that the environmental and social concerns and suggestions are incorporated and implemented in the project;
- Undertaking environmental and social monitoring and reporting to the PD and follow-up activities;
- Document the standard construction practices in the project on incorporation and integration of environmental and social issues into engineering design and on implementing measures in the bridge construction, rehabilitation and maintenance program;
- Assist the project director to arrange for the Environmental and Social Auditing and follow up action on the Audit recommendation;

- Report to the project director on the environmental and social aspects pertaining to the project;
- Guide and assist the project director and the LGED to strengthen the environmental and social management practices in infrastructure development projects base on the experiences gained in the implementation of the bridge construction, rehabilitation and maintenance program.

9.5.3.3 Assistant Engineers (Environment and Social)

- Assist the consultants in environmental and social screening process
- Assist the project management unit in environmental and social assessments for the projects;
- Assist in obtaining of requisite Environmental Clearance Certificate for the project;

- Assist the Executive Engineers (Environment and Social) in preparation of the training materials and in conducting training;
- Review the contractor's implementation plan for the environmental and social measures, as per the environmental and social management plan;
- Liase with the contractors on the implementation of the EMF and ESMP;
- Carry out consultations with the NGOs and Community groups to be involved in the project;
- Establish dialogue with the affected communities and ensure that the environmental and social concerns and suggestions are incorporated and implemented in the project;
- Carry out site inspections, check and undertake periodic environmental and social monitoring and initiate necessary follow-up actions;
- Document the good practices in the project on incorporation and integration of environmental and social issues into engineering design;
- Report to the Executive Engineer (Environment and Social)/Project Director on the environmental and social aspects pertaining to the project;
- Assist in the preparation of periodic reports for dissemination to the project management unit and donors etc.

9.6 Capacity Building of the EMU

The effectiveness of the environmental assessment and implementation will be depends on the understanding and preparedness of the engineers and in particular their environmental and social team. It is important that the project authority will effort to sensitize the engineers and environmental and social team on management of environmental and social issues, provides guidance and encourages them to build requisite capacities. Capacity building can be achieved by following two strategies.

- Knowledge sharing with consultants, having requisite expertise; and
- Training programme for the staff.

9.6.1 Requirement of additional expert

In addition to that, qualified consultant (environment and social specialist) can recruit by the LGED in a temporary basis to provide technical assistance, training and capacity building to the environmental and social sections. In generally, the roles and responsibilities of the environmental and social expert should be as follows, but not limited:

- Supervision of the implementation of the ESMP by the Contractors;
- Monitor and review the screening and categorization process for each bridges sub-project;
- Develop, organize and deliver environmental and social training programmes and workshops for the staff of the EMU, contractors, field supervision staff, LGED officials and the quality auditors;
- Review and approve site specific environmental and social enhancement/mitigation designs worked out by the contractors;
- Hold regular construction meetings;
- Review the contractors environmental and social implementation plans to ensure compliance with the environmental and social management plan;
- Plans to ensure compliance with the ESMP;
- Develop good practice construction guidelines to assist the contractors in implementing the ESMP;
- Monitor tree plantation programmes and the periodic environmental and social monitoring programmes to ensure compliance with the ESMP & GOB requirements;
- Prepare and submit regular environmental and social monitoring and implementation progress reports;
- Identify suitable locations for sitting of labour camps, construction waste disposal locations, construction and vehicle parking/maintenance sites and obtain the approval of the environmental specialist of the consultant of the same;
- Ensure that proper environmental and social safeguards are being maintained at all ancillary sites such as brick fields, borrow areas, brick crushing area, materials storage yards, worker's camps etc. from which the contractor procures material for construction;
- Supervise the proper construction and maintenance of the facilities for the labour camps, including the provisions for the safety and health of workers and their families;
- Ensure that proper facilities are available for the monitoring of water quality and vehicular emissions as provided for in the environmental monitoring plan during the construction period.

9.6.2 Capacity Building Training

Advanced training on environmental and social management and monitoring would be useful for the engineers of the EMU of the LGED in successfully implementing environmental and social management. It is also advised to provide the basic training for key personnel on regulatory requirements, environmental impacts, and environmental assessment and management in home or abroad. They can participate in field based training including the environmental and social impact assessment, screening, scoping, mitigation and monitoring of existing bridge construction, rehabilitation and maintenance projects under the LGED. Different organizations in Bangladesh like: DoE, IEB, FD, Climate Change Unit, training institutes/organizations etc. provide training on environment, social, disaster, climate change etc. issues that would be better for their capacity development.

9.6.3 Training Module

The following types of training programs may be effective for the capacity building of the environmental and social team of EMU and the project staffs during the implementation of the bridge construction,

rehabilitation and maintenance programme. A sample list of the tentative training programme is given in the following Table 9-3

Table 9-1: Tentative training programme module

SL#	Training Module	Provider (s)	Duration (days)
1	Environmental Legal Requirements of DoE/Government of Bangladesh	DOE/Ministry of Environment	2
2	Donors Environmental and Social Safeguards (WB, ADB, JICA, IFC etc.)	Donors representatives	3
3	Training on the environmental law, standards and guidelines	Consultants	2
4	Skill training for environmental and social assessment studies	Consultant	3
5	Training in code of practices in bridge construction, rehabilitation and maintenance programmes in Bangladesh	Consultant	2

Above all, the EMU at LGED needs to be furnished with sufficient and regular budget to manage the above mentioned tasks and to ensure efficient functioning of the proposed unit.

CHAPTER TEN : HEALTH AND SAFETY GUIDELINES

10.1 General

10.1.1 Policy of Health and Safety

The Policy of Health and Safety is to promote high standards in safety performance, health preservation, and security through developing and maintaining the appropriate Health and Safety Plans and Procedures covering such elements as assessments, education, motivation, participation, implementation and accountability.

Health and Safety Policy consists of the following seven principles:

- All accidents and injuries can be prevented;
- Providing safe and healthy working circumstances is essential;
- Personal safety, health and protection are paramount;
- All tasks shall be planned and performed with concern for the safety and security of the staff and labor;
- All employees are responsible for their own and their colleagues" safety and health at work;
- All employees shall be trained properly and periodically by the competent organization to work safely;
- Full cooperation and assistance shall be offered to the Employer and the Engineer, statutory authorities and local communities.

10.1.2 Legislation and Documents

This Policy is based on the following documents to ensure the conformance with requirements and procedures of:

- Bangladesh Labor Act, 2006;
- Public Procurement Rule, 2008;
- Water Supply and Sewerage Authority Act, 1996;
- National Safe Drinking Water Supply and Sanitation Policy, 1998;
- Labor Relations under Labor Laws, 1996 (Revisions to scattered Acts and Ordinances to formulate a unified code);
- Public Health Emergency Provisions Ordinance,1994;
- Bangladesh Factory Act, 1979;
- The Employees State Insurance Act, 1948;

- The Employer‟s Liability Act, 1938; and
- Maternity Benefit Act, 1950.

10.1.3 Objectives

The objective of this Health and Safety Plan is to provide minimum requirements for major critical activities to identify hazards in each specific construction activities and operations to be carried out during construction phase. Also it is intended to provide guidelines to all employees to safeguard the Health and Safety of the workforce and properties during the execution of the Project. This Health and Safety Program shall not be treated as a single document; rather, it shall be observed and implemented in conjunction or parallel with all other Contract Documents.

10.1.4 Organization and Responsibilities

The Contractor shall provide Safety Organization, and the Safety Organization shall be submitted to the Engineer for approval.

The following matters shall be clearly defined in this Safety Organization.

(i) Safety control staff organizational structure, which should identify the personnel to be engaged solely for safety assurance.

(ii) Each Personnel‟s Roles, responsibilities and authorities;

- Proposed interaction and communication procedures between the Contractor‟s construction personnel and safety assurance staff.

Even though the specific responsibilities of each staff are described in the structured organization for Safety Management, it should be clearly understood by and educated to every personnel associated in this project that the responsibilities of Safety belong to every personnel associated in this project, not to only Safety Team.

It is recommended to provide one safety officer/manager for the project to ensure adequate supervision of the construction activities, plant, equipment and materials.

10.1.5 Worksite Safety

The Contractor shall:

(i) Maintain control of the work site, all personnel on the work site and all equipment on the work site;

(ii) Keep worksites as clean and tidy as is reasonably practicable;

(iii) Upon completion of the work, promptly clear away and remove from the work site all surplus materials and equipment and reinstate as required to the satisfaction of the employer;

(iv) Provide continuous adequate protection at the work site, of the property and the construction site;

(v) Take responsibility for the safety of all persons on the work site;

(vi) All employees, agents and others entering the premises shall comply with the safety laws, rules or regulations;

(vii) Ensure all equipment in use is operated in accordance with safe systems of work;

(viii) Provide rest and welfare facilities at work locations;

(ix) Provide Safety officers and/or paramedics at site;

(x) Provide access to any area as required to conduct investigations, inspections, safety meetings or any other activity.

10.1.6 Working Hours

The Contractor shall abide by the regulation covering the working and rest hours as stipulated by the regulations of the Government of Bangladesh (GOB).

Shifts, overtime and working on night or on locally recognized days of rest may be allowed. During such overtime work or shift work in the night hours, supporting facilities such as the lighting, messing etc. shall be provided in order to maintain safe working conditions for the workforce. The Contractor shall provide with the proper arrangements for compliance with all the relevant requirements of the Contract to the satisfaction of the Engineer. All work at night shall be carried out without unreasonable noise and disturbance. The night means from 21:00 to 06:00 hours and day means from 06:00 to 21:00 hours.

10.1.7 Documentations

The Contractor shall retain records to provide evidence of the operation of the Health and Safety Management system and demonstrate the extent of compliance with the Health and Safety Policy and strategic objectives, targets and performance standards.

Records shall include:

(i) Reports of reviews, studies and investigations including any recommendations, actions and their status (Safety Action Records);

(ii) Situations of non-compliance and details of any notices served by regulatory authority and the improvement actions to correct these non-compliance"s;

(iii) Details of accidents and incidents with follow up and lessons learned actions;

(iv) Information concerning contractors" Health, Safety and Security performance;

(v) Reports of assessments, inspections and tests including emergency response exercises;

(vi) Composition, properties and hazards of chemical substances;

(vii) Personnel development and training records;

(viii) Safety critical elements, performance standards and schemes of verification;

(ix) Safety cases, impact studies and their supporting reports;

(x) Written complaints;

(xi) Audit results and follow up actions; and

(xii) Management reviews.

10.2 Safety Procedures

This Construction Safe Operating Procedure will be utilized to assure the possible control and reduction measures for purpose of incident and accident prevention.

The Contractor shall break down the project work scope before work commences. For each element of the breakdown, method statements, systematic identification of hazards, recording of hazards,

performing of risk assessments, and devising risk controls to eliminate or reduce risk to a tolerable and as low as reasonably practicable level shall be developed.

Only minimum guidelines for each Procedure are provided in this section, the Contractor shall separately provide detail procedures for all construction process. All Procedures prepared by the Contractor shall be submitted to the Engineer prior commencement of actual construction work, and it will be subject to the approval of the Engineer.

The Construction Safe Operating Procedure shall be addressed the following procedures:

10.2.1 Emergency Response Procedure

The Contractor shall provide and prominently display internally and external to the boundary, at the construction camp and worksite a listing of key personnel, including persons responsible for the Emergency Response Team, complete with contact details and telephone numbers. The displayed information shall include which of the personnel are available on a 24-hour call basis.

The emergency response procedure shall detail project specific emergency preparedness and response based on the potential emergency scenarios associated with construction activities are listed below.

(i) Fire Emergency;

(ii) Medical Emergencies;

(iii) Security Breeches;

(iv) Fire and Explosion;

(v) Collapse of Structure and Equipment (During and after installation);

(vi) Vehicle or Traffic Accident;

(vii) Spills (Hydrocarbons, Chemicals and Wastewater), exposure to harmful or toxic substances;

(viii) Natural occurrences such as lightning, storms and other important security issues such as civil unrest or terrorist activity;

(ix) Off-Site incidents involving the Contractor personnel conducting construction related business.

10.2.2 Site Security and Access Control Procedure

The Contractor shall be responsible for implementing and maintaining the Site Security Procedure within the Construction Site including warehousing and related storage facilities.

- **Site Entry Control**

(i) The entry of personnel to the construction site shall be controlled through identifying each individual by an identification card (ID) to ensure he is authorized to enter the site;

(ii) All persons (including the Employer"s and Engineer"s staffs, visitors, operators, Vendor Specialist, Agents, Workforce and etc.) entering the work site shall wear proper PPE (Personnel Protective Equipment) as appropriate to the work being undertaken. No one shall be allowed to enter the working areas without proper PPE wearing;

(iii) The entries of visitors require the approval from the Engineer, and shall be accompanied by the competent guider provided by the Contractor;

(iv) Non-business visitors shall not be allowed into the construction site unless otherwise approved by the Engineer;

(v) An ID card logbook shall be maintained by the Contractor until the end of the project;

(vi) Any vehicles and equipment shall not be allowed to enter the site without entry permit of the Engineer prior to the entry.

- **Site Property & Material Control**

The quantity and type of material shall be checked at the entrance to the Construction Site. The Project Management shall designate some staffs to authorize cargoes, properties and material entering or exiting the Construction Site.

When property and/or material are lost through theft, careless handling or malicious behavior, a thorough investigation shall be conducted by the Contractor to find the cause factors and the responsible person. Corrective actions shall be determined, and preventive actions shall be implemented immediately to prevent any further loss or damage after due investigation.

- **Drugs, Alcohol and Weapons**

The consumption of any intoxicating substances during working hours or within such time, where a person could still be considered intoxicated and he shall be prohibited from entering the Construction Site.

Any such substance including alcoholic beverages, illegal drugs, inhalants and prescription drugs are not to be consumed during working hours or within such time a person shall be mentally or physically impaired.

The use of prescription drugs during working hours is prohibited unless verification from the prescription physician states that the medication shall not impair the person‟s ability to perform his specific duties. This verification shall be in writing from the physician and on the office letterhead.

The Contractor shall educate the workforce during Safety Orientation Training and other safety awareness campaigns to introduce the dangers and consequences of substance abuse during employment to ensure compliance with the substance abuse policy.

As a standard policy on all security access points and worksite locations, Security teams shall be authorize to stop and search any person on site for the abuse of such substances.

Any person found to have committed the substance abuse policy shall be liable to immediate termination of their contract.

In any case, any kinds of weapons are never to be allowed to bring to the work site.

The Contractor shall control this matter with the highest standards.

10.2.3 First Aid and Medical Procedure

Medical and first aid facility in accordance with Sub-Clauses First Aid Base of the Special Specification shall be provided and staffed as required.

The Contractor also shall ensure, through auditable means, that all personnel employed on the project are assessed and passed as medically for fitness to work, and periodically re-assessed.

- **Medical and First Aid Facilities**

The Contractor shall provide a hierarchy of first aid and medical treatment facilities to rapidly and effectively treat any personnel taken ill or injured during the course of the work. The rapid approach to the first aid and immediate trauma response at the casualty location shall be provided and followed by stabilization and evacuation to specialist medical care in a dedicated facility.

To achieve this, the Contractor shall provide:

(i) Basic first aid training for the Supervision;

(ii) First aid kits suitable for trauma response in all working areas;

(iii) A purpose-built clinic staffed with general practitioner level at the site. The facility shall be sufficient to provide stabilization and resuscitation, and be generally equipped to cope with emergency situations;

(iv) Air-conditioned, long wheelbase ambulances suitably outfitted and capable of transporting patients at work site or at a place nearby during working hours.

First aid facilities shall be provided adjacent to the Contractors‟ office and it shall be opened and adequately staffed during working hours.

- **Medical Fitness Examination**

All employees associated with this project shall be subjected to employment medical examination to ensure the employee is fit to be employed for the project.

The Contractor shall provide this examination procedure. No one suffering from a transmittable disease shall be allowed to work on the project. The Contractor shall operate a personal health program in order to prevent illness occurring or spreading, and this shall include sexually transmitted diseases.

10.2.4 Safety Training and Education Procedure

The behavior of people at all levels of the project is critical to its success and to the achievement of the Health and Safety goals. It is therefore essential that all personnel are carefully selected and trained, and that their skills and competencies are regularly assessed. The Contractor is responsible for identifying and providing the appropriate training and procedures necessary to ensure safe work. Through Safety Training and Education program, all employees shall realize the importance of attitude and behavior to Safety. The behavioral change program shall be provided by the Contractor to develop awareness of risk and encourage teams and individuals to build an interdependent safety culture with personal and team commitment to improving safety.

Prior to commencing any site works, all employees shall have successfully completed the essential Health and Safety training to ensure competence and safe performance of duties, appropriate to the work being performed.

The major concerns of this section are as follows;

- **Safety Induction**

Health and Safety Inductions shall be delivered to all personnel prior to entry to worksite or access route in their own language. A detail Safety Induction Program shall be developed and submitted to the Engineer for approval prior to the commencement of actual construction activities and operations. This Induction shall cover the followings, but not to be limited;

(i) Health and Safety rules and emergency procedures;

(ii) General guidance to working site;

(iii) Specific Health and Safety responsibilities;

(iv) General element applicable to all personnel working on site;

(v) Task–specific training applicable to the work concerned;

(vi) Provided PPE (Personal Protective Equipment) and usage;

(vii) Attitude and behavior to Safety.

As part of the induction, personnel will be required to complete a test questionnaire, again in their own language to demonstrate their understanding of the induction.

The Contractor shall retain a record of Health and Safety trainings, and this record will be subject to inspection by the Engineer.

Only persons who are in possession of certification shall be permitted on site.

- **Safety Orientation**

Health and Safety Orientation Training and Refresher Training shall be provided and conducted by the Contractor to all personnel attending the site. The delivery of such training shall be completed prior to starting any work or being allowed to visit areas of the site unaccompanied.

- **Specific Safety Training**

The Contractor shall organize Specific Safety Training for all employees throughout the Construction Phase. The purpose of such training is to equip the performing parties or a better knowledge of the specific requirements regulating such specific task. Specific Safety Training may include but not limited to the followings:

(i) Working at Height;

(ii) Handling of Hazardous Substances and Materials;

(iii) Handling of Power Actuated Tools;

(iv) Heavy Lifting; and

(v) First Aid Treatment.

Specific Safety Training can be conducted through External Trainer such as Manufacturer and Supplier for specific task and equipment operation.

- **Safety Training Facilities**

The Contractor shall establish a fully functional Training Centre within the Permanent Facility Area. The Training Centre shall have the facilities to provide the training and be provided with relevant audio-visual aids, graphics and multi-lingual support to enable training to be given effectively to all levels of personnel.

10.2.5 Safety Communication and Meeting Procedure

The Contractor shall be responsible for the arrangement of Safety Meeting and assurance of Communication procedures.

- **Pre-Construction Meeting**

Pre-construction meeting will be held between the Engineer and the Contractor‟s Management. The agenda of the meeting will include issues such as:

(i) Current and applicable Health and Safety Legislation and Regulations of the Local Government Authority;

(ii) Health and Safety Requirements of the Employer and the Engineer;

(iii) Pre-construction Risk Assessment;
(iv) Review of construction plants and equipment intended for used on the project prior mobilization to ensure compliance and condition;

(v) Review of key project personnel, their qualification and experience.

The Contractor shall acknowledge and undertake the responsibilities to comply with all the above requirements to effectively implement this Health and Safety Plan and other related programs and procedures developed under this plan.

The Contractor shall also ensure all his employees understood the requirements set forth by developing and organizing communication programs such as those mentioned above.

- **Toolbox Meeting**

Daily Toolbox Meeting shall be held by the Contractor to ensure that the workforce shall understand daily tasks and receive pre-work instructions.

Concerns are as follows:

(i) Toolbox meeting shall be held on a daily basis prior to the commencement of work/shift. The Contractor shall determine the actual meeting time and duration;

(ii) Each meeting shall be documented. The subject discussed, topics covered, suggestions offered, remarks from the Workforces, the attendees shall be listed in this document, and signed by the person conducting the meeting;

The toolbox meeting report shall be kept and filed by the Contractor for audit and inspection purpose.

- **Ad-Hoc Meeting**

The Contractor shall organize Ad-Hoc Meeting to ensure the discussion and recognizing of major, non-routine and hazardous construction activities and operations prior to its actual execution.

Major, non-routine and hazardous construction activities and operations such as the installation of a heavy element (Pre-cast concrete Beam) or size of load is too large in term of length or width (extra large size formwork) that involves potential risk and consequences shall require the preparation and submission of a detail construction method statement with a hazard and risk assessment report. A meeting shall then be organized after all respective personnel involved have thoroughly studied the Construction Method Statement and Risk Assessment Report submitted by the Contractor.

The objectives of such ad-hoc meetings are:

- Discuss and analyze construction method and sequence of work to prevent the occurrence of incident/accident. Such discussion shall include the proposed machinery, equipment and personnel involved, their capacity, certification, qualification and etc;
- Identify hazards underlying in activities, the risk of their occurrence, the potential impacts and significant aspects of an activity;
- The mitigations measures proposed to reduce and minimize the potential impacts.

All matters discussed in these meetings shall be recorded, kept and filed by the Contractor. A copy of the meeting minutes shall be distributed to the Contractor‟s workforce for the understanding and incorporation of the matters discussed into the method statement and used subsequently for the supervision of the actual work. The Contractor shall notify the Engineer the date/time and subjects of this meeting well advance.

10.2.6 Report and Investigation Procedure

The Report and Investigation Procedure is essential to the improvement of the overall management of Project Health and Safety objectives.

The Contractor shall ensure all injuries and accidents and near misses involving personnel, property, vehicles and the environment are reported, investigated, acted upon and documented.

- **General Report**

The Contractor shall regularly report to the Engineer of all Safety concerns and activities related to the Health and Safety of the Project. In exceptional cases as described in below, such happenings shall be reported immediately to the Engineer, and the detail investigation and report shall be followed.

- Any fatality resulted from an accident arising out of, or in connection with the construction activities;
- Fire;
- Collapse of permanent or temporary structure;
- Any other serious happenings.
- Incident/Accident Investigation and Report

(a) Investigation

All incidents/accidents happened in the construction site shall be investigated promptly. The followings shall be considered to be included in the procedures.

(i) Proceed to scene where an incident / accident has been reported;

(ii) Assess the condition of the affected area before proceeding with investigation;

(iii) Remove injured worker(s) from dangers based on the above assessment;

(iv) Identify potential witnesses before proceeding to interview them;

(v) Inspect machinery, equipment and affected structure if situation permits;

(vi) Record all evidences including facts and materials, machinery and equipment involved;

(vii) Photographs should be taken as evidence whenever possible;

(viii) Analyze control and prevention measures.

(b) Reporting

All incidents/accidents shall be reported immediately to the Employer and the Engineer. Preliminary report shall be submitted to the Engineer within 24 hours after its occurrence. A final investigation report shall be followed after the submission of the preliminary report and be submitted to the Engineer within 7 days after the occurrence. The final investigation report shall contain at a minimum the following information:

(i) Details of injured person(s) if applicable;

(ii) Date, Time and Location of incident/accident;

(iii) Details of person(s) involve including person(s) working in immediate vicinity and witnesses;

(iv) Details of materials, machinery, equipment or tools involved;

(v) Details of injury sustained. (Medical report shall be enclosed in the report if available.);

(vi) Description of the incident / accident;

(vii) Results of immediate and root cause analysis;

(viii) Control and prevention measures;

(ix) Status of follow-up action and implementation.

Format of the Incident/Accident Report is given in Annex-K.

- **Corrective Actions**

This Incident/Accident Investigation and Reporting Procedure are only effective when effective corrective action(s) are implemented in accordance with the control and prevention measures recommended by the Investigation Team.

The Contractor shall be responsible for overseeing the corrective action(s) is effectively implemented within the stipulated time and that such corrective action(s) are communicated to all employees working in the Project Site.

The Contractor shall report to the Engineer regularly as it congregate on the status of such implementation.

10.2.7 Safety Improvement Procedure

To improve Safety implementation, identification of risks, control measures, applied solutions and results in each activity shall be fed back into the assessment process in order to re-evaluate the risk to achieve the reasonable solution. All accidents and incidents shall be analyzed in detail, and the cause of the accident and prevention measures shall be inducted and cascaded to all employees through Safety Training and Education.

Also, a quality management system is required to ensure that work is performed in accordance with the standards as specified in the Contract Documents. The Contractor shall provide Safety Improvement Procedure, and the followings shall be considered:

(i) Monitor the effectiveness of risk control measures;

(ii) Define and carry out a review, and worksite inspection program;

(iii) Encourage personnel to report hazards and non-conformances in a blame free environment;

(iv) Conduct task observations to ensure compliance with procedures and understanding of instructions;

(v) Provide reports for assessment;

(vi) Monitor incident frequency rates;

(vii) Work only to pre-submitted method statements;

(viii) Stop work in the presence of uncontrolled hazards;

(ix) Submit hazard, near miss and incident reports;

(x) Prepare method statements for all non-routine and critical tasks, submitting these to the Employer and the Engineer;

(xi) Attend HSE meetings;

(xii) Analyze performance indicators and action items and consider how the management system might be modified to improve future performance.

To promote good Health and Safety management, the Contractor‟s development and implementation of an incentive scheme which all employees will receive reward or penalty for their work assessed against predetermined standards is strongly encouraged.

The purpose of the scheme is to promote continuous improvement of Health and Safety in every activity. The incentive scheme may involve an assessment of the effectiveness of Health and Safety procedures and how well they are implemented.

10.3 Implementation Plan

The Contractor shall provide Safety Implementation Plan in each activity. Only minimum guidelines for each activity are provided in this section, the Contractor shall separately provide detail Safety Implementation Plan in each activity to ensure that every activity are designed, safely constructed and properly used by the workforce throughout the Construction Phase, and the Plan shall be submitted to and approved by the Engineer before start any actual activity in work site. The Safety Implementation Plan shall be addressed the following plans:

10.3.1 Personnel Protective Equipment (PPE) Plan

The Contractor shall provide the proper PPE Plan to protect all persons legitimately on site, and Safety Equipment and Materials to react special hazards.

- **Mandatory PPE**

Mandatory PPE identified in below is specific to all persons in all Project managed areas.

(i) Hard Hat;

(ii) Safety Footwear / Steel toed Boots.

- **Optional PPE**

The following optional PPE is specific to all persons entering in the specific operation area.

(i) Eye Protection;

(ii) Reflective Jacket;

(iii) Gloves;

(iv) Coveralls;

(v) Hearing Protection;

(vi) Safety Harnesses;

(vii) Respirators;

(viii) Breathing Apparatus;

(ix) Face Visors / Shields;

(x) High Visibility Vests.

- **Special Equipment**

The Contractor shall provide other necessary special Safety equipment or materials to identify the core hazards as instructed by the Engineer.

(i) Test Equipment;

(ii) Cable Location Detection Tools;

(iii) Self Contained Breathing Apparatus;

(iv) Rescue Equipment.

The above specified equipment is minimum requirements. The Contractor shall provide all kinds of Safety Equipment to ensure Health and Safety in working areas.

10.3.2 Housekeeping, Sanitation and Hygiene Plan

The clean and tidy conditions of the construction site and all associated areas shall be ensured to minimize the potential accidents and incidents in workplace (e.g. trips, slips, fires and spills), and to avoid blockage of important emergency access.

Construction waste both hazardous and non-hazardous shall be properly collected and disposed daily to appropriate waste collection bins at the end of each day/shift. Flammable and combustible materials shall be properly stored in appropriate containers located in designated storage area. Spillages of oil, chemical, solvent or any other hazardous waste shall be clean up immediately and reported to the competent personnel.

th ineffective housekeeping, sanitation and hygiene measures during construction. This Plan applies to all construction activities and areas, including the construction site, workshops, warehouses, offices, camps, tank farm, roads and common areas.

This Housekeeping, Sanitation and Hygiene Plan shall be thoroughly communicated to all relevant personnel during all construction phases of the Project, and this Plan is strictly observed and complied with by the Contractor and its employees to ensure compliance with applicable laws, legislation, regulations and requirements of the GOB.

This Plan includes, but is not limited to, the following issues:

- General Housekeeping and Site Cleanliness;
- Accommodation;
- Dust Control;
- Waste Management;

- Toilet and Washing Facilities;
- Drainage facilities
- Water Supply for drinking and other purposes.

10.3.3 Excavation Safety Plan

Excavation is an essential operation of the construction process. In the process of carrying out an excavation operation, it is often necessary to assess the ground condition when determining the type of shoring necessary as well as the detection of buried services to prevent injury to person and damage to services.

This excavation safe operating plan outlines the required safety and prevention measures necessary in the performance of an excavation operation. Safety and prevention measures discuss are:

10.3.4 Excavation Safety Measures

10.3.4.1 Access, Ingress and Egress

Access to, from and over excavation area and pit shall be adequately considered and provided for the many types of vehicles:

Sufficient number of Ingress to and Egress from an excavation pit shall be strategically provided.

10.3.4.2 Storage and Placement

(i) Spoils shall be immediately transported to the stockpile or dumping ground;

(ii) Materials such as spoils, shoring materials, tools and equipment shall be stored at a distance of least 1 meter away from the edge of an excavation;

(iii) Excavation plant or machinery shall not be operated close to an excavation pit unless effective shoring system has been provided;

(iv) Other construction plants including mobile crane shall position at least 2 meters away from the edge of an excavation. In addition to the above, steel plate of sufficient thickness shall be used to spread the load of the plant imposed on the shoring.

10.3.4.3 Barrier and Stop Block

(i) Effective guarding shall be erected and installed on excavations with depth of more than 2 meters;

(ii) Warning lights, sturdy guarding (water barriers) and warning signage shall be erected on excavation (regardless of depth of excavation) located adjacent to public access and vehicular access ways;

(iii) Watchman shall be provided for deep excavation when operators are not able to see the base of excavation. Watchman plays an important role when both top and bottom excavation is being carried out concurrently.

10.3.4.4 Lighting

(i) Excavation pit adjacent to public access shall be adequately illuminated;

(ii) Adequate lighting shall be provided for deep excavation.

10.3.5 Support System

When determining the support system for an excavation, following factors shall be considered:

(i) Type of excavation (Mechanical or Manual).

(ii) Ground condition (Soft, Hard, Clay, Rock etc.)

(iii) Ground water condition.

Depends upon the above mentioned factors, the Contractor shall decide the supporting system in both of shoring or slope system. This support system shall be designed by a qualified engineer.

10.3.6 Buried Service

Buried services, existing or newly installed, are a major concern for excavation operation in a construction site. Potential hazards include injury to person and damage to equipment, unanticipated public impact or loss and delay to work schedule. Common buried services found in a construction site are:

(i) Water mains (Fire, Industrial and Common Services);

(ii) Electrical cables (High Voltage and Low Voltage, Permanent and Temporary);

(iii) Drainages and Sewers;

(iv) Fuel pipes (Oil, Gas and Chemical);

(v) Communication and Optic Fiber cables (Telephone and Instrumentation).

10.3.6.1 Control Method

(i) The Contractor shall be responsible for detecting, identifying and marking of all buried services on work area affected by the excavation operation.

(ii) The Contractor shall indicate and submit to the Engineer a copy of the updated utilities and services drawing;

(iii) Before the commencement of excavation work where buried services have been detected, trial pits shall be manually open to determine the exact location of the buried services, the depth where it is rested, types of protection provided and more importantly, the direction on the where the buried services lead;

(iv) During excavation, buried services shall be prominently marked or peg for easy identification;

(v) Regard all underground services as “live”;

(vi) Manual excavation shall be employed until services are exposed and instruction given by Competent Person before work commences.

10.3.6.2 Inspection and Examination

The inspection items shall include the following:

(i) Location of buried services prominently marked and protected;

(ii) Prevention measures such manual digging made to expose and determine exact location and depth of buried services;

(iii) Barrier erection of at least 2m away from known buried services;

(iv) Attendance of a full time supervisor during mechanical excavation;

(v) Cable markers and concrete tiles are re-instated after excavation. Inspection shall be called before a trench is backfilled;

(vi) A trained and qualified person shall perform examination of the atmospheric condition continuously before and throughout the duration where work is being carried out inside deep and narrow excavation.

10.4 Demolition Safety Plan

Demolition work involves great risks of structure collapsing, fire and explosion and health hazards when exposed to asbestos dust and insulation fibers.

Pre-planning of demolition work shall include the methods intended to demolish a structure, the machinery and equipment necessary to perform the job and the safety measures to be taken and observed in order to perform the work safely.

the following descriptions shall be included in the demolition procedure but not to be limited:

(i) all electric, gas, water, steam, sewer, and other energy services or power lines shall be capped/blinded and/or otherwise cut before the commencement of demolition work;

(ii) all asbestos, insulation materials, glass and other hazardous materials and substances shall be removed. such materials shall not be stored within the structure to be demolished;

(iii) openings and weak flooring shall be prominently marked or barricaded before the commencement of demolition. operators of machinery and equipment and workers involved in demolition work shall be informed of such hazardous location;

(iv) demolition work shall commence from the top of a structure and progress downward;

(v) proper entrances of adequate strength to protect workers from falling materials shall be erected for access into the structure;

(vi) the whole of the demolition site shall be effectively barricaded with appropriate safety signs display;

(vii) the lower floor where demolition wastes are collected shall be properly barricaded and guarded to prevent materials from ricocheting and injuring workers or passer-by;

(viii) excessive debris shall not be allowed to accumulate inside a demolished structure. all demolition waste and debris shall be cleared from the work site on a daily basis.

10.5 Ladders and Lightweight Staging Safety Plan

Ladder and lightweight staging comes in many different form, size, height and material. The purpose and objectives of this clause is to provide guidelines on the proper selection of a suitable ladder or lightweight staging for the safe performance of a task to prevent workers from falling from height.

10.5.1 Inspection of Ladders and Lightweight Staging

Ladders and lightweight staging shall be inspected in accordance with the following frequency by the respective person:

- Daily Inspection by User;
- Monthly Inspection by Immediate Supervisor.

10.5.2 Maintenance of Ladders and Lightweight Staging

(i) Ladders and lightweight staging shall be effectively maintained in the utmost condition at all times;
(ii) All joints, steps and fittings shall be securely attached;
(iii) Movable parts shall operate freely without binding or undue play;
(iv) Rungs shall be kept free of grease, oil and chemical;
(v) Platforms shall be free from cracked, warped and opaque finishing.

10.5.3 Other Requirements, Restrictions and Limitations

It is preferable not to use aluminum or steel ladders and steps when carrying out any electrical work or where they shall be liable to come into contact with unprotected electrical conductors.

Before use, ladders and steps shall be visually checked for any obvious signs of damage. If serious faults are evident the item shall be removed from the site.

(i) Access ladders to working platforms shall be firmly secured at the landing. The ladder shall extend at least 1 meter above the landing platform;
(ii) Access points to ladders and lightweight staging shall be kept free of obstructions;
(iii) Ladders and lightweight staging shall not be set up near doorways or moving machinery. When necessary, barricades shall be used to protect and guard against moving vehicles or from mechanical damage;
(iv) Vertically erected ladders shall have a landing/rest place at every 9 meters;
(v) Damaged or deformed ladders shall be refrained from used and immediately removed from the site.

10.6 Scaffolding Safety Plan

The safe and efficient erection, use, dismantling, and alteration of scaffold and elevated work platforms are considered an important objective in maintaining a safe work environment.

All employees are charged with the responsibility to provide full support and act in strict accordance when using scaffolds and elevated work platforms within the construction site. Every employee who observes violations of these requirements has the responsibility to report any unsafe conditions or unsafe practices observed to the supervisor-in-charge immediately and share with supervision the responsibility for following safety guidelines.

10.6.1 Requirements and Reference

The minimum requirements of Scaffolding Safety are described in this section. The Contractor shall refer and thoroughly review the 29 CFR 1926.451 Construction Scaffold Standards by the Federal Occupational Safety and Health Administration (OSHA), and shall prepare Scaffolding Safety Plan for implementing, enforcing, administering, and monitoring the erection, use, dismantling and storage of scaffolds and elevated work platforms.

10.6.2 Scaffold Constructions

(i) No scaffold shall be erected, dismantled, or altered except under the supervision of the Scaffolding Supervisor/Inspector;
(ii) Guardrails and toe boards shall be installed on all open sides and ends of platforms;
(iii) Access ladder(s) or equivalent safe access shall be provided;

(iv) Scaffold and its associated components shall be capable of supporting its own weight and at least 4 times the maximum intended load (weight of person or persons, including tools and materials) applied;

(v) Direct connections to roofs and floors, and counterweights used to balance or hold a suspension scaffold, shall be capable of resisting 4 times the tipping moment imposed by the scaffold operating at the rated load of the hoist, or 1.5 times the tipping moment imposed by the scaffold operating at the stall load of the hoist;

(vi) Wire ropes, including the connecting hardware used in suspension scaffolds, shall be capable of supporting at least 6 times the maximum intended load applied;

(vii) Each suspension rope, including connecting hardware, used on adjustable suspension scaffolds shall be capable of supporting, without failure, at least 6 times the maximum intended load applied or transmitted to that rope with the scaffold operating at either the rated load of the hoist, or 2 (minimum) times the stall load of the hoist, whichever is greater;

(viii) The stall load of any scaffold hoist shall not exceed 3 times its rated load.

10.6.3 Scaffold Inspection

All scaffolds shall be inspected immediately upon erection and before use. The Contractor shall be responsible for conducting such an inspection.

The inspection shall include visual inspection of the scaffold, and its associated components, for the following:

(i) Visible defects such as damaged platforms, access, guardrails, toe boards, etc;

(ii) Missing platforms or guardrails that may create falling hazards;

(iii) Missing or loose parts and components that may affect a scaffold"s structural integrity;

(iv) Materials or substances that may create slipping and tripping hazards.

10.6.4 Safe Use of a Scaffold

I. caffolds shall not be erected, used, dismantled, modified/altered or moved in close proximity to exposed or energized power lines, unless the following measures have been taken;

II. Sufficient clearance is made for the performance of such work;

III. The utility company, or electrical system operator, has been notified of the need to work in such close proximity and that the power lines has been de-energized, relocated or installed with protective coverings to prevent accidental contact with the lines.

IV. Scaffolds shall only be erected, moved, dismantled or modified / altered under the direct supervision of a Scaffold Supervisor;

V. Scaffolds shall only be erected, dismantled or modified / altered by trained and qualified scaffold erectors;

VI. During inclement weather, work on scaffolds shall be suspended or prohibited unless scaffold is built internally to a building or structure;

VII. Materials used for construction shall not be left on a scaffold in such a manner that they may overload the scaffold, obstruct the walking platform or access, or cause tripping hazards;

VIII. Each incomplete scaffold or completed scaffolds found not meeting with the requirements shall have a sign attached that shall state:

“Unsafe for use. Inspection required”, “Do Not Use”

These signs shall be placed at the location of the access. It is the responsibility of the Contractor to make daily inspection of scaffolding ensuring that incomplete scaffolding is not being used and the inspected scaffolding is maintained in a safe condition.

10.7 Working at Height Safety Plan

The main purpose and objective of this clause is to arrest incident/accident resulting from workers falling from height.

Only those persons who have received formal training and instruction can work on temporary structures or means of access such as ladders, scaffolding and power operated mobile work platforms at heights above 2 meters.

All personnel who are required to work at height or perform inspection at height of 2 meters and above shall be required to wear and use a full body harness.

Traveling at unguarded work locations shall involve the use of the full body harnesses and a lifeline. Lifelines (vertical and horizontal) shall be installed by qualified rigging personnel and shall be subjected to daily and weekly inspection by the Contractor. Each lifeline shall as a minimum be able to support 2.5 tons.

Full body harnesses are required as follows:

(i) Any task carried out at height exceeding 2.0m above ground;

(ii) All workers shall tie off with a full body harness when there is no handrail or guardrail, when there are openings over 18 in. in the working platform, or when on suspended working platforms;

(iii) On elevated equipment such as fan housings, pipes, motors, and switchgear without handrails;

(iv) On a slope or roof without handrails and angle greater than 15 degrees to the horizontal;

(v) On a ladder when the worker‟s waist is above a protective handrail on an upper level adjacent to the edge;

(vi) Full body harnesses shall be constructed with a buckle fastener and a single „D‟ ring for multi-purposes, with a 1/2 in. nylon lanyard 6 ft long. Lanyard shall be eye spliced into the „D‟ ring with a drop forged steel double locking snap hook on the other end;

(vii) Full body harnesses shall be inspected by the user on daily basis prior to each use.

10.8 Heavy Lifting and Rigging Plan

Heavy and Awkward Lifting Operations refers to lifting operations involving the following:

(i) Load exceeding 20 metric tones;

(ii) Shape of the load is awkward (e.g. center of gravity is not conventionally in the center of the load); or

(iii) Size of load is too large in term of length or width for a single crane operation (e.g. tandem lifting operation).

This Heavy/Awkward Lifting Plan shall be provided to ensure a safe performing a heavy, awkward or tandem lifting operation.

A Comprehensive Lifting & Rigging Plan shall be submitted to the Engineer for approval at least twenty-eight days (28) before the plan lifting operation.

10.8.1 Comprehensive Lifting & Rigging Plan

Heavy lifting operation and the lifting of awkward load is classified as a hazardous operation that requires careful planning, comprehensive study and meticulous impact and effect assessment.

The Comprehensive Lifting & Rigging Plan should contain, at a minimum, the following information:

10.8.1.1 Weight & Loading

(i) Weight of the load including dressings;

(ii) Total lifting weight including the load (fully dressed) and the weight of lifting equipment including wire ropes, shackles and spreader beam;

(iii) Impact loading or safety factor for sudden movement during hoisting and weather condition such as wind velocity, temperature, rain, etc; and

(iv) The center of gravity in order to ascertain the position lifting point and the design of lifting eyes or lifting lugs.

10.8.1.2 Lifting Eyes or Lifting Lugs

The following measures should be considered when designing and installing the lifting eyes or lifting lugs:

(i) Material of the load;

(ii) Weight and shape of the load; and

(iii) Installation and testing/inspection criteria.

The quality and integrity of the lifting eyes or lifting lugs should be tested or inspected with relevant test/inspection certificate from an approved test/inspection center or person.

10.8.1.3 Cranes & Lifting Equipment

During planning stage, the Contractor should prepare a list of all equipment design for installation to identify the heavy equipment that may be categorized under this plan.

Based on this equipment list and the process in which the weight and loading of the equipment is ascertained, the following measures should be observed when selecting a crane and its lifting equipment:

(i) Total weight of load including impact loading (safety factor);

(ii) Size of load including height, width or diameter;

(iii) Distance to transverse or swing angle and hoist angle;

(iv) Operation space and site condition; and

(v) Type and size of lifting equipment including wire ropes, shackles and spreader beam.

10.8.1.4 Hazard Identification & Risk Analysis

With all the above information all in hand, the Contractor shall conduct risk assessment. This assessment should include the following potential hazards that are common to a lifting operation:

(i) Working in or near elevated power cables;

(ii) Ground condition (hollow or soft ground condition);

(iii) Weather condition (high wind velocity);

(iv) Violent swinging (failure to use tag line and guide rope);

(v) Falling from height (access to secure or release rigging points);

(vi) Failure of crane load bearing structure; and

(vii) Failure of lifting equipment.

10.8.2 Site Preparation

The site where the lifting operation is scheduled to take place shall be prepared in accordance with the following:

(i) Ground is investigated for soft condition, air pockets and buried services (e.g. power lines, sewer line or drainage);

(ii) Ground is compacted to ensure it is capable of taking the entire loading during lifting operation (i.e. crane, total weight of load, weight of lifting equipment and impact load;

(iii) Affected area is clear of obstruction, services (above and underground) and activities.

10.8.3 Pre-Operation Briefing

Before the commencement of a heavy or awkward lifting operation, The Contractor shall conduct a pre-entry briefing to all personnel involved in the lifting operation.

Pre-operation briefings may be conducted in the form of a Toolbox Meeting. Such briefings should include information such as, but not limited to, the following:

(i) Roles and responsibilities of each individual including verification checks to be performed before a lifting operation;

(ii) Potential hazards and its associated risks;

(iii) The prevention, control and mitigation measures in preventing the occurrence of an incident;

(iv) Communication, instruction and signs used.

10.8.4 Final Inspection (After Set Up)

Once the crane is set and all lifting equipment attached to the intended load, the Contractor shall conduct a final inspection on the crane and all its accessories in accordance with the checklist in the procedure. The following shall be considered during the final inspection:

(i) Working conditions of all mechanical parts on the crane. Mechanical parts referred to brakes, winches, pulleys and drums;

(ii) Working conditions of all safety devices on the crane. Safety devices referred to limit switches, load indicator and radius indicator;

(iii) Ground condition and stability of the crane including outriggers position and sitting;

(iv) Physical conditions and validity of all lifting appliances and gears.

10.9 Plant and Equipment Inspection and Maintenance Plan

All equipment shall be supplied in a safe condition suitable for its intended purpose, identified with a unique project ID code, with appropriate valid certification and test records.

Equipment shall be fit for purpose, safe to use and not cause unexpected pollution during its operation or transport to site.

Equipment brought to site by the Contractor shall be inspected by the Engineer, any sub-standard condition equipment or plant shall not be permitted entry into the site and replacement is required with acceptable equipment or plant in a timely manner at no additional cost.

All vehicles, plant and powered equipment shall be well maintained and adequately silenced to minimize noise, leaks and emissions.

Suitably designed Drip trays shall be used to eliminate fuel release to the environment from all sources of vehicles and fuel-powered equipment in use.

Vehicle speeds shall be kept as low as practicable to minimize dust generation.

Pumps, generators and other mobile equipment shall be sited as far as practicable from accommodation and other noise sensitive locations.

All Equipment shall be switched off when not in use, or if practicable when left unattended.

A variety of mobile construction plants, machineries and equipment shall be used during the Construction Phase.

10.9.1 Certification and Inspection

Necessary manufacturers or governmental test, inspection and maintenance certificates shall be submitted to the Engineer and such certificates have been verified current and valid.

The required frequency of subsequent testing after the plants were mobilized shall subject to statutory and/or manufacturer's requirements. No plants shall be allowed operation in the construction work site without a current and valid test and inspection certificate.

Operators and owners of construction plants shall be required to performed regular inspection of their plants to ensure the physical conditions are safe for continuous operation and that its does affect the health of workers and the environment.

Such inspections shall be properly documented and filed.

10.9.2 Maintenance

All mobile plant shall be maintained and service in pre-determined period by trained and competent personnel in accordance with the manufacturer's instructions.

10.9.3 Operating Procedures

All mobile plant shall be operated only by license operators who have received formal training with competence certificates.

All plants, machineries and equipment shall be used in accordance with the manufacturer's operating procedures. Operators shall be required to carry out pre-inspection daily before operation.

10.9.4 Hired Plant

All hired plant shall be accompanied by necessary statutory certificates and/or test or inspection documents of the plants and shall be subject to the same scrutiny and management as above.

Designated service areas for repair and maintenance of vehicles and machinery shall be established by the Contractor.

These areas shall be properly constructed and fitted out so that waste materials are contained and segregated according to the waste management procedure and to ensure that there is no pollution of soil or watercourses.

10.10 Confined Space Entry Safety Plan

Confined space is defined as any enclosed or partially enclosed space or trench having restricted access or egress, a potential for a hazardous atmosphere and which due to its nature will form a trap and become a life threatening environment.

Such spaces are usually not designed or intended for human occupancy. They include sewers, pits, holes, flues, manholes and voids. They also include any space in which dangerous contaminants can accumulate and ventilation is restricted e.g. excavations, trenches (normally deeper than 1.5 meters), sumps, culverts and any other poorly ventilated.

10.10.1 Hazards Involved in a Confined Space

(i) Fire and Explosion involving flammable gases, above 10% LEL, or 0% LEL if hot work is required;

(ii) Asphyxiation or Enrich Oxygen Environment: below 21% of volume and over 23% of volume;

(iii) Electrocution from electrical equipment and shock or ignition of flammable gases from electrical equipment/tools;

(iv) Injury from mechanical equipment not properly isolated;

(v) Bodily injury from direct contact with corrosives or irritants and collapse of banks in excavation pits.

10.10.2 Control Measures

(i) Authorized Gas Tester makes tests for oxygen levels, toxic gases and flammable gases prior to entry and during working duration;

(ii) Buddy system shall apply: person(s) to look-out for each other;

(iii) Dedicated „Safety Watcher", shall always be present when the space is occupied and shall be located outside the confined space, who is able to immediately call for assistance and who shall inspect and monitor the confined space for the presence of gases and other hazards e.g. potential trench collapse due to excessive ground water;

(iv) The person entering the confined space shall be attached to a lifeline;

(v) Regards to safeguarding slope and/or shoring requirements, dependent on soil types;

(vi) If any of the hazards are present, entry is not permitted;

(vii) Before entering an excavation, either the excavation sides shall be graded to angle-of-repose or appropriate shoring is installed to prevent collapse of earthen walls.

10.11 Electrical Safety Plan

Electrical hazards may result in personal injury by electric shock or burns, while a serious electrical fault on electrical system shall cause fire or explosion resulting in devastating consequences. The following descriptions shall be included in the Electrical Safety procedure but not limited to:

(i) Only authorized personnel shall be allowed to work on power substations, switchboards and sites where high-voltage electric equipment is installed;

(ii) Before carrying out inspection and maintenance of electric installations, the main switch shall be turned off and the relevant signs shall be posted;

(iii) The area around the switch box shall be kept clean in all times and anything which may hinder the operation of switches cannot be remained near the switch box;

(iv) Any inflammable or explosive materials shall not be stored near switches, electric motors, or switch boards;

(v) All electrical machines shall be grounded to prevent leak current;

(vi) Test operational on the circuit breaker equipped on the electric equipment shall be done before starting daily operation;

(vii) In wet conditions, electrical activities shall be minimized; additional pre-cautions shall be taken in unavoidable critical cases.

10.12 Safety Plan for Powered Hand Tools

Powered tools or equipment are generally tools powered by explosive, electricity, compressed air and etc.

These tools can be very useful and efficient when they are used in a safe manner. However, such powered tools can also inflict serious injury to the operator and sometime workers working in close proximity when they are mishandled or abused.

This guideline discussed only powered tools that are commonly found and used in the construction site. These tools are:

10.12.1 Electrical Powered Tools

Electric tools are tools powered by electricity and they include the following:

(i) Powered drill;

(ii) Powered wrench;

(iii) Portable grinder;

(iv) Portable disc cutter;

(v) Powered hand saw;

(vi) Inspection lamp.

General Safety Measures are as follows but not limited to;

(i) Operators of electrical powered tools shall have received adequate training to allow him to perform a task safely. Qualified Personnel or the Manufacturer shall conduct trainings as appropriate;

(ii) Modification, repairing and servicing of electrical powered tools and all its attachment shall only be performed by qualified electrical workers;

(iii) Operators shall ascertain power ratings of distribution panel before connecting an electrical powered tool to the distribution panel;

(iv) Operators shall perform visual inspection on the tool and its attachment such as guarding devices, cords and cables, plugs and sockets before use. Any defects shall be immediately reported and the tool returned for service or repair;

(v) Operators shall not pry open or attempt to tap electrical supply from distribution panel. Always seek assistance from qualified electrical worker when power is not available;

(vi) Operators shall be provided with and wear adequate protective equipment such as helmet, goggles, and ear plugs/ear muff and dust mask when necessary.

10.12.2 Pneumatic Powered Tools

Pneumatic tools are tool powered by compressed air and shall sometimes with water these include the following:

(i) Chippers;

(ii) Drills;

(iii) Hammers;

(iv) Sanders;

(v) Pneumatic Guns (Nails, Rivets, Staples or Similar Fastener)

(vi) Hydro-Blasting Gun.

General Safety Measures are as follows but not limited to;

(i) Pneumatic tools are usually operated by high-pressure compressed air and sometimes with water as in hydro blasting. High-pressure compressed air and water shall inflict serious injury to operators as well as workers working in close proximity;

(ii) Adequate safety measures shall be considered when such tools are being used;

(iii) Operators of pneumatic powered tools shall have received adequate training to allow him to perform a task safely. Qualified Personnel or the Manufacturer shall conduct trainings as appropriate. Records of trained operators shall be properly kept and filed for audit purposed;

(iv) Appropriate and approved fastener, coupling and restrainers shall be used to effectively secure all pneumatic tools in its attachments including couplings and hoses;

(v) Operators shall turn off pressure from compressor before equipment is disconnected or a tool is removed;

(vi) Operators shall not improvise or attach any devices onto the switch or trigger to allow pressurized air or water to eject from the nozzle freely. Such action is only allowed on tools that are designed with such a locking device. However, permission shall be sought and consideration shall be made depending on the pressure used;

(vii) Operators shall be provided with and wear appropriate protective equipment such as helmet, face shield, goggles, ear plugs/ear muff and dust mask when necessary.

10.13 Safety Plan for Compressed Gas Cylinder Handling

The safe handling, storage, transportation and use of compress gas cylinders during the Construction Phase shall be provided by the Contractor to establish guidelines and instructions to all employees.

10.13.1 Handling of Compressed Gas Cylinder

(i) Proper handling equipment, such as purpose-designed cradle or lifting cages, shall be used;

(ii) The protection of valves head by steel protective cap shall be used during handling;

(iii) Only nylon slings shall be used for lifting or hoisting of lifting cages.

10.13.2 Transportation of Compressed Gas Cylinders

(i) Gas cylinders are adequately secured in the upright position and transport in open-backed vehicles within the construction site;

(ii) Cylinders shall not be allowed to project over and out of a vehicle"s body;

(iii) During transportation, all compressed gas cylinders shall be fitted with their respective valve protective cap;

(iv) Gauges, hoses and burning/cutting torches shall be disconnected from the compressed gas cylinders during transportation.

10.13.3 Storage of Compressed Gas Cylinders

(i) Compressed gas cylinder storage compound shall be constructed openly with natural ventilation, away from drains and pits and high activity work zones;

(ii) Compressed gas cylinder storage compound shall be adequately fenced with emergency gates and sited on firm and level ground;

(iii) Flammable gases such as Acetylene, LPG, Propane and Hydrogen shall be stored separately from Oxygen. The required distances for these cylinders to be stored apart shall be at least 6 meters;

(iv) Inert gas, such as Nitrogen shall be stored in between these cylinders;

(v) Storages where compressed gas cylinders are kept shall be prominently marked as to the type of compressed gas stored. Emptied and filled compressed gas cylinders shall also be stored separately;

(vi) Compressed gas cylinders shall always be stored and secured in the upright position;

(vii) Compressed gas cylinders shall never be subject to rough treatment/shock; they shall always be handled with great care.

10.13.4 Use of Compressed Gas Cylinders

(i) Prior to installing a regulating valve onto a compressed gas cylinder, blow out or quick release action to remove impurities such as dust and dirt shall be performed. However, this action does not apply to Compressed Hydrogen Cylinders and can be dangerous if it is performed;

(ii) After connection, regulating valves, hoses, burning/cutting torches and all joints shall be inspected for leaks by applying soap water and serviceability by visual inspection;

(iii) Flame arrestors shall be fitted between the hoses and the cylinders;

(iv) Gas hoses shall be properly elevated from the ground to prevent tripping hazard and being damaged mechanically;

(v) Gas hoses shall not be resting together with electrical or welding cables in the elevated position;

(vi) Storage area for gas hoses, regulators valves and burning and cutting torches shall be well ventilated;

(vii) Serviceable fire extinguisher of the correct type shall be used in hot work area.

10.14 Safety Plan for Welding and Gas Cutting

The Contractor shall provide guidelines and instructions to perform welding and gas cutting operations.

The Contractor shall provide the relevant Safety Training for welding and gas cutting operations and the trained and authorized personnel shall only be allowed to perform welding work.

The following guidelines shall be observed and complied with when performing welding operation:

10.14.1 General Requirements

(i) Inspect and check the work area and it‟s surrounding. Remove all combustible materials as well as protect all plants, equipment and cables before the commencement of the welding operation;

(ii) Inspect and check welding equipment and its accessories. Replace or repair any damaged parts when necessary;

(iii) Inspect and check firefighting and prevention equipment. Replace non-serviceable and damaged equipment before the commencement of the welding operation;

(iv) Wear appropriate type of personal protective equipment for protection against ultra violet radiation, sparks and hazardous fumes;

(v) Elevate welding cables from floors and entrances to above a men‟s height. Materials used for the elevating the welding cables shall preferably be a non-conductor. Welding cables shall not rest on steel structures including metal scaffold and working platform;

(vi) Erect appropriate welding screens to shield workers working in close proximity from the ultra violet rays;

(vii) The fire watchmen shall extinguish all potential fire hazards during and after the welding operation before he leaves the work area. This is to ensure the prevention of delay fire outbreak;

(viii) Employees shall be made responsible for the welding equipment used. Regular inspection shall be performed to ensure condition of welding equipment and its accessories are always in good condition;

(ix) Oil and grease shall be kept out of all parts of cutting tools and cylinders. This shall include the gas cylinders, torch, hoses and flashback arrestor.

10.14.2 Arc Welding

(i) Welding cable shall be connected in an approved manner. There shall be no exposed metal parts in any cable;

(ii) Welding cable shall be uniquely identified and inspected regularly. Splices shall be avoided;

(iii) The grounding cable shall be attached to the work piece by means of a clamp. The ground cable shall not be attached to equipment or existing installations or apparatus.

(iv) Welding of the ground cable is forbidden. Concrete reinforcing shall not be used for grounding purposes;

(v) Welding equipment shall be installed so that the welder can see it during welding activities;

(vi) Welding equipment shall not be placed in the path of falling sparks;

(vii) Cables shall be kept clear from passageways, ladders and stairs. When exposed to possible damage, suitable covers shall protect cables;

(viii) When not in use, diesel welding machines, generators and transformers shall be switched off;

(ix) When in use, they shall be protected by suitable covers and correctly placed drip trays;

(x) Refueling operations shall be done with the machine turned off;

(xi) Hot electrode holders shall not be dipped into water, as this will expose the welder to electrical shock;

(xii) Safety goggles (not glasses) shall be worn at all times when grinding or welding, welding hoods shall attach to hard hats.

10.14.3 Gas Welding and Burning

(i) Welding or cutting torches and hoses shall not be connected to cylinders when stored;

(ii) Cylinders shall not be placed in containers or buildings;

(iii) When work is stopped and equipment is unattended, all valves at the gas and oxygen cylinders shall be closed;

(iv) The hoses shall be bled and a check shall be made five minutes later for possible pressure build-up;

(v) Torches shall be removed from the hoses prior to putting them into the toolbox. Smoking shall not be permitted during this stopping procedure;

(vi) Special care shall be taken during overhead cutting and welding operations to safeguard and prevent falling sparks from starting a fire;

(vii) Warning signs shall be posted around and at each level below the area of each overhead welding or burning operation;

(viii) Fire extinguishers / Fire Wardens shall be available and fire blankets shall be used for protection;

(ix) When welding or cutting, adequate ventilation shall be ensured;

(x) Hoses shall be kept clear from passageways, ladders and stairs. When hoses are exposed to possible damage, they shall be properly protected;

(xi) Hoses shall be inspected regularly;

(xii) The use of full or empty cylinders as supporting elements for welding activities is forbidden;

(xiii) Unprotected eyes and exposed skin are liable to injury from the intense ultra violet light emitted during arc welding. Any person who suspects that he/she has received "weld flash" injuries shall contact a first aide immediately for treatment.

10.15 Fire Prevention & Protection Plan

This clause provides the guidelines, instructions and requirements pertinent to fire hazard control. A detail Fire Prevention and Protection Procedure shall be prepared by the Contractor and submitted to the Engineer separately.

The Contractor shall hold the ultimate responsibility in ensuring all fire prevention requirements during the course of the Construction Phase.

Training requirements and agreements with external organizations shall be established and implemented. The Contractor shall provide training to selected employees nominated personnel on the principle of fire, the prevention measures and the techniques in fighting a fire.

Fire prevention and protection program shall be based upon the following objectives:

(i) Prevention of fires;

(ii) Early detection;

(iii) Control of fire spread;

(iv) Prompt extinguishment;

(v) Plan for prompt and orderly evacuation of personnel.

10.15.1 Prevention of Fires

The following practices shall be observed:

(i) Regular clean-up of debris, particularly combustibles;

(ii) Regular thorough inspections of the work areas to detect and eliminate fire hazards or the potential sources of fire;

(iii) Safe storage, handling and use of combustible materials.

10.15.2 Early Detection

Early detection is performed through daily inspection potential fire hazard area such as offices, chemicals and hydrocarbons storage area, waste storage areas and work location involving hot work.

The Contractor remains vigilance of their work area and removes any potential fire hazards prior commencement of work.

10.15.3 Control of Fire Spread

The Contractor shall provide adequate fire extinguishers of the correct type and size within the Common Area and Grass Root Area.

(i) Fire extinguishers shall be strategically located;

(ii) Fire extinguishers shall be clearly marked and made highly visible;

(iii) All firefighting equipment shall be regularly inspected and periodically tested.

10.15.4 Extinguishing a Fire

The extinguishment of fire often involves critical matters of judgment, which are best exercised by trained firefighting personnel.

However, it will be necessary to contain a fire until arrival of trained firefighting personnel before decision is made on the correct method of extinguishment.

The training to its nominated site firefighting personnel is good only to contain the spread of fire. Actual firefighting shall be carried out by professional fire fighter from the local fire-fighting department.

10.15.5 Fire Reporting

The person discovering a fire shall alert all personnel in the immediate vicinity and shall immediately inform his immediate or the nearest supervisors following the flow chart to be provided by the Contractor.

The emergency phone number for reporting fires shall be prominently displayed.

10.15.6 Fire Extinguishers

The Contractor shall study the proper type and required quantity of the fire extinguisher, and provide impletion plan, and it will be subject to the Engineer‟s approval.

Damaged, malfunction or empty fire extinguishers shall be serviced, repaired or refilled in a timely manner. The location of temporary mounted fire extinguishers shall be clearly marked and free access to such fire extinguishers shall be maintained.

Based on the identified potential fire hazards, fire extinguishers located on site shall be suitable for the various classes of fire and with a content of at least 9 kg.

10.16 Hazardous Substance and Materials Treatment Plan

The Contractor shall maintain a detailed database to track receipt, storage and issuance of all hazardous materials, including its MSDS (Material Safety Data Sheet) rating.

Separate and secure storage areas that conform to the Health and Safety plan and procedures, and the Bangladesh laws and regulations governing the handling, storage and use of hazardous materials shall be conformed to.

Hazardous materials and waste are defined by virtue of their concentration of constituents and characteristics such as flammability, corrosiveness, reactivity, toxicity, mutagenesis, radioactive that will posed a hazard to environment and human health, if improperly managed.

Hazardous materials and wastes are mainly liquid such as chemicals, solvents, paints and fuel/oil.

Solid hazardous waste includes radioactive source and medical waste.

Measures in storage, handling, transportation and disposal shall include:

(i) Provision of designed storages to contain spill, protect against run-off and the spread of fire.

(ii) Construction of impermeable dike with 110% retention capacity of the largest container or tank stored.

(iii) Provision of suitable containers or storage tanks of compatible material to hold hazardous materials and waste prior transportation.

(iv) Hazardous material and waste containers or tanks to be prominently marked and labeled in accordance to its properties and characteristics in the Material Safety Data Sheet provided by the supplier/manufacturer prior transportation.

(v) The amount of waste collected and disposed shall be documented in accordance to an inventory system.

(vi) The instructions in the Material Safety Data Sheet (MSDS) shall be observed. Any MSDS shall be distributed to the final users of the materials, and read out and fully understood by them before using the materials.

(vii) Trainings shall be provided to workers handling hazardous materials and waste. Training shall include topics such as the selection and used of appropriate personal protective equipment.

10.16.1 Combustible and Flammable Substances and Materials Storage Area

No combustible or flammable substances or materials shall be allowed storage in buildings or places of public assembly, offices, camps, and hazardous work area or buildings containing source of ignition, open electric motors, motor vehicles or where welding or cutting or power generation operations are conducted.

Inside storage of flammable liquids shall be confined to isolated fire-resistant buildings, except that small quantities, in approved sealed containers.

Petrol, acetone, alcohol, naphtha and benzene shall not be used for kindling fires or as a solvent for cleaning clothes, tools, equipment or exterior of buildings. Only approved solvents shall be used for cleaning purposes.

On the external of each Combustible and Flammable Substances and Materials Storage Area, suitable fire extinguishers shall be positioned near its entrances.

Storage of paints or paint materials, other than in paint storage buildings shall not exceed 100 liters capacity, and shall be in the original sealed containers and be stored in ventilated metal cabinets, isolated from other materials.

Fuel cans used for petrol shall be approved safety cans and shall have the upper part and top painted red to identify them.

Drums, cans and other flammable liquid containers shall be tightly closed, except when being filled or emptied.

Rubbish, brush, long grass or other combustible materials shall be removed from the immediate areas where flammable liquids are stored and handled.

Personnel coming into contact with flammable liquids in the course of their assigned duties shall be thoroughly trained in the hazards of these products.

“No Smoking” signs shall be placed conspicuously in and around storage locations, and carrying of open lights, matches, lighters and the like shall be prohibited.

10.17 Chemicals Spill Prevention Plan

Effective and well-designed chemical storage is the best preventive measures of hazardous chemical spilling into the environment.

Other spill prevention measures shall include the followings but not limited to:

(i) Regular inspection of storage area to identify leakage due to poor condition of containers or damaged to containers during handling;

(ii) Designate area for the maintenance of vehicles and construction plant and equipment;

(iii) Regular maintenance of vehicles and construction plant and equipment;

(iv) Provision of spill cleaning materials in hazardous chemical storage area and plant maintenance area. This shall enable the prevention of spills from spreading;

(v) Practice good product storage and arrangement to reduce possibilities of spillage.

10.18 Air Emission Control

Stationary construction plant will typically include power generators and water heaters.

Dust could enter environmentally sensitive areas and could affect people in immediate surrounding areas.

Uncontrolled application of water will result in sediment-laden effects on water quality, aquatic ecosystems and environmentally sensitive areas.

Dust reduction measures adequate to prevent erosion and local pollution shall be provided by the

Contractor and the followings shall be included but not limited to:

(i) Proper storage and handling of materials that will give rise to fugitive particles;

(ii) Stabilizing of stockpile area;

(iii) Control of dust generation during site preparation work with wetting methods and water trucks. Water trucks shall be used to apply water on construction areas and unsealed thoroughfares for dust control;

(iv) Dust control practices shall be applied throughout all work areas as required;

(v) Water shall be applied by means of a pressure type distributor equipped with a spray system of nozzles that shall ensure a uniform application of water. Minimal amounts of water required to control dust shall be applied such that potential for surface runoff of sediment is minimized;

(vi) Waste oil, or other petroleum products, shall not be used for dust control under any circumstances.

10.19 Noise Control

Every endeavor shall be made to limit the sound level at these boundaries to a level that is within the permissible limits for noise in Bangladesh:

- For Silent Areas: 50 dB (for day time) and 40dB (for night time);
- For Residential Area: 55dB (for day time) and 45dB (for night time);
- For Mixed Area (Residential, Commercial & Industrial Areas): 60dB (for day time) and 50dB (for night time);
- For Industrial Area: 75dB (for day time) and 70dB (for night time); and
- For Commercial Area: 70dB (for day time) and 70dB (for night time).

Notes: Day time counts from 6:00 to 21:00 hr. and night time from 21:00 to 6:00 hr.

10.19.1 Noise Preventative Measures

If any limit is exceeded, or if there is a significant risk of exceeding such limits at the boundaries of the nearest facility, noise screening shall be provided. Noise screening shall consist of:

(i) Earth mounds such as spoils between the affected construction activity and the nearest facility;

(ii) Solid fencing of a height to screen line of sight between the nearest facility and the affected construction activity. Such fencing shall be placed close to the site or close to the facility, whichever offers the most effective screen.

Only genuine reasons for complaint shall be dealt with by providing such noise screening.

10.19.2 Construction Noise Monitoring

Noise measurements shall be taken from time to time on any noisy activity, vehicles and construction plants. If any of such activities or construction plants is found to have exceeded the limit, all affected site personnel shall wear ear defenders as a short-term measure.

10.20 Risk Assessment and Management Plan

The Contractor shall provide Risk Assessment and Management program in each major activities, and it shall be attached in Work Method Statements separately and submitted to the Employer and the Engineer prior to the commencement of construction works.

All risks shall be periodically reviewed to ensure hazards and risks related to each operation have not changed. Those Method Statements shall be interwoven with the analyzed risks to maximize the effect of Safety control. The Contractor shall provide method statements which the required counter measures are specified to manage all identified risks and hazards after break down of the work scope.

The following matters shall be included in the Risk Assessment and Management program:

(i) Identification of Hazards;

(ii) Hazard Effects;

(iii) Risk Ranking;

(iv) Mitigation Measures;

(v) Recovery Measures.

ANNEX-A: Screening Checklist and Questionnaire
Annex A-1: Sample EnvironmentalScreening Checklist for Bridge projects

Name of the Bridge:
Relative Location:
Geographical Location:
Connecting Road:
Name of the Khal/River:

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
A. Project Siting Is the project area adjacent to or within any of the following environmentally sensitive areas?						
Cultural heritage site						
Protected Area (Forest)						
Wetland (Beel, Haor)						
National Park						
Wildlife sanctuary						
Buffer zone of protected area						
Special area for protecting biodiversity						
B. Potential Environmental Impacts Will the Project cause…						
Loss of agricultural land?						
Negative effects on rare (vulnerable), threatened or endangered species of flora or their habitat?						
Affects designated fish sanctuary?						
Increase river bank erosion?						
Affect boat traffic?						
Negative effects on designated wetlands?						
Negative effects on wildlife habitat, populations, corridors or movement?						
Negative effects on locally important or valued ecosystems or vegetation?						
Destruction/removal of trees and vegetation						
Impact on fish migration and navigation?						
Obstruction of natural connection between river and wetlands inside project area?						
Water logging in the areas?						
Insufficient drainage?						
Negative effects on surface water quality?						

Negative effects on groundwater quality?	
Loss of existing buildings, property, economic livelihood?	

Screening Questions	Yes	No	Scale of Impact			Remarks
			High	Medium	Low	
Increased soil erosion and/or sedimentation?						
Negative impact on soil stability and compactness?						
Impacts on sustainability of associated construction waste disposal?						
Traffic disturbances due to construction material transport and wastes?						
Increased noise due to transportation of equipment and construction materials?						
Increasednoiseduetoday-to-day construction activities?						
Increased wind-blown dust from material (e.g. fine aggregate) storage areas?						
Health risks to labors involve in activities?						
C. Potential impacts of the improved bridge Will the improved Bridge cause ...						
Negative effects on neighborhood or community characters?						
Negative effects on local business, institutions or public facilities?						
Potential social conflict between occupational groups: farmers vs. fisheries?						
Degradation or disturbance of historical or culturally important sites (mosque, graveyards etc.)?						
Blockage of navigation system?						
Obstructions to movements of people and animals?						
Conflicts in water supply rights and related social conflicts?						
Air quality?						
Shifting of utilities?						

Assessment: .....

Annexure-A-2: Sample Questionnaire for Bridge projects

Name of Investigator: ..... Date:.....

1. BASIC INFORMATION

1.1 Name of the Bridge:.....; Location:..... (Chainage)

1.2 Relative location of the Bridge: A) Village:.....B) Union:.....

C) Upzilla:..... D) District:.....

1.3 Geographical location: Latitude:.....Longitude:.....

2. CHARACTERISTICS OF THE BRIDGE

2.1 Status of the Bridge: A) New construction; B) Rehabilitation; C) Reconstruction; D) Major Maint.

If existing then specify the year of construction & executing agency:.....&.....

2.2 Length of the Bridge.....(m) (existing)..... (m) (proposed)

2.3 Width of the Bridge.....(m) (existing)..... (m) (proposed)

2.4 How many piers are in the bridge: .....Nos.

2.5 Width of the walking way *(if available):* side 1(L/R).....(m) & side 2 (L/R).....(m)

2.6 Length of Span..... (m)..... nos. and abutment.....(m).....nos.

2.7 Name of the Road: ..... & total length..... (km)

2.8 Name of the River/Khal:..... & total length.....(km)

2.9 Is there have any connection of the following utility services with the Bridge/approach road:

Types of Utility services	Yes	No	Remarks/comments
Gas pipeline			
Water supply pipeline			
Electricity transmission line			
Any other cables			
Others (please specify)			

3. DESCRIPTION ABOUT THE RIVER/KHAL

3.1 Top width of River/Khal:..... (m) *(bank to bank distance)*

3.2 Present water depth in the River/Khal..... (m)

3.3 Maximum water depth of the River/Khal:..... (m)

3.4 Maximum depth of River/Khal:..... (m)

3.5 Type of Channel (River/Khal): A) Straight B) Meandering

3.6 Types of River/Khal: A) Seasonal B) Not Seasonal

4. EROSION/SEDIMENTATION/DRAINGAE CONGESTION CHARACTERISTICS

4.1 Is there have any Khal/River bank erosion activities in the Bridge area? A) Yes B) No

If yes then specify the area in ..... (m) erosion/year & causes of erosion:
a)..... b)..... c)..... d).....

4.2 Is there have any bank/bridge approach protection activity in the bridge area? A) Yes B) No

4.3 Whether bridge/approach is inundated by flood water? A) Yes B) No *(if yes, then specify the year)……..*

4.4 Is there have any drainage congestion in the bridge area? A) Yes B) No

If yes, what are the reasons: a)…… b)……..c)……

4.5 Is there have any siltation in river/khal? A) Yes B) No *(if yes, then which bank or side)…….*

5. NAVIGATION

5.1 Vertical Navigation clearance during high flood…… (m)

5.2 Types of boat moved in the river/khal under the bridge: a)…… b)……c)……

5.3 Nos. of boat movement per day:…… nos./day

6. VEHICLES/TRANSPORTATION

6.1 ***Types of Vehicles/transports*** moved on BR/ROW and ***nos./day***: a)……Nos./day……b)……Nos./day……c)……Nos./day……

d)……Nos./day……e)……Nos./day……f)……Nos./day……

6.2 History of accident in the Bridge area:……*(if yes then what's the reason):……*

Figure: Sketch of River/Khal including the Bridge

7. IEFS IN THE BRIDGE AREA

7.1 IEFs around the Bridge area *(ex. Archaeological sites, protected area, religious institutes, social institutes etc.) (Please collect GPS location of the IEFs)*

50 meter at ……			end
L/S		R/S	
Within ROW (5m)	Within IA (0.5 km)	Within ROW (5m)	Within IA (0.5 km)

8. TREE CENSUS

At bridge 50 m approach road at……						end
Name of tree	L/S *[within ROW (5 m)]* Size & Number			R/S *[within ROW (5 m)]* Size & Number		
	Small	Medium	Large	Small	Medium	Large

9. ECOLOGY OF THE STUDY

AREA 9.1 Terrestrial Ecology

9.1.1 Terrestrial Flora (Trees, Plants, Shrubs, Herbs and Medicinal)

A) At present Abundant:

.....

B) Not Abundant:

.....

C) Not Available:

.....

9.1.2 Terrestrial Fauna (Birds, Amphibian, Reptiles, Mammals, Butterfly & Wildlife)

A) At present Abundant:

.....

B) Not Abundant:

.....

C) Not Available:

.....

9.2 Aquatic Ecology

9.2.1 Aquatic Flora

A) At present Abundant:

.....

B) Not Abundant:

.....

C) Not Available:

.....

9.2.2 Aquatic Fauna (Dolphin, Turtle, Crab, Frog etc)

A) At present Abundant:

.....

B) Not Abundant:

.....

C) Not Available:

.....

9.3 LIST OF FISH SPECIES

A) At present Abundant:

.....

B) Not Abundant:

.....

C) Not Available:

.....

9.1.1 Please take note from the fisherman *(if fish and fisherman exist in the area)* on their economic condition, daily income, amount of capture fish per day, market price of the fish etc.....

10. PHYSICAL ENVIRONMENTAL CHARACTERISTICS

10.1 Surface Water Quality *(at downstream of the bridge)*

Description/parameter		SW1
Type (khal/pond/river at downstream)		
GPS location	Latitude	

Description/parameter		SW1
	Longitude	
Relative location (village, union, Thana, District)		
Water Quality Parameter		
Temperature		
PH		
TDS		
EC		
Salinity		
DO		
COD		
BOD		
TSS		

10.2 Ground Water Quality *(adjacent to the bridge location)*

Description/parameter		GW1
Type (close to bridge location)		
GPS location	Latitude	
	Longitude	
Relative location (village, union, Thana, District)		

Water Quality Parameter	
pH	
Fe	
Mn	
As	
Fc	
Tc	
Salinity	

10.3 Air Quality *(adjacent to the bridge location)*

Description/parameter		AQ1
GPS location	Latitude Longitude	
Relative location (village, union, Thana, District)		
Air Quality Parameter		
PM_{10}		
$PM_{2.5}$		
SPM		
NOx		
SOx		

10.4 Noise Level *(on the bridge and approach road)*

Description		NL1	NL2
GPS location	Latitude Longitude		
Relative location (village, union, Thana, District)			
	Max		
	Min		
	Average		

11. SOCIAL INFORMATION

11.1 Is there have any requirement of land acquisition for bridge *(construction/rehabilitation/reconstruction)?* A) Yes B) No *(if yes, then how much land will be required?)…….*

11.2 What are the existing land use activities around the bridge area? a) ……, b)……., c)…… ….

11.3 Is there have the possibility to resettlement/displacement of the settlement during the development activities? A) Yes B) No *(if yes, how many houses, utility, family etc.)……*

11.4 Is there have any possibility to damage to livelihood or a way of life? A) Yes B) No

11.5 Is there have any impacts on minority or vulnerable groups (ex. Indigenous, tribal etc.) A) Yes B) No

11.6 What is the current trends of road accident in the area…….is there have any possibility to increase in future? A) Yes B) No

11.7 Based on the current location, is the bridge is located in the best location? A) Yes B) No *(if no, then what's the reason*)……

ANNEX- A-3: SCREENING FORM FOR SOCIAL SAFEGUARDS ISSUES

[To be filled by Consultants for each bridge spot. Where private lands are to be acquired or public lands (including LGED's own) are to be resumed from authorized and unauthorized private uses, census of affected persons and inventory of losses to be prepared. The consultants will include a summary of the impacts and mitigation requirements for each bridge spot in the Focus Group Discussion. Impacts identification and the mitigation eligibility and requirements should follow the principles adopted in this SMF]

A. Identification

1. Name of bridge: ……..…… ……
District:…..……..Upazila:……Union/Municipality:…….... Village ……; Length of Bridge:……Name of the canal/river……..Connecting road……..
Location with mark: Left …… Right…….. Front…….. Back…….

2. Brief description of the physical works: ……..……

.....……..

……..

……

……..

3. Focus Group Discussion Date(s): ……

B. Participation in Focus Group Discussion

4. Names of Consultants' representatives:

……

…… ……

5. Names of LGED officials participated in Focus Group Discussion:

……

……

……

6. Local Government representatives and community members and organizations participated in Focus Group Discussion: List them in separate pages with names and addresses, in terms of bridge/road sections/spots and any other information to identify them during preparation of impact mitigation plans.

7. Would-be affected persons participated in Focus Group Discussion: List them in separate pages with names, addresses in terms of bridge/road sections/spots where they would be affected, and any other information to identify them during preparation of impact mitigation plans.

C. Land Requirements & Ownership

8. Will there be a need for additional lands* to carry out the intended works under this contract?

(a) Yes (b) No (* 'Additional lands' mean lands beyond the approach road of bridge)

9. If 'Yes', the required lands presently belong to (Indicate all that apply):

(a) LGED (b) Government – khas & other GOB agencies (c) Private Citizens

(d) Others (Mention):……

D. Current Land Use & Potential Impacts

10. If the required lands belong to Private Citizens, they are currently used for (Indicate all that apply):

(a)Agriculture # of households using the lands: ……

(b) Residential purposes # of households living on them: ……..

(c) Commercial purposes # of persons using them: …… # of shops: .....

(d) Other Uses (Mention): ..……..…… # of users: ……..

11. If the required lands belong to LGED and/or other Government agencies, they are currently used for (Indicate all that apply):

(a) Agriculture# of persons/households using the lands: ……..…….

(b) Residential purposes# of households living on them: ……

(c) Commercial purposes # of persons using them: …… # of shops: …….

(d) Other Uses (Mention): ……..……..……... # of users: ..……

12. How many of the present users have lease agreements with any government agencies?
……

13. Number of private homesteads that would be affected on private lands:

Entirely, requiring relocation: ……..

Partially, but can still live on present homestead: .....

14. Number of business premises/buildings that would be affected on private lands: ……...

Entirely and will require relocation: ……# of businesses housed in them: …..……..

Partially, but can still use the premises: ..…. # of businesses housed in them: …..……...

15. Residential households will be affected on LGED's own and public lands: ……..

Entirely affected and will require relocation: # of these structures: ……...

# of structures built with brick, RCC, & other expensive and durable materials: …….....

# of structures built with inexpensive salvageable materials (bamboo, GI sheets, etc: ……

Partially affected, but can still live on the present homestead: # of structures: …….…….

# of structures built with brick, RCC, & other expensive and durable materials:

……..

# of structures built with inexpensive salvageable materials (bamboo, GI sheets, etc):

…….

16. # of business premises that would be affected on LGED's own & other public lands: ……

Entirely affected and will require relocation: # of these structures: …….

# of businesses housed in these structures: ……

# of persons presently employed in the above businesses: ……

# of these structures built with brick, RCC, & other durable materials: …….

# of structure built with inexpensive salvageable materials (bamboo, GI sheets, etc):

Partially affected, but can still stay in the present premises: # of these structures: ..…….

# of businesses housed in these structures: ……...

# of persons presently employed in these businesses: ……

# of these structures built with brick, RCC, & other durable materials: ……..

# of structure built with inexpensive salvageable materials (bamboo, GI sheets, etc):

…….

17. # of businesses/trading activities that would be displaced from make-shift structures on the approach road, and other areas/spots: ……..

18. Do the proposed bridge works affect any community/ groups' access to any resources that are used for livelihood purposes?

(a) Yes (b) No

19. If 'Yes', descrTPtion of the resources:

……..…….....……

……..……..……

20. Do the proposed works affect community facilities like school, cemetery, mosque, temple, or others that are of religious, cultural and historical significance?

(a) Yes (b) No

21. If 'Yes', description of the facilities:

……..

……..……..……..

……..……

22. Whether the sub-project (proposed bridge) will effect on normal water flow of adjacent source of water and how?

……

……

23. If any water transport system that crosses the bridge.

(a) Yes (b) No

24. If yes, is freeboard sufficient for moving water transport in rainy season?

(a) Yes (b) No

25. Describe any other impacts that have not been covered in this questionnaire?

……..…….

……..……..…

26. Describe alternatives, if any, to avoid or minimize use of additional lands:

……..…….……

……..……

……..……..……

……

27. Which of the following impact mitigation plans would be prepared for the bridge?

(a) Resettlement Plan (b) Abbreviated Resettlement Plan(c) None

E. ADDITIONAL INFORMATION ON TRIBALPEOPLES (TPs)

(This section must be filled in if bridge is located in areas that are also inhabited by tribal peoples.)

28. Names of TP community members and organizations who participated in Focus Group Discussion:

……..……..…

……..……

……..……..……

29. Have the TP community and that would-be affected TPs been made aware of the potential positive and negative impacts and consulted for their feedback and inputs?

(a) Yes (c) No

Has there been a broad-based community consensus on the proposed works?

(a) Yes (c) No

30. Total number of would-be affected TP households:…….

31. The would-be affected TP households have the following forms of rights to the required lands:

(a) Legal: # of households: ……

(b) Customary: # of households: ……

(c) Lease agreements with any GOB agencies: # of households: …..…..…

(d) Others (Mention): ……..…… # of households: ...……

32. Does the project affect any objects that are of religious and cultural significance to the TPs?

(a) Yes (b) No

33. If 'Yes', description of the objects:
……..……..……
……

……

34. The following are the three main economic activities of the would-be affected TP households:

a. ……

b. ……

c. ……..……

35. Social concerns expressed by TP communities/organizations about the works proposed under the subproject:

……..……

……

……

36. The TP community and organizations perceive the social outcomes of the subproject:

(a) Positive (b) Negative (c) Neither positive nor negative

37. In respect of any conditions that may have been agreed for the broad-based community consensus, and the social impacts on TPs and their concerns, is there a need to, undertake an in-depth Impact Assessment study? (a) Yes (b) No

Prepare an Tribal Peoples Plan? (a) Yes (b) No

On behalf of the consultants, this Checklist has been filled in by:

Name: …….. Designation: ……..……..…...

Signature: …… Date: ……...

ANNEXURE- A-4: Attendance of the participants (Identity and signatures)

Sl. No.	Name	Sex	Address with Phone Number	Occupation	Signature

ANNEX- A-5: TRIBALPEOPLES' CONSULTATION MATRIX

Timing	Consultation ParticTPants		Consultation Method	Expected Outcome
	Project Authority	TP Community		
Reconnaissance of road under consideration	LGED, NGOs/ CBOs and others working with TP issues	TP Communities, including organizations, community leaders/elders	Open meetings & discussions, visit of TP settlements & surroundings	First-hand assessment of TPs' perception of potential social risks and benefits, and prospect of achieving broad base support for the project
Preliminary Screening of the road	LGED, NGOs/CBOs and others working with TP issues	TP Communities, including would-be affected TPs, TP organizations, community leaders/elders, key informants	Open meetings, focus group discussions, spot interviews, etc.	Identification of major impact issues, feedback from TP communities and would-be affected persons/households, and establishing broad-based community support for the project
Feasibility Study taking into consideration , inter alia the conditions thatled to community consensus	LGED, project consultants (Social Scientists), NGOs/CBO, Other knowledgeable persons	Would-be affected TPs, TP organizations, community leaders/elders, key informants	Formal/informal interviews; focus group discussions; hotspot discussion on specific impacts, alternatives, and mitigation; etc.	More concrete view of impact issues & risks, and feed back on possible alternatives and mitigate on measures; estimates of displacement from homesteads; inventory of common property resources; and information on other key impacts
Social Assessment	LGED, project consultants (Social Scientists)	Adversely affected individual TPs/households	Structured survey questionnaires covering quantitative & qualitative information	Inputs for TPP, and identification of issues that could be incorporated in engineering design
Detailed Design	LGED, project consultants (Social Scientists) and other stakeholders	TP organizations, community leaders/elders, adversely affected TPs	Group consultations, hot spot discussions, etc.	*Preparation of TPP, and incorporation of SA inputs into engineering design to avoid or minimize adverse impacts, and TP development programs*
Implementation	LGED, project consultants (Social Scientists) &other stakeholders	Individual TPs, TP organizations, community leaders/elders & other stakeholders	Implementation Monitoring committees (formal or informal)	Quick resolution of issues, effective implementation of TPP
Monitoring & Evaluation	LGED, IDA, project consultants (Social	TP organizations/ groups and individuals	Participation in review and monitoring	Identification & resolution of implementation issues, effectiveness of TPP

Timing	Consultation ParticTPants		Consultation Method	Expected Outcome
	Project Authority	TP Community		
	Scientists), NGOs & CBOs			

ANNEX-B: Environmental Code of Practices

ECOP-1: SITE PREPARATION

1. General

The preparation of site for construction involves: (i) clearing of land required for construction; (ii) Existing bridge dismantling; (iii) removal of utilities and vegetation; and (iv) management of activities such as traffic during construction. These activities have been detailed out for civil works of new bridge construction, rehabilitation and maintenance activities separately.

2. Bridge construction, rehabilitation and maintenance activities

A. Site Preparation Activities

After obtaining the consent of the community on the alignment, the Project Implementation Unit of the District Office shall be responsible to stake out the location and alignment by establishing working benchmarks on ground. It shall be the responsibility of the PIU to take over the possession of the proposed RoW and handover the land width required clear of all encumbrances to the Contractor. Activities pertaining to the clearance of land and relocation of utilities need to be initiated by the PIU well in advance to avoid any delays in handing over of site to the Contractor. Assistance of the Revenue Department shall be sought in accomplishing the task. To summarize, the PIU's responsibilities before handing over the site to the contractor include:

- Clearance of encroachments within proposed ROW and project site;
- Initiation of process for legal transfer of land title;
- Location and alignment of approach road modification or relocation of common property resources in consultation with the local community;
- Alignment and location modification or relocation of utilities in consultation with the various government departments; and
- Obtain clearances required from government agencies for
  - Cutting of trees;
  - Removal of utilities; and
  - Land Diversion of forestlands, etc.

B. Site Preparation Activities by the Contractor

Site preparation shall involve dismantling and removal of existing bridge and removal of commercial and housing structures and utilities and stock piles in a designated area of the construction camp. The PIU shall transfer the land for civil works to the Contractor after peg marking of the alignment.

The Contractor shall verify the benchmarks soon after taking possession of the site. The Contractor, prior to initiation of site preparation activities, shall highlight any deviations/discrepancies in these benchmarks to the PIU in writing. The contractor shall submit the schedules and methods of operations for various items during the construction operations to the PIU for approval. The Contractor shall commence operations at site only after the approval of the schedules by the PIU.

The activities to be undertaken by the contractor during the clearing and grubbing of the site are as follows:

The clearance of site shall involve the removal of all existing bridges, materials such as trees, bushes, shrubs, stumps, roots, grass, weeds, part of topsoil and rubbish. Towards this end, the Contractor shall adopt the following measures: (i) Limiting the surface area of erodible earth material exposed by clearing and grubbing; (ii) Conservation of top soil and stock piling as per the measures suggested as part of ECOP 7: Top Soil Management and (iii) Carry out necessary backfilling of pits resulting from

uprooting of trees and stumps with excavated or approved materials to the required compaction conforming to the surrounding area. To minimize the adverse impact on vegetation, only ground cover/shrubs that impinge directly on the permanent works shall be removed. Cutting of trees and vegetation outside the working area shall be avoided under all circumstances. In case the alignment passes through forest areas. The Forest Ranger shall be consulted for identification of presence of any rare/endangered species within the proposed road way and water way. Protection of such species if found shall be as per the directions of the Forest Department.

The locations for disposal of grubbing waste shall be finalized prior to the start of the works on any particular section of the project site. The selection of the site shall be approved by the PIU. The criteria for disposal of wastes shall be in accordance with the measures given in ECOP-2: Waste Management.

In locations where erosion or sedimentation is likely to be a problem, clearing and grubbing operations should be so scheduled and performed that grading operations and permanent erosion and sedimentation control features can follow immediately, if the project conditions permit. Dismantling of bridge structures and culverts shall be carried out in a manner as not to damage the remaining required portion of structures and other surrounding properties. The disposal of wastes shall be in accordance with the provisions given in ECOP-2: Waste Management. The following precautions shall be adopted:

- The waste generated shall not be disposed off in watercourses, to avoid hindrance to the flow,
- All necessary measures shall be taken while working close to cross drainage channels to prevent earthwork, stonework as well as the method of operation from impeding cross drainage at rivers, water canals and existing irrigation and drainage systems.

The designated sites duly approved by Implementing Agency shall be cleared of its existing cover for setting up of the construction sites, camps and related infrastructure facilities, borrow areas and other locations identified for temporary use during construction. The contractor shall comply with all safety requirements in consideration as specified in the ECOP-18: Occupational Health and Safety.

Before initiation of site preparation activities along these lands to be used temporarily during construction, it shall be the responsibility of the Contractor to submit and obtain approval of the site redevelopment plan from the implementing agency. The letter/contract agreement between the owner(s) of the land parcel for temporary usage shall include site redevelopment to its original status. The guidelines for the same are furnished in the ECOP-16: Construction Camps management and ECOP-8: Borrow areas development and operation.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	ECOP-2: WASTE MANAGEMENT	
General Waste	Soil and water pollution from the improper management of wastes and excess materials from the construction sites	The Contractor shall • Develop waste management plan for various specific waste streams (e.g., reusable waste, flammable waste, construction debris, food waste etc.) prior to commencing of construction and submit to LGED for approval; • Organize disposal of all wastes generated during construction in an environmentally acceptable manner. This will include consideration of the nature and location of disposal site, so as to cause less environmental impact;

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		• Minimize the production of waste materials by 3R (Reduce, Recycle and Reuse) approach; • Segregate and reuse or recycle all the wastes, wherever practical; • Prohibit burning of solid waste in the construction site; • Collect and transport non-hazardous wastes to all the approved disposal sites. Vehicles transporting solid waste shall be covered with tarps or nets to prevent spilling waste along the route; • Provide refuse containers at each worksite. • Request suppliers to minimize packaging where practicable; • Maintain all construction sites in a cleaner, tidy and safe condition and provide and maintain appropriate facilities as temporary storage of all wastes before transportation and final disposal.
Construction Waste	Health hazards and environmental impacts due to improper waste management practices	The Contractor shall • Contractor shall select designated area/site for storing of construction waste; • Collect, carrying and stock piling of construction waste in designated area regularly; • Construction waste should not be placed here and there in the construction sites; • Sorting the construction waste and reuse; • Collect, carrying and stockpiling of dismantling of waste from existing bridge, piece of wood, rod, bamboo, bricks etc.
Fuels and Hazardous goods	Materials used in construction have a potential to be a source of contamination. Improper storage and handling of fuels, lubricants, chemicals and hazardous	The Contractor shall • Prepare spill control procedures and submit the plan for LGED approval; • Train the relevant construction personnel in handling of fuels and spill control procedures; • Store dangerous goods in bounded areas on a top of a sealed plastic sheet away from water courses; • Refueling shall occur only within bounded areas; • Make available MSDS for chemicals and

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	goods/materials onsite and potential spills from these goods may harm the environment or health of construction workers	dangerous goods on-site; • Transport waste of dangerous goods, which cannot be recycled, to a designated disposal site approved by the DoE; • Provide absorbent and containment material (e.g., absorbent matting) where hazardous material are used and stored and personnel trained in the correct use; • Provide protective clothing, safety helmets, masks, gloves, goggles and ear plugs to the construction personnel, appropriate to materials in use; • Make sure all containers, drums, and that are used for storage are in good condition and are labeled with expiry date. Any container, drum, or tank that is dented, cracked, or rusted might eventually leak. • Check for leakage regularly to identify potential problems before they occur; • Put containers and drums in temporary **storages in clearly marked areas, where they** will not be run over by vehicles or heavy machinery. The area shall preferably slope or drain to a safe collection area in the event of a spill; • Take all precautionary measures when handling and storing fuels and lubricants, avoiding environmental pollution; • Avoid the use of material with greater potential for contamination by substituting them with more environmentally friendly materials.
Discharge from Construction Sites	During construction both surface and groundwater quality may be deteriorated due to construction activities on the waterway/river/canal, sewerages from construction sites and work camps. The construction works will modify	The Contractor shall • Install temporary drainage works (channels and bunds) in areas required for sediment and erosion control and around storage areas for construction materials; • Install temporary sediment basins, where appropriate, to capture sediment-laden run-off from site; • Divert runoff from undisturbed areas around the construction site; • Stockpile materials away from drainage lines; • Prevent all solid and liquid wastes entering waterways by collecting solid waste, oils, chemicals, bitumen spray waste and wastewaters from brick, concrete and asphalt cutting where possible and transport to an

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	groundcover and topography changing the surface water drainage patterns of the area including infiltration and storage of storm water. These changes in hydrological regime lead to increased rate of runoff increase in sediment and contaminant loading, increased flooding, groundwater contamination and effect habitat of fish and other aquatic biology	approved waste disposal site or recycling depot; • Wash out ready-mix concrete agitators and concrete handling equipment at washing facilities off site or into approved bunded areas on site; • Ensure that tires of construction vehicles are cleaned in the washing bay (constructed at the entrance of the construction site) to remove the mud from the wheels. This should be done in every exit of each construction vehicle to ensure the local roads are kept clean.
Soil Erosion and Siltation	Soil erosion and dust from the material stockpiles will increase the sediment and contaminant loading of surface water bodies	The Contractor shall • Stabilize the cleared areas not used for construction activities with vegetation or appropriate surface water treatments as soon as practicable following earthwork to minimize erosion; • Ensure that roads used by construction vehicles are swept regularly to remove sediment; • Water the material stockpiles, access roads and bare soils on an as required basis to minimize dust; • Increase the watering frequency during periods of high risk (e.g. high winds).

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities in water bodies	Construction works in the water bodies will increase sediment and contaminant loading and effect habitat of fish and other aquatic biology	The Contractor Shall • Monitor the water quality in the runoff from the site or areas affected by dredge plumes, and improve work practices as necessary; • Protect water bodies from sediment loads by silt screen or bubble curtains or other barriers; • Minimize the generation of sediment, oil and grease, excess nutrients, organic matter, litter, debris and any form of waste (particularly petroleum and chemical wastes). These substances must not enter waterways, storm water systems or underground water tables; • Use environment friendly and nontoxic slurry during construction of piles to discharge into the river/canal; • Reduce infiltration of contaminated drainage through storm water management design; • Do not discharge cement and water curing used for cement concrete directly into water courses and drainage inlets.
Drinking Water	Groundwater at shallow depths is contaminated with arsenic and hence not suitable for drinking purposes Depletion and pollution of groundwater resources	The Contractor Shall • Pumping of groundwater should be from deep aquifers of more than 300m to supply arsenic free water. Safe and sustainable discharges are to be ascertained prior to selection of pumps; • Tube wells will be installed with due regard for the surface environment, protection of groundwater from surface contaminants and protection of aquifer cross contamination; • Protect groundwater supplies of adjacent lands.
Excavation and earth works and construction yards	Lack of proper drainage for rainwater/liquid waste or wastewater owing to the construction activities harms environment in terms of water and soil contamination, and mosquito growth.	The Contractor shall • Prepare a program for prevent/avoid standing waters; • Provide alternative drainage for rainwater if the construction works/earth-fillings cut the established drainage line; • Establish local drainage line with appropriate silt collector and silt screen for rainwater or wastewater connecting to the existing established drainage lines already there; • Rehabilitate road drainage structures

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		immediately if damaged by contractors' road transports; • Construct wide drains instead of deep drains to avoid sand deposition in the drains that require frequent cleaning; • Provide appropriate silt collector and silt screen at the inlet and manholes and periodically clean the drainage system to avoid drainage congestion; • Protect natural slopes of drainage channels to ensure adequate storm water drains; • Regularly inspect and maintain all drainage channels to assess and alleviate any drainage congestion problem; • Reduce infiltration of contaminated drainage through storm water management design.
Ponding of water	Health hazards due to mosquito breeding	• Do not allow ponding of water especially near the waste storage areas and construction camps; • Discard all the storage containers that are capable of storing of water, after use or store them in inverted position.
Filling of Sites with dredge materials	Soil contamination will occur from drainage of dredged materials	The Contractor shall • Prior to filling, sand quality should be tested to confirm whether soil is pollution free; • Sediments should be properly compacted. • Top layer should be the 0.5 m thick clay on the surface and boundary slopes along with grass; • Side Slope of Filled Land of 1:2 should be constructed by suitable soils with proper compaction as per design; • Slope surface should be covered by top soils/ cladding materials (0.5m thick) and grass turfing with suitable grass; • Leaching from the sediments should be contained to seep into the subsoil or should be discharged into settling lagoons before final disposal; • No sediment laden water in the adjacent lands near the construction sites, and/or

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		wastewater of suspended materials excessive of 200mg/l from dredge material storage/use area in the adjacent agricultural lands.
Storage of Hazardous and Toxic Chemicals	Spillage of hazardous and toxic chemicals will contaminate the soils	The Contractor shall • Strictly manage the wastes management plan proposed in ECOP-2; • Construct appropriate spill contaminant facilities for all fuel storage areas; • Establish and maintain a hazardous materials register detailing the location and quantities of hazardous substances including the storage, use of disposals; • Train personnel and implement safe work practices for minimizing the risk of spillage; Identify the cause of contamination, if it is reported, and contain the area of contamination; • Remediate the contaminated land using the most appropriate available method to achieve required commercial/industrial guideline validation results.
Construction material stock piles	Erosion from construction material stockpiles may contaminate the soils	The Contractor shall • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds.
Development and operation of borrow areas	Generally dredge materials will be used as borrow material for filling of construction sites to the 100 year flood level. In case, the borrow pits developed by the Contractor, there will be impacts on local topography, landscaping and natural drainage.	The Contractor shall • Identify borrow pits in consultation with the local LGED staff; • Obtain the borrow material from: - barren land or land without tree cover outside the road reserve; - excavating land and creating new water tanks/ponds; - land acquired temporarily outside the road reserve; - excavation of proposed culverts; • Do not dug the borrow pits within 5m of the toe of the final section of the road embankment; • Dig the borrow pits continuously. Ridges of not less than 8 m widths shall be left at intervals not exceeding 300 m and small

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		drains should be cut through the ridges to facilitate drainage; • Slope the bed level of the borrow pits, as far as possible, down progressively towards the nearest cross drain, if any, and do not lower it than the bed of the cross-drain, to ensure efficient drainage; • Do not locate the borrow pits within 500 m of any identified archaeological, religious or cultural sites if any; • Follow the below for restoration of borrow areas are: - Return stockpiled topsoil to the borrowit if is used for agriculture; - Stabilize the banks of the borrow pit with the top soil if it is used for fish ponds by compaction; - Return stockpiled topsoil to the borrow pit and all worked areas to be stabilized through re-vegetation using local plants. • Control at each site by ensuring that base of the borrow pit drains into a sediment trap prior to discharging from the site.
Construction vehicular traffic	Air quality can be adversely affected by vehicle exhaust emissions and combustion of fuels	The Contractor shall • Fit vehicles with appropriate exhaust systems and emission control devices. Maintain these devices in good working condition; • Operate the vehicles in a fuel efficient manner; • Cover haul vehicles carrying dusty materials moving outside the construction site; • Impose speed limits on all vehicle movement at the worksite to reduce dust emissions; • Control the movement of construction traffic; • Service all vehicles regularly emissions.
Construction machinery	Air quality can be adversely affected by emissions from machinery and	The Contractor shall • Fit machinery with appropriate exhaust systems and emission control devices; • Maintain these devices in good working condition in accordance specifications defined by their manufacturers to

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
	combustion of fuels	maximize combustion efficiency and minimize the contaminant emissions; • Proof or maintenance register shall be required by the equipment suppliers and contractors/subcontractors; • Focus special attention on containing emissions from generators; • Machinery causing excess pollution (e.g. visible smoke) will be banned from construction sites; • Service all equipment regularly emissions; • Provide filtering systems, duct humidification or other techniques (as applicable) to the concrete batching and mixing plant to control the particle emissions in all its stages, including unloading, collection, aggregate handling,dumping, circulation of trucks and machinery inside the installations.
Construction activities	Dust generation from construction sites, material stockpiles and access roads is a nuisance in the environment and can be a health hazard	• Water the material stockpiles, access roads and bare soils on an as required basis to minimize the potential for environmental nuisance due to dust; Increase the watering frequency during periods of high risk (e.g. high winds); • Stored materials such as gravel and sand shall be covered and confined to avoid their being wind-drifted; • Minimize the extent and period of exposure of the bare surfaces; • Reschedule earthwork activities or vegetation clearing activities, where practical, if necessary to avoid during periods of high wind and if visible dust is blowing off-site; Restore disturbed areas as soon as practicable by vegetation/grass-turfing; • Store the cement in silos and minimize the emissions from silos by equipping them with filters; Establish adequate locations for storage, mixing and loading of construction materials, in a way that dust dispersion is prevented because of such operations.

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Noise quality will be deteriorated due to vehicular traffic	The Contractor shall • Maintain all vehicles in order to keep it in good working order in accordance with manufactures maintenance procedures; • Make sure all drivers will comply with the traffic codes concerning maximum speed limit, driving hours, etc.; • Organize the loading and unloading of trucks, and handling operations for the purpose of minimizing construction noise on the work site.
Construction machinery	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment	The Contractor shall • Appropriately site all noise generating activities to avoid noise pollution to local residents; • Use the quietest available plant and equipment; • Modify equipment to reduce noise (for example, noise control kits, lining of truck trays or pipelines); • Maintain all equipment in order to keep it in good working order in accordance with manufactures maintenance procedures; • Equipment suppliers and contractors shall present proof of maintenance register of their equipment; • Install acoustic enclosures around generators to reduce noise levels; • Fit high efficiency mufflers to appropriate construction equipment; • Avoid the unnecessary use of alarms, horns and sirens.
Dismantling and construction activities	Noise and vibration may have an impact on people, property, fauna, livestock and the natural environment	The Contractor shall • Notify adjacent landholders prior any typical noise events outside of daylight hours; • Educate the operators of construction equipment on potential noise problems and the techniques to minimize noise emissions; • Employ best available work practices on-site to minimize occupational noise levels; • Install temporary noise control barriers where

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		appropriate; • Plan activities on site and deliveries to and from site to minimize impact; • Monitor and analyze noise and vibration results and adjust construction practices as required; • Avoid undertaking the noisiest activities, where possible, when working at night near the residential areas.

ECOP-11: TREE CUTTING AND AFFORESTATION

This Guideline discusses the issue of tree cutting and afforestation. Loss of trees creates adverse environmental impacts. In order to mitigate there impacts, suitable measures have been suggested as part of this Guideline. These measures have been given for each of the stages of the bridge and approach road construction activities.

1. Project Planning and Design Stage

During location and alignment finalization, due consideration shall be given to minimize the loss of existing tree cover, encroachment of forest areas/protected areas etc. as specified in ECOP-11: Tree cutting and afforestation. Tree felling, if unavoidable, shall be done only after compensatory plantation of at least three saplings for every tree cut is done.

The plantation/afforestation would be carried out by the forest department. It should be ensured that plantation is carried out only in areas where water can be made available during dry seasons and the plant can be protected during the initial stages of their growth. The species shall be identified giving due importance to local flora. It is recommended to plant mixed species in case of both avenue or cluster plantation.

The plantation strategy shall suggest the planting of fruit bearing trees and other suitable trees. Development of cluster plantations will be encouraged in the community lands, at locations desired by the community. The choice of species will be based on the preferences of the community. The PIU shall oversee the plantation to check the following:

- Whether trees are obstructing live of right at junctions;
- Whether trees are at the inside of the junctions; and
- Whether trees are within 5 meters of the proposed centerline.

During the tree/vegetation removal from the proposed bridge sites and approaches construction sites diameter at brest height (DBH) of the trees is 6 inch, only such trees should be considered by the contractor for compensation and plantation.

2. Post-construction Stage

The maintenance of the saplings (including activities much as weeding, watering, planting of replacement saplings, etc. application of manure etc.) shall be the responsibility of the forest department. The PIU shall ensure the following:

- Shoulder of roads to be kept clear of weeds/undesirable undergrowth; and
- Branches of trees do not obstruct clear view of the informatory and cautions signs.

ECOP-12: PROTECTION OF FISHERIES

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities in River/Canal	The main potential impacts to fisheries are hydrocarbon spills and leaks from riverine transport and disposal of wastes into the river	**The Contractor shall** • Ensure the water transports are well maintained and do not have oil leakage to contaminate river water; • Contain oil immediately on river/canal in case of accidental spillage from vessels and ships and in this regard, make an emergency oil spill containment plan to be supported with enough equipment's, materials and human resources; • Do not dump wastes, be it hazardous or non-hazardous into the nearby water bodies or in the river; • Fingerling (fish) can be released to the river/khal near the bridge site to boost up the fish resources.
Construction activities on the land	Filling of ponds for site Preparation will impact the fishes	**The Contractor shall** • Inspect any area of a water body containing fish that is temporarily isolated for the presence of fish, and all fish shall be captured and released unharmed in adjacent fish habitat; • Install and maintain fish screens etc. on any water intake with drawing water from any water body that contain fish.

ECOP-13: ROAD TRANSPORT AND ROAD TRAFFIC MANAGEMENT

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction vehicular traffic	Increased traffic use of road by construction vehicles will affect the movement of normal road traffics and the safety of the road users	**The Contractor shall** • Prepare and submit a traffic management plan to LGED for his approval at least 30 days before commencing work on any project component involved in traffic diversion and management; • Include in the traffic management plan to ensure uninterrupted traffic movement during construction; • Detailed drawings of traffic arrangements showing all detours, temporary road, temporary bridges temporary diversions, necessary barricades, warning signs/lights, road signs etc. • Provide signs at strategic locations of the roads complying with the schedules of signs contained in the Bangladesh Traffic Regulations; • Install and maintain a display board at each important road intersection on the roads to be used during construction, which shall clearly show the following information in Bangla: – Location: chainage and village name; – Duration of construction period; – Period of proposed detour/alternative route; – Suggested detour route map; – Name and contact address/telephone number of the concerned personnel; – Name and contact address/telephone number of the Contractor ; – Inconvenience is sincerely regretted.
	Accidents and spillage of fuels and chemicals	**The Contractor shall** • Restrict truck deliveries, where practicable, to daytime working hours; • Restrict the transport of oversize loads; • Operate road traffics/transport vehicles, if possible, to non-peak periods to minimize traffic disruptions; • Enforce on-site speed limit.

ECOP-14: WATER TRANSPORT MANAGEMENT

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Construction activities in River/Canal	Accidents	**The Contractor shall** • Prepare an emergency plan for dealing with accidents causing accidental sinking of the vessels and ships; • Ensure sufficient equipment and staffs Rehabilitation and Maintenance Program available to execute the emergency plans; • Provide appropriate lighting to barges and construction vessels.

ECOP-15: EROSION AND SEDIMENTATION CONTROL

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
Clearing of construction sites	Cleared areas and slopes are susceptible for erosion of top soils that affects the growth of vegetation which causes ecological imbalance	**The Contractor shall** • Reinstate and protect cleared areas as soon as possible; • Mulch to protect better slopes before planting; • Cover unused area of disturbed or exposed surfaces immediately with mulch/grass turfings/tree plantations.
Construction activities and material stockpiles	The impact of soil erosion are (i) Increased run off and sedimentation causing a greater flood hazard to the downstream, (ii) destruction of aquatic environment in nearby lakes, streams, and reservoirs caused by erosion and/or deposition of sediment damaging the spawning grounds of fish, and (iii) destruction of vegetation by burying or gullying	**The Contractor shall** • Locate stockpiles away from drainage lines; • Protect the toe of all stockpiles, where erosion is likely to occur, with silt fences, straw bales or bunds; • Remove debris from drainage paths and sediment control structures; • Cover the loose sediments and water them if required; • Divert natural runoff around construction areas prior to any site disturbance; • Install protective measures on site prior to construction, for example, sediment traps; • Control drainage through a site in protected channels or slope drains; • Install cut off drains' on large cut/fill batter slopes to control water runoff speed and hence erosion; • Observe the performance of drainage structures and erosion controls during rain and modify as required.
Siting and Location	Campsites for construction	**The Contractor shall**

of construction camps	workers are the important locations that have significant impacts such as health and safety hazards on local resources and infrastructure of nearby communities	• Locate the construction camps at areas which are acceptable from environmental, cultural or social point of view; • Consider the location of construction camps away from communities in order to avoid social conflict in using the natural resources such as water or to avoid the possible adverse impacts of the construction camps on the surrounding communities; • Local authorities responsible for health, religious and security shall be duly informed on the set up of camp facilities so as to maintain effective surveillance over public health, social and security matters.
Construction camp facilities	Lack of proper infrastructure facilities such as housing, water supply and sanitation facilities will increase pressure on the local services and generate substandard living standards and health hazards	• Contractor shall provide the following facilities in the campsites; • Adequate housing for all workers; • Safe and reliable water supply. Water supply from deep tube wells of 300 m depth that meets the national standards; • Hygienic sanitary facilities and sewerage system; • The toilets and domestic waste water will be collected through a common sewerage; • Provide separate latrines and bathing places for males and females with total isolation by wall or by location; • The minimum number of toilet facilities required is one toilet for every 10 persons, as per BNBC; • Provide in-house community/common entertainment facilities. Dependence of local entertainment outlets by the construction camps to be encouraged/prohibited to the extent possible.
Disposal of Waste	Management of wastes is crucial to minimize impacts on the environment	**The Contractor shall** • Ensure proper collection and disposal of solid wastes within the construction camps; • Insist waste separation by source; organic wastes in one pot and inorganic wastes in another pot at household level; • Store inorganic wastes in a safe place within the household and clear organic wastes on daily basis to waste collector. Establish waste collection, transportation and disposal systems with the manpower and equipment's/vehicles needed; • Locate the garbage pit/waste disposal site min 500 m away from the residence so that peoples are not disturbed with the odor likely tobeproducedfromanaerobic

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		decomposition of wastes at the waste dumping places. Encompass the waste dumping place by fencing and tree plantation to prevent children to enter and play with; • Do not establish site specific landfill sites. All solid waste will be collected and removed from the work camps and disposed in approval waste disposal sites.
Health and Hygiene	There will be a potential for diseases to be transmitted including malaria, exacerbated by inadequate health and safety practices	**The Contractor shall** • Provide adequate health care facilities within construction sites; • Provide first aid facility round the clock. Maintain stock of medicines in the facility and appoint fulltime designated first aider or nurse; • Provide ambulance facility for the laborers during emergency to be transported to nearest hospitals; • Initial health screening of the laborers coming from outside areas; • Provide adequate drainage facilities throughout the camps to ensure that disease vectors such as stagnant water bodies and puddles do not form. Regular mosquito repellant sprays during monsoon; • Carryout short training sessions on best hygiene practices to be mandatorily participated by all workers. Place display boards at strategic locations within the camps containing messages on best hygienic practices.

ECOP-17: CULTURAL AND RELIGIOUS ISSUES

Project Activity/	Environmental Impacts	
Construction activities near religious and cultural sites	Disturbance from construction works to the cultural and religious sites, and contractors lack of knowledge on cultural issues cause social disturbances	**The Contractor shall** • Communicate to the public through community consultation and newspaper announcements regarding the scope and schedule of construction, as well as certain construction activities causing disruptions or access restriction;

		• Do not block access to cultural and religious sites, wherever possible; • Restrict all construction activities within the foot prints of the construction sites;
Project Activity/ Impact Source	**Environmental Impacts**	**Mitigation Measures/ Management Guidelines**
		• Stop construction works that produce noise (particularly during prayer time) should there be any mosque/religious/educational institutions close to the construction sites and users make objections; • Take special care and use appropriate equipment when working next to a cultural/religious institution; • Show appropriatebehavior with all construction workers especially women and elderly people; • Resolve cultural issues in consultation with local leaders and supervision consultants; • Establish a mechanism that allows local people to raise grievances arising from the construction process.
ECOP-18: OCCUPATIONAL HEALTH AND SAFETY		
Best practices	Construction works may pose health and safety risks to the construction workers and site visitors leading to severe injuries and deaths. The population in the proximity of the construction site and the construction workers will be exposed to a number of (i) biophysical health risk factors, (e.g. noise, dust, chemicals, construction material, solid waste, waste water, vector transmitted diseases etc.), (and (ii) road accidents from construction traffic	**The Contractor shall** • Implement suitable safety standards for all workers and site visitors which should not be less than those laid down on the international standards (e.g. International Labor Office guideline on Safety and Health in Construction; World Bank Group‘s Environmental Health and Safety Guidelines‘) and contractor‘s own national standards or statutory regulations, in addition to complying with the national standards of the Government of Bangladesh (e.g. `The Bangladesh Labor Code, 2006‘); • Provide the workers with a safe and healthy work environment, taking into account inherent risks in its particular construction activity and specific classes of hazards in the work areas; • Provide appropriate PPE for workers, such as safety boots, helmets, masks, gloves, protective clothing, ear plugs, goggles, full-face eye shields, and ear protection. Maintain the PPE properly by cleaning dirty ones and

	replacing them with the damaged ones; • Safety procedures include provision of information, training and protective clothing to workers involved in hazardous operations

Project Activity/ Impact Source	Environmental Impacts	Mitigation Measures/ Management Guidelines
		and proper performance of their job; • Appoint an environment, health and safety manager to look after the health and safety of the workers.
Accidents	Lack of first aid facilities and health care facilities in the immediate vicinity will aggravate the health conditions of the victims	• Provide health care facilities and first aid facilities are readily available. Appropriately equipped first-aid stations should be easily accessible throughout the place of work; • Document and report occupational accidents, diseases, and incidents; • Prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice; • Identify potential hazards to workers, particularly those that may be life-threatening and provide necessary preventive and protective measures; • Provide awareness to the construction drivers to strictly follow the driving rules; • Provide adequate lighting in the construction area and along the roads.
Water and sanitation facilities at the construction sites	Lack of Water sanitation facilities at construction sites cause inconvenience to the construction workers and affect their personal hygiene	• The contractor should provide portable toilets at the construction sites, if about 25 people are working the whole day for a month; • Location of portable facilities should be at least 6m away from storm drain system and surface waters; • These portable toilets should be cleaned once a day and all the sewerage should be pumped from the collection tank once a day and should be brought to the common septic tank for further treatment; • Contractor should provide bottled drinking water facilities to the construction workers at all the construction sites.

ANNEX-C: Bridge Dismantling Plan

C-1: General

Of the total 13 selected bridges studied under the EMF preparation study, 10 existing damaged RCC bridges need to be dismantled prior to start construction. Due to dismantle of these bridges, several environmental impacts especially a huge solid waste (such as concrete wastes, rods, wood and bamboo piles etc.) will be generated and as a result, waterway opening of the bridges will be partially or fully blocked. For clearing the waterway opening of the bridges, these wastes should be removed from the bridge sites and stored in nearby the construction camp or near site for future use or selling to the venders. For managing all the dismantle wastes of the existing bridges, a proper bridge dismantling plan is required.

C-2: Environmental impacts due to existing damaged bridge dismantling activities

Due to dismantle of the bridges, several environmental impacts will be occurred which are as follows:

A. Dust and Air pollution

The major sources of air pollution are dust generation during the dismantling of existing bridges. Dust pollution has also long been known to have an adverse effect on human beings, aquatic life and plants growth. If any archaeological and cultural sites, housing and commercial structures are located close proximity to the dismantling sites will be affected by the dust pollution.

B. Noise pollution

Noise will be generated during the dismantling of existing bridges by hammering, movement of vehicles for carrying concrete wastes and movement of workers. Noise will impact on the occupational health and safety of the workers and aquatic animals.

C. Vibration

During the dismantling of the existing bridges vibration will be generated due to the hammering, and movement of vehicles for carrying concrete wastes of the bridges. Vibration also depends on the method of dismantling and types of equipment's. If any archaeological and cultural sites, housing and commercial structures are located close proximity to the dismantling site will be affected by the vibration. Aquatic animals will be disturbed by the vibration activities.

D. Surface water pollution

During the dismantling of existing bridges, surface water will be polluted by concrete dust, pieces of broken concrete and others dismantling wastes. Other possible source of water pollution is the improper management of the wastes and human excreta from the workers, if no toilets are constructed.

E. Soil pollution

During the removal of pier from the existing bridges and other parts of the bridges, soil will be impacted. Due to accidental spillage of oil and chemicals from the dismantling equipment and vehicles at the dismantling site, surface soil will be affected.

F. Waste generation

During the dismantling of existing bridges different types of waste will be generated. Types of waste like general wastes: organic (food waste, leafs, papers, fruit cover etc.), inorganic (plastic, polythene, glasses, synthetic paper etc.) and construction wastes (piece of rod, concrete, bamboo, wood etc.) will be generated. These wastes can effects on the soil, surface water and aquatic life in the dismantling bridge site.

Due to dismantle of these bridges, huge solid wastes (such as concrete wastes, rods, wood & bamboo piles etc.) will be generated and as a result, surface water and waterway opening of the bridges will be affected.

G. Navigation

The bridge dismantling activities will create disturbance for the movement of water transports on the channel. On the other hand, if the piers/piles/abutments of the dismantled bridges will not be fully removed from the river bed then it will create a barrier for the frequent movement of water transports.

H. Aquatic Animals

During the dismantling of existing bridges, if appropriate protective measures are not taken by the contractor the pieces of broken concrete debris can accumulate on the river bed and increase the turbidity in the waterbody. As a result, turbid water will be reduced the infiltration of sunlight into deep water. That's why aquatic life becomes affected and disturbed their frequent movement. In addition aquatic animals will be affected due to noise pollution from dismantling activities.

I. Disturbance of Utilities

Different types of utilities like: Electricity, Water supply, Gas, Telecommunication and Internet Cables are attached with the bridge structures. It will be required to isolated or disconnected before demolition work begins for a safety working environment. If this is not possible, in that case it must be labelled clearly, to make sure they are not disturbed. Due to the removal of the utility services local community will be temporarily disturbed.

J. Occupational Health and Safety

During dismantling works, noise, vibration, air and dust pollution will be occurred. Workers can be injured by falls from height, injured by uncontrolled collapse of concrete wastes etc. In case of absence of PPE, quality drinking water, sanitation, accommodation, first aid facilities in the dismantling site workers' health and safety will be affected.

K. Disturbance of road communication

Due to the bridge dismantling and its carrying activities on the road, existing road condition and communication will be affected.

L. Community disturbance

The bridge dismantling works will create a temporary disturbance for the local community especially old aged people, vulnerable groups, school going children, disabled persons, pregnant women and sick people for their movement.

M. Business and commercial impacts

Local business and commercial activities will be affected by the bridge dismantling works. They will be unable to transport their products in nearest business center in time. Transportation costs may be increased due to the use of alternative road or water transport network.

Table C-1: Possible mitigation measures for the environmental impacts

SL#	Environmental Parameters	Possible Mitigation Measures	Responsibility	
			Implementation	Supervision
1	Dust and Air Pollution	• Regular spraying of water on the dry surface for reducing dust pollution; • Careful handling of dismantling waste and disposal of wastes; • Impose speed limits on vehicle movement at the dismantling site to reduce dust emissions; • Maintain vehicles and dismantling equipment in good working condition including regular servicing; • Fit vehicles with appropriate exhaust systems and emission control devices. • Air quality monitoring should be carried out by the contractor following the National Air Quality Standard (Schedule-2: Standards for Air Quality, ECR, 1997 and Amendment in 2005).	Contractor	LGED
2	Noise Pollution	• Notify the adjacent community before starting the dismantling/demolishing work; • Create noise barrier and consider the minimum noise levels at sensitive receptor sites (e.g. dense residential area, schools, mosques, health centers etc.); • Protection devices (ear plugs or ear muffs) shall be provided to the workers operating in the vicinity of high noise generating location and sources during dismantling; • Dismantling works should be conducted during daytime only; • Instruction to the drivers to avoid unnecessary horn; • Noise level monitoring should be carried out by the contractor following the National Noise Quality Standard (Schedule-4: Standards for Sound, ECR, 1997 and Noise Pollution (control) rules 2006).	Contractor	LGED
3	Vibration	• Notify the adjacent community before starting the demolishing work; • Dismantling activities can be done during dry season; • Dismantling works should be conducted during daytime only; • Vibration monitoring should be carried out by the contractor as per following the available standards.	Contractor	LGED

4	Surface Water Pollution	• Proper safety fence will be provided by the contractor to control the dismantled piece of concrete into the waterbody; • Any wastes should not be throwing into the River/Khal other than dump in to the designated waste dumping area;	Contractor	LGED

SL#	Environmental Parameters	Possible Mitigation Measures	Responsibility	
			Implementation	Supervision
		• Handling of dismantled wastes should be done carefully by the designated experienced person; • Dismantling work should be preferred during the dry season; • Monitor the surface water by testing in designated laboratory should be done by the Contractor following the National Water Quality Standard (Schedule-3: Standards for Water, ECR, 1997).		
5	Soil Pollution	• During the dismantling of the existing bridges pier will be fully removed and stored at the designated area of the construction camp by the contractor. At any cost, cutting of bridges' piles/piers/abutments will not be allowed. • Care will be taken during removal or demolish the structures and operations of equipment's; • The soil quality test should be carried out by the contractor as per following the available standards.	Contractor	LGED
6	Waste generation	• Any wastes should not be throwing into the river/khal other than dump in to the designated waste dumping area; • Store the oil and petroleum product in a separate location cover by a concrete structures; • Train the relevant dismantling personnel in handling of dismantling wastes; • Make sure all containers, drums, and tanks that are used for storage are in good condition; • Waste water monitoring should be carried out by the contractor, following the national standard (Schedule-10: Standard for Waste from Industrial units or Projects waste).		
7	Navigation	• Inform the local community before starting the dismantling work; • Established required safety sign in the dismantling site; • Banned the boat movement for a temporary basis in the dismantling site, if required; • During the dismantling of the existing bridges pier will be fully removed and stored at the	Contractor	LGED

		designated area of the construction camp by the contractor. At any cost, cutting of bridges' piles/piers/abutments will not be allowed.		
8	Aquatic Animals	• Fencing and safety net will be provided by the contractor to reduce the accumulation of broken debris on the river bed; • Proper collection and storage of dismantling debris in a designated place; • Instruction to the workers not to disturb the aquatic life.	Contractor	LGED

	Environmental Parameters	Possible Mitigation Mea	Implementation	Supervision
9	Disturbance of Utilities	• Local community and users should be informed by the contractor before removal of utilities and starting dismantling works; • Prior to carrying out any bridge dismantling, detailed bridge survey and structural survey and appropriate assessments should be carried out by the contractor and take necessary approval from the Engineer; • Proper H&S measures for the workers should be taken during shifting of these utilities to avoid any incidents; • Rehabilitation of the utilities as early as possible by the contractor.	Contractor	LGED
10	Occupational Health and Safety	• Detailed survey and assessment of the condition of the bridge will be assessed by the contractor and submit a dismantling plan the engineer, after approval from the engineer dismantling plan will be implemented; • Provide PPE shall be provided by the contractor and ensure the use during the dismantling work; • Provide adequate first aid facilities for the workers; • Instruct to the workers about the environment of the working site before starting dismantling; • Firefighting facilities shall be provided and maintained in working conditions; • Safe and reliable water supply; • Hygienic sanitary facilities and sewerage system;	Contractor	LGED

		• Ensure proper collection and disposal of wastes in the dismantling site; • The contractor shall strictly follow the Chapter-5: Health and Hygiene; Chapter-6: Safety; Chapter-7: Special provisions relating to health, hygiene and safety; Chapter-8: Welfare (section 89 to 92); and Chapter-12: Workers compensation for injury by accident under the Labour Act 2006 for ensuring the occupational health and safety.		
11	Disturbance of road communication	• Inform the local community or the users of the road before starting dismantling work; • Alternative road or bypass will be constructed by the contractor; • Road safety sign will be established near the dismantling site; • Contractor will keep adequate provision of water and aquatic life movement during bypass	Contractor	LGED

SL#	Environmental Parameters	Possible Mitigation Measures	Responsibility	
			Implementation	Supervision
		construction.		
12	Community Disturbance	• Inform the local community before starting the dismantling works; • Dismantling should be continued during day time only; • Provide alternative route for the movement.	Contractor	LGED
13	Business and commercial impacts	• Inform the local community before starting the dismantling works; • Provide alternative route for the movement.	Contractor	LGED

Table D-2: Environmental Monitoring Plan

Aspects/Components	Monitoring Parameter	Means of Monitoring	Frequency	Monitoring Location	Standards/Guidelines	Responsibility	
						Implementation	Supervision
Air Quality	SPM, PM2.5, PM10, SOx, NOx, CO	Field measurement and laboratory analysis	Twice in a week	Dismantling site	National Air Quality Standard (Schedule-2: Standards for Air Quality, ECR, 1997 and Amendment in 2005)	Contractor	LGED
Noise Level	dB(A)	Field measurement	Twice in a	Dismantling	National Noise Quality	Contractor	LGED

			week	site	Standard (Schedule-4: Standards for Sound, ECR, 1997 and Noise Pollution (control) rules 2006).		
Vibration level	PPV, MM/S	Field measurement	Twice in a week	Dismantling site	-	Contractor	LGED
Surface Water Quality	pH, Turbidity, EC, DO, BOD, COD, Heavy Metals, Oil & Grease	Field measurement and laboratory analysis	Once	River/Khal at the dismantling site	National Water Quality Standard (Schedule-3: Standards for Water, ECR, 1997)	Contractor	LGED

Aspects/Components	Monitoring Parameter	Means of Monitoring	Frequency	Monitoring Location	Standards/Guidelines	Responsibility	
						Implementation	Supervision
Soil Quality	Heavy metal	Laboratory analysis	Monthly	Dismantling site	-	Contractor	LGED
Waste	Types and quantity of wastes	Monitoring	Daily	Dismantling site and storage location	Visual inspection	Contractor	LGED
Navigation	Disturbance of boat movement	Monitoring	Daily	Dismantling site	Visual inspection	Contractor	LGED
Aquatic animals	Visible fish killing	Monitoring	Daily	Dismantling site	Visual inspection	Contractor	LGED
Disturbance of utilities	Utilities disturbance	Monitoring	Daily	Dismantling site	Visual inspection	Contractor	LGED
Occupational Health and Safety	Accidents, incidents, occupation diseases, dangerous occurrences	Monitoring	Daily	Dismantling site	Visual inspection	Contractor	LGED
Disturbance of road communication	Traffic movement	Monitoring	Daily	Dismantling site	Visual inspection	Contractor	LGED
Community disturbance	Community disturbance	Monitoring	Based on occurrence and complain	Dismantling site and surrounding site	Visual inspection	Contractor	LGED

Business and commercial	Business and commercial activities	Monitoring	Based on occurrence	Dismantling site and	Visual inspection	Contractor	LGED

Aspects/Components	Monitoring Parameter	Means of Monitoring	Frequency	Monitoring Location	Standards/Guidelines	Responsibility	
						Implementation	Supervision
impacts			and complain	surrounding site			

Institutional Arrangement

Contractor will be implemented all the above mentioned activities during the dismantling of the bridges. LGED will supervise the implement the mitigation and monitoring plan.

Budget

Budget for the testing of the different environmental components will be same that have been proposed in Chapter-6 of the report. Once testing of Air, Water, Noise & Vibration need to be carried out before pre-construction and construction phase.

M-3: Conclusions and Recommendations

Conclusions

- During the dismantling of the existing bridge structures major impacts will be found on the occupational health and safety, dust pollution, management of dismantling waste, surface water quality, navigation, disturbance of utilities and communication system.
- For mitigating the possible environmental impacts during the bridge dismantling that are identified and possible mitigation measures and monitoring plan has been given in this bridge dismantling plan.

Recommendations

- Prior to start construction, dismantling and removing of the concrete wastes of exiting bridges must be done.
- Avoiding any disruption/disturbance and negative effects of the dismantling works, mitigation measures along with monitoring plan as mentioned above should be carried out in time.

ANNEX-D: Occupational Health and Safely Guidelines

D-1: Background

Safety hazards generally arise from the following aspects of work during bridge construction, rehabilitation and maintenance:

- Different construction activities (excavation, quarrying, filling, use of heavy machineries, machineries operated by electricity etc.);
- Construction equipment and materials used;
- Management in the work site/place.

The health and safety of both the general public and the workers must be of prime concern for all parties involved in with bridge construction, rehabilitation and maintenance activities. During the progress of work, following are the safety requirements that the contractor at the construction site shall ensure to the public and workers;

D-2: Health Concern:

- Creation of stagnant water ponds/khal/river/waterlogged areas near construction sites and labor camps have the potential to increase public health risks, as such locations will serve as breeding ground for water-borne disease vectors (e.g. malaria, dengue, intestinal worms).
- Unauthorized use of local natural resources by work forces on items like medicinal plants, non-timber forest products, fire wood, hunting species, fish etc. may lead to resource depletion, inducing secondary side-effects like malnutrition that may harm public health.
- Migrant workers, especially when under drug and alcohol influence, may cause social conflicts which can result in physical clashes with the general public and the workers, putting local health facilities under constraints. Similarly, migrant workers may act as vectors for sexually transmitted diseases such as HIV/AIDS. Migrant workers may become vectors for other endemic diseases.
- Drinking water as per DoE standard must be used for all the works in the project site.
- Low quality drinking water as well as inappropriate storage of drinking water likely to cause water borne diseases among workers.
- Good quality accommodation should be provided for all the workers in the bridge construction site.
- Good quality sanitation as mentioned in the National Building code should be provided.

D-3: Safety Concerns:

The contractor should ensure and avoid the following safety concern to the workers

- Appropriate personal protective equipment (PPE) (such as: footwear, gloves, boots and goggles, helmets, mask etc.) shall be made available to the workers and appropriate training in its use shall be provided and ensure the use by the contractor.
- Adequate budget for each PPE should be included in EMP.
- The contractor shall strictly follow the Chapter-5: Helath and Hygene; Chapter-6: Safety;

Chapter-7: Special provisions relating to health, hygene and safety; Chapter-8: Welfare (section 89 to 92); and Chapter-12: Workers compensation for injury by accident under the Labour Act 2006.

- A protective helmet and safety shoes are mandatory on a construction site in an area where, due to the work technology, the risk of head injury exists.

- Non-slippery and non-penetrable safety footwear shall generally be used on construction sites. Kneepads shall be used while working on the floor or during other work involving kneeling.
- Restricting the working hours to day time as far as possible.

- Working hour should be 8 hours.
- Adequate lighting arrangement if working hours are at night time due to unavoidable circumstances.
- If work is performed in the dark, a reflex reflector or a reflector-band shall be worn on clothing. If work is performed in places in the vicinity of traffic, the worker shall wear a bright waistcoat or clothing and, in the dark, also a reflector-band. A reflector-band shall be attached in a visible place and, if necessary, also to a protective helmet.
- Improper handling of materials like bitumen, oil and other flammable/hazardous material at construction sites, likely to cause safety concerns to the workers.
- Lack of safety measures such as fences, adequate lockers, alarm, awareness and safety equipment may result in accidents,
- Lack of specific precautionary measures, especially at work sites with or around heavy machinery/equipment's near rivers/khal, steep slopes, equally bears many accident risks, partly with fatal consequences.
- Proper and regular maintenance of vehicles and equipment used in the field.
- Facilities for administering first aid.
- In case of extra work are need to pay overtime as per labour law.
- Safety fence must be provided surrounding of the construction camp.
- Road safety measures such as speed breaker, Zebra crossing, Sign board etc. should be provided on the start and ending of the bridge approaches.
- Safety signboard with mentioning safety first and others appropriates should be installed at the gate of the construction yard and at the start and ending of the bridge approaches.

D-4: For general Public

The contractor should ensure and avoid the following safety concern to the public

- Dust generation should be controlled by spraying water.
- At any cost do not obstruct any public accesses.
- Parking of equipment and vehicles at the end of the day likely to cause accidents to the general public especially during night hours.
- Transportation of uncovered loose material or spillage of material increases the chances of accidents to road users and surrounding settlements.
- Children hanging on trucks and vehicles being at particular risks for fatal accidents.

ANNEX-E: APPLICATION GUIDELINES FOR MITIGATION MEASURES

ANNEX E-1: APPLICATION GUIDELINES FOR MITIGATION MEASURES

The following guidelines are based on the compensation eligibility of PAPs and mitigation principles and standards, and correspond to the entitlements proposed in the Entitlement Matrix.

1. LOSS OF AGRICULTURAL & OTHER LANDS

Entitlements for Legal Landowners

Compensation-Under-Law (CUL): As per Land Acquisition Ordinance, CUL covers lands and other assets, such as house/structures, trees, and other items of value, that are built and grown on the acquired lands.

CUL is assessed by the Deputy Commissioners (DCs) and paid only to the persons who have legal titles (and legal agreements in cases of leased-in assets) to the acquired lands and other assets.

Replacement Cost: Current cost of purchasing land of same quality and use, equal to the amount acquired, *PLUS* the registration cost or stamp duty.

Current cost will be determined by LGED through local market price surveys for different types of lands, by using the methods suggested in Annex B2.

Stamp Duty and Registration Cost: Charged on the price at which the land is being bought or sold.

Stamp duty and registration cost will be calculated on the current market prices that will be determined through land market surveys.

Top-Up: Equals the positive difference between the total replacement cost and the total CUL paid byDCs.

- *Top-up will apply only to the landowners who have legal titles (DCs identify the titleholders) to the affected lands and other assets.*
- *Top-up will be paid in cases where total CUL paid by DC to an affected property owner is found smaller than the total replacement costs/market prices of all affected assets determined through the market price surveys.*
    - *Individual top-ups will be determined by taking into account all acquired assets (re: section 2.8) (Partial CUL and top-up payment may occur in situations where the lands acquired from an owner are located in more than one mouza, or are under more than one daag, or involve legal disputes.)*

Top-up will be determined in the following manner:

Sum of the replacement costs and market prices (as may apply) of all affected assets, MINUS the total amount of CUL paid by DC to a landowner for lands and other assets affected in any number of mouzas (re: paragraph 52 in Section B).

Transition Allowance: Will apply to certain landowners and 'vested non-resident (VNR)' land owners/users. Operational guidelines are provided under Loss Category 5below.

Leaseholders of Public Lands

If such lands come under acquisition the DCs, who execute the lease agreements, will determine and settle the contractual obligations in the form of CUL.

2. LOSS OF HOMESTEAD LANDS (*VITA)*

Homesteads on Private Lands: For homesteads on private lands, the proposed assistance measureswill apply in addition to the compensation for the lands as per provisions described above, and for the houses and other assets as per the provisions described below.

- *Where the affected households can no longer live in the present homesteads (vitaa), they can either directly purchase replacement lands at locations of their choice, or relocate on public lands that LGED would arrange. Wherever they decide to relocate, additional relocation assistance will consist of:*

- Development of the lands to the level of other homesteads in the locality and provision of access roads.

- Restoration of pre-acquisition level basic utilities, such as water supply and sanitation, electricity, etc.

Homesteads on Public Lands (Squatters): Relocation assistance will apply to poor and vulnerable households, and consist of:

Development, as above, of LGED's own or other public lands that LGED would designate for their relocation, as well as provision of water supply and sanitation facilities.

Homesteads on VNR Lands: Relocation assistance as follows:

- *Where parts are acquired and the remainders of the homestead lands are adequate to move and rebuild the houses*: Compensation/assistance will consist of moving and rebuilding costs.

- *Where acquisitions require physical relocation elsewhere* – Relocation assistance will consistof relocation plot on public lands to be arranged and developed by LGED, and moving and rebuilding costs; *OR*

- Six months' rent for living accommodations comparable to the affected ones. The rent will be determined based on the prevailing rates in the nearby towns/urban settlements, including Upazila headquarters and the like.

2. LOSS OF HOUSES/STRUCTURES

Legal Owners

Compensation-Under-Law: Assessed by the DCs on all houses/structures standing on the acquired private lands at the time of issuance of Notice-3 under the Land Acquisition Ordinance.

Replacement Costs: Assessed by LGED, will include current costs of the same building materials, labor and any other cost items to rebuild the affected houses/structures.

- *Costs of materials, labour and other cost items will be determined by surveying their current prices in the local markets by using the methods suggested in Annex B2.*

- *Where houses/structures are partially affected and the remainders are structurally safe and useable, replacement costs will be determined on the affected portions.*

Squatters

Socio-economically vulnerable squatters are entitled to Transfer and Reconstruction Grant (TRG) for shiftable and House Construction Grant (HCG) for non-shiftable houses.

- *TRG will apply to shiftable houses/structures built with materials/components that can be dismantled without much damage and the materials can be used to rebuild them.* Shiftable houses/structures are generally built with bamboo thatch, GI sheets, wood, plastic sheets, and other inexpensive, generally non-breakable materials.

- *HCG applies to non-shiftable houses/structures* generally built with materials/components that cannot be dismantled intact. These are likely to be built with mud walls, mud-plastered walls of straw/bamboo/jute stalks and similar cheap materials, and straw roofs.

The following exceptions will apply for TRG and HCG:

- *Both shiftable and non-shiftable houses/structures will be ineligible for compensation if (a) they are not used by the owners themselves, or (b) are rented out to others.*

· *No affected structures built after the cut-off dates will be eligible for compensation.*

Vested Non-Resident Property Users/Owners

Are eligible for TRG or HCG, which will be determined in consultation with the present users/owners.

- *TRG will apply where houses/structures are to be moved and rebuilt.*

- *HCG will apply where houses/structures are partly affected and the remainders are structurally safe and usable.*

- *Where houses/structures are partly acquired, the current users will be allowed to use the remainder.*

4. LOSS OF TREES ON ACQUIRED PRIVATE & PUBLIC LANDS

Compensations for trees affected on private lands will be assessed by the District Forestry Department, and those grown on public and VNR lands by LGED.

Compensation for Trees: Will be based on the survey of current prices in the local markets by usingthe methods suggested in Annex B2. The compensation will take into account the species, size, maturity and other characteristics of the affected trees that influence their market value.

In addition to the above compensation, the owners will be allowed to fell the trees and keep them. The owners will however not fell the trees unless LGED asks them to do so after it verifies, as and when necessary, the assessment by the Forestry Department.

Compensation for Fruits on Trees: Will apply if the trees need to be felled before the fruits areharvested.

LGED will use the standards of the Agriculture Department to estimate the amount of fruits on individual trees, and determine their value based on the survey of current harvest prices in the local markets (as suggested in Annex B2).

5. LOSS OF AGRICULTURAL, BUSINESS, EMPLOYMENT & RENTAL INCOME

Agricultural Income*:* The transition allowance (TA), three times the value of crops grown a year, will be applied as follows: (a) *Legal Owners*: if acquisition amounts to 20% or more of the total productive area; and (b) *VNR Owners/Users*: for any amount of land acquired. The TA will be determined as follows:

In cases of multiple crops: *Sum of the harvest prices of the crops produced on the acquired land in each cropping season in the year, MULTTPLIED by three.*
In cases of single and perennial crops: *Total harvest price of the crop, MULTTPLIED by three.*

LGED will use the standards of the Agriculture Department to determine the amount of various crops produced per unit of land, and the market surveys for harvest prices (as suggested in Annex B2).

Business Income: Applies to the owners of all businesses affected on private and public lands.

Unless proper bookkeeping is practiced by the business owners, use of the method suggested for determining loss of business income may become difficult. In order to corroborate the income loss determined based on information given by the owners, LGED will examine previous year's income tax returns and VAT payment records.

Compensation for Temporarily Closed Businesses*:* Average daily net income, exclusive of expenses like rent, staff salary, utilities, etc., based on a period of 30 days.

Compensation will be paid for the number of days needed to reopen the individual businesses, or complete the civil works, whichever is smaller.

Compensation for Partially Affected Businesses*:* Applies to those which are affected partially and can still operate from the remainders of the premises.

Compensation, calculated as above, will be paid for the number of days needed to repair and reopen the individual businesses, or complete the civil works, whichever is smaller.

Compensation for Businesses Requiring Physical Relocation: Applies to businesses that are to be removed entirely from the present locations.

- In addition to their own initiatives to find alternative locations, the business owners will be allowed to relocate on LGED lands, if any in the vicinity, OR

- On public lands arranged by LGED, in consultation with the affected business owners and the local governments like Municipality, Union Parishads and haat/bazaar committees.

- Compensation based on average daily net income, exclusive of expenses like rent, staff salary, utilities, etc., based on a period of 30 days. Compensation will be paid as follows:

- Self-relocation: For the number of days needed to reopen the individual businesses in locations the business owners choose, for a maximum of 90 days.

- Relocation on LGED/Public Lands: For the number of days needed to reopen the individual businesses, for a maximum of 45 days.

Employment Income Loss: Will apply to persons who would be (i) found continuously employed inthe affected businesses for at least six months up to the date of PAP census (cut-off date); and (ii) remain employed in those establishments at the time the businesses are required to vacate the lands.

- *Employees of businesses requiring temporary closure during construction will be compensated for the actual number of days needed to reopen the individual businesses, or for a maximum of 30 days.*
- *Employees of businesses requiring relocation will be compensated for the actual number of days needed to relocate them, or for a maximum of 45 days.*

  The daily compensation rates will be based on the individual employee's current monthly salary or daily wages.

Rental Income Loss: Applies to the legal owners of the affected built premises located on private lands, which have been rented out to others. *The three months' compensation will be based on monthly rent paid by the current tenants*.

6. UNFORESEEN LOSSES

LGED will take into account any impacts/losses that are unique to any subprojects and not covered in this SMF, and consult IDA to adopt measures and application guidelines required to mitigate them.

ANNEX E- 2: SUGGESTED METHODS FOR MARKET PRICE SURVEYS

In line with the proposed compensation principles, LGED, assisted by the DS consultants, will conduct market price surveys to determine replacement costs of the acquired lands, and where necessary of houses/structures and other replaceable assets and market prices of irreplaceable assets by using the methods suggested below.

Lands of All Kinds

The surveys will explicitly take into consideration the quality of the lands under acquisition. Quality will take into account current uses, cropping intensity and value of crops produced, accessibility from the existing roads, and any other characteristics that influence the market value. The surveys will be conducted with the following three groups of respondents:

- A random sample of 10-15 landowners in the *mouza* in which the lands under acquisition are located and in those adjacent to it along the road;
- As many of most recent buyers and sellers of similar lands as can be found in the same and adjacent Mouzas along the road or near the subproject; and
- Deed writers, as many as can be found and agree to be interviewed at the land registration offices, who recently handled transactions of roadside lands in the same or adjacent mouzas. (They will be asked about the actual prices, not those written in the deeds.)

Market value of the lands will be determined in the following manner:

- *If variations in average prices reported by the three respondent groups are insignificant (or, are 10% or less), current value of the lands will be fixed at the average of the prices reported by the three groups.*
- *In cases of significant differences (more than 10%), the current prices will be negotiated in open meetings with the affected and other landowners, community leaders, CBOs/NGOs and the like.*

Replacement costs of land will equal the market price, plus the registration cost or stamp duty. The registration cost will be calculated on the current market price.

Houses and Other Built Structures

Replacement costs will be based on the current prices of various building materials, labor and other cost items in the local markets. The costs of building materials, such as bricks, cement, steel, sand, bamboo, timber, GI sheet, roofing materials like straw, golpata, etc, and labor will be based on:

- Survey of current prices of different types of materials with five or so dealers/manufacturers in the local markets.

- *The replacement cost of the house/structure will be based on the lowest quoted price for each type of material, plus their carrying costs to the sites.*

- The current costs of labor with different skills will be determined by interviewing local contractors, LGED staff, or local construction workers.

Replacement costs of any other replaceable affected assets will also be based on the current prices of materials, transportation and labor costs, etc.

Trees & Other Irreplaceable Assets

Market prices of different species of trees will be determined by surveying the prevailing prices paid by timber and fuel-wood traders in the local markets. *The compensation for trees will be fixed at the highest prices offered by a trader.*

Compensation for all other irreplaceable assets will also be based on survey of their prevailing prices with dealers/traders in the local markets.

Fruits and Other Crops

Compensation will be fixed at the harvest prices of the fruits and other crops. Harvest prices of different varieties of fruits and crops will be collected from a sample of 7-10 dealers in the local markets. *The compensation for each type of fruit and crop will be fixed at the highest price offered bya trader.*

The market price surveys will begin as soon as locations of the required acquisitions are identified on the ground. LGED will document the replacement costs and market prices of various affected assets and make them available as and when asked for review by Donor/s..

ANNEX –F : OUTLINE OF RESETTLEMENT ACTION PALN

OUTLINE OF RAP

Resettlement Action Plan (RAP)

Project Background	Brief introduction about the project, description of project interventions and areas of jurisdiction of ULB, description of project components causing land acquisition and resettlement, scope of land acquisition and resettlement, an account of the alternatives considered to avoid and/or minimize the adverse impacts
Census and Socioeconomic Surveys	Identify all categories of PAP and their vulnerability, identify all categories of impacts (loss of property and assets, loss of livelihood; impacts on groups and communities, impact on physical cultural resources) An account of impacts by gender and vulnerability due to project and the special assistance that is to be provided
Participation and Consultation	An account of the disclosure of SMF and consultations with the project affected people/households about the mitigation measures and implementation procedure;
Legal and policy framework	Analysis of the legal framework for compensation, applicable legal and administrative procedures, gaps between local laws and the Bank's resettlement policy, and the mechanisms to bridge such gaps;
Compensation Entitlements	Description of compensation and other resettlement assistance that will be provided according to the principles and guidelines adopted in this SMF;
Relocation and Livelihood Restoration	Description of resettlement sites and programs for improvement or restoration of livelihoods and standards of living
Grievance redress mechanism	Describe specific arrangement and procedure for receiving and resolution of complaints and grievances from the PAP and their community
Resettlement Budget	Resettlement budget with breakdowns by loss categories and the number of persons entitled to compensation/assistance Specific compensation rates and standard of entitlements and EPs/households for different types of losses Fund flow and disbursement procedures
Implementation Arrangement	Institutional arrangement and management of preparation and implementation of resettlement activities, grievance resolution, property assessment and valuation, and implementation time schedule
Monitoring and Evaluation	Describe monitoring arrangement involving PMO and ULBs and mechanism for independent review and evaluation as well as reporting

Abbreviated RAP

Project Background and Impacts	Description of project interventions, assessment of land needs (private and public lands, including ULB's own) for the civil works in each polder, screening of physical cultural resources, a census survey of PAP, and valuation of the affected assets;
Legal and policy framework	Analysis of the legal framework for compensation, applicable legal and administrative procedures, gaps between local laws and the Bank's resettlement policy, and the mechanisms to bridge such gaps;
Compensation Entitlements	Description of compensation and other resettlement assistance that will be provided according to the principles and guidelines adopted in this SMF;
Participation and Consultation	An account of the consultations with the displaced persons/households about acceptable alternatives;
Grievance redress mechanism	Describe specific arrangement and procedure for receiving and resolution of complaints and grievances from the PAP and their community
Budget and Implementation Schedule	A resettlement budget with breakdowns by loss categories and the number of persons entitled to compensation/assistance, and an implementation schedule;
Monitoring and Evaluation	Describe monitoring arrangement involving PMO and ULBs and mechanism for independent review and evaluation as well as reporting

ANNEX G: HEALTH AND SAGFETY

INCIDENT/ACCIDENT REPORT

Ref No:

Date:	Project Site:
Works:	Subcontract:
Reported By:	Position and Signature:

Details of Incident/Accident

Date and Time:	Place:
Person Injured:	
Property Damaged:	
Description : (States Who, What, When, Where & How, use sketch if necessary)	
Root Cause of Incident/Accident:	

Current Status And Action Taken (If Any):

Victim‟s Particulars

Name :

P.P No. :

Date of Birth :

Nationality :

Race :

Age :

Sex :

Name of Hospital / Clinic where victim received treatment :

Medical Leave From _____ Till _____ Hospitalization :

Remedial Action:

Engineer/Employer Comments: _____ _____ Date: _____Name & Signature : _____