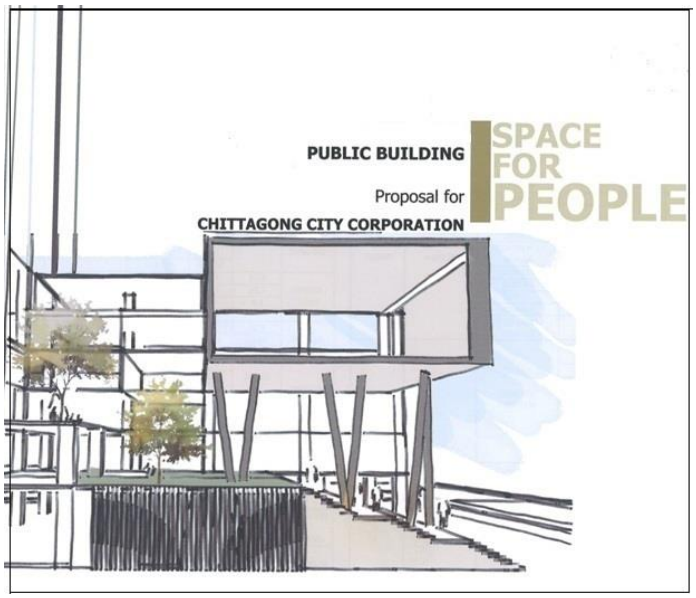
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

Bangladesh Municipal Development Fund (BMDF)

ENVIRONMENTAL ASSESSMENT REPORT

Name of the Subproject: Construction of Commercial Complex at South Agrabad

Chittagong City Corporation



Municipal Governance and Services Project (MGSP)

FINAL REPORT

February 2018

Submitted by

CHITTAGONG CITY CORPORATION

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ABBREVIATIONS

AP	Affected Person
BDT	Bangladeshi Taka
BMD	Bangladesh Meteorological Department
BMDF	Bangladesh Municipal Development Fund
BNBC	Bangladesh National Building Code
BOQ	Bill of Quantity
CC	Cement Concrete
CCC	Chittagong City Corporation
CDA	Chittagong Development Authority
CP	Contingency Planning
ECR	Environmental Conservation Rules
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EPP	Emergency Preparedness Planning
ES	Environmental Screening
GoB	Government of Bangladesh
GRC	Grievance Redress Committee
GRM	Grievance Redress Mechanism
GRP	Grievance Redress Procedure
GSB	Geological Survey of Bangladesh
MGSP	Municipal Governance and Services Project
NE	North East
NW	North West
PIU	Project Implementation Unit
PMU	Project Management Unit
PMU	Project Management Unit
PPE	Personal Protective Equipments

RCC	Reinforcement Cement Concrete
RCC	Reinforcement Cement Concrete
SE	South East
SW	South West

1 INTRODUCTION

1.1 Subproject Background

Chittagong City Corporation (CCC) was declared as a City Corporation in the year of 1990. Area of Chittagong City Corporation is 160.99 sq km, located in between 22°13' and 22°27' north latitudes and in between 91°40' and 91°53' east longitudes. It is bounded by Sitakunda, Hathazari and Raozan Upazila on the north, Anowara Upazila on the south, Raozan and Boalkhali Upazila on the east, Sitakunda Upazila and Bay of Bengal on the west. Total Population of Chittagong City Corporation (CCC) is 2068082. (Population projection in 2030 is about 2.68*1014 and in 2040 is about 1.099*1015).

Chittagong City Corporation (CCC) is a self-governing organization which governs the municipal areas of Chittagong and some adjoining areas of South-Eastern Bangladesh. Infrastructures and physical development are not yet attained significantly in the Chittagong City Corporation. Hence, this commercial complex with various facilities will significantly contribute infrastructural and physical development of the Chittagong City Corporation which will enhance revenue generation.

The significant features of the subproject are stated below:

Name of the Subproject:	Construction of a Commercial Complex at South Agrabad
ULB Name:	Chittagong City Corporation
Jurisdiction Area:	27 South Agrabad Ward
Structural Design Option:	6 storied commercial complex including two basements (12 storied Foundation)
Tribal People:	No tribal people settlement found in the subproject area
Land Acquisition:	No private land acquisition is required
Estimated Cost:	562.378 million BDT (approx.)
Subproject Duration:	15 Months
Tentative Start Date:	December 2018
Tentative Completion Date:	March 2020

1.2 Objectives of the Study

The aim of the study is to examine the environmental impacts due to construction and operation of the subproject and formulate the environmental management plan to minimize the negative impacts and enhance the positive impacts.

The specific objectives include:

- To assess the existing environmental conditions of the subproject site and its adjacent areas in order to establish a baseline framework against which potential environmental impacts due to implementation of the subproject would be compared;

- To identify and assess impacts resulting from the subproject during its construction phase and operation phase;
- To develop a rational environmental management plan with recommendations for mitigating adverse impacts and enhancing positive impacts and outlining environmental monitoring requirements both during construction and operational phase of the subproject.

1.3 Scope and Methodology of the Study

Environmental screening of this subproject has been performed for the primary evaluation of the anticipated impacts due to the subproject intervention. According to that screening, environmental assessment is required to fulfill the regulatory requirement. Hence, this environmental assessment report is prepared to meet the regularity requirement. This study simplifies the anticipated impacts and corresponding mitigation measures for easy understanding of the personnel responsible for the subproject implementation. Therefore, this study only includes key contents that are appropriate. However, it covers all the required elements for a full scale environmental assessment report. The study methodology comprised the following activities:

Desktop Study

The desktop study involved:

- Initial meetings with client, stakeholders to discuss the proposed subproject, including subproject activities;
- Collection and review of the baseline data, maps, reports and other relevant information on the existing environmental and social conditions of the subproject area;
- Review of the relevant existing legislation, regulation and policies;
- Understand the anticipated technical processes that may affect the environment.

Field Investigation and Data Collection

A team of the consultants made a field investigation to the proposed site and field investigations involved mainly site walks within the subproject area and the neighboring areas that may be affected by the subproject. The following key tasks were performed during the field visit:

- Taking photographs of the significant aspects to assist in describing the baseline environmental conditions of the subproject area;
- Interviews with representatives of the relevant City Corporation Officials, beneficiary and affected people within the subproject influence zone;
- Obtaining relevant documents from the City Corporation and local people within the subproject influence zone;
- Verifying information and data collected during the desktop study and to collect new information that may have been important in the assessment of the impacts and design of the mitigation measures.

Data Analysis and Report Writing

The data and information collected from all the sources (literature review, secondary and primary data, public consultation) were analyzed to describe the existing environmental setting of the subproject area, to identify the potential positive and negative impacts of the proposed subproject, as well as to provide preliminary suggestions for mitigation measures. Finally, this environmental assessment report has been prepared.

2 SUBPROJECT DESCRIPTION

2.1 Subproject Setting

The subproject site is situated within the jurisdiction area of the 27 South Agrabad Ward of the Chittagong City Corporation. The lay-out plan, site plan and location map of the subproject are shown in ***Figure 2.1.1and Figure 2.1.2***.

Figure 2.1.1: Lay-out Plan and Site Plan of the Proposed Commercial Complex

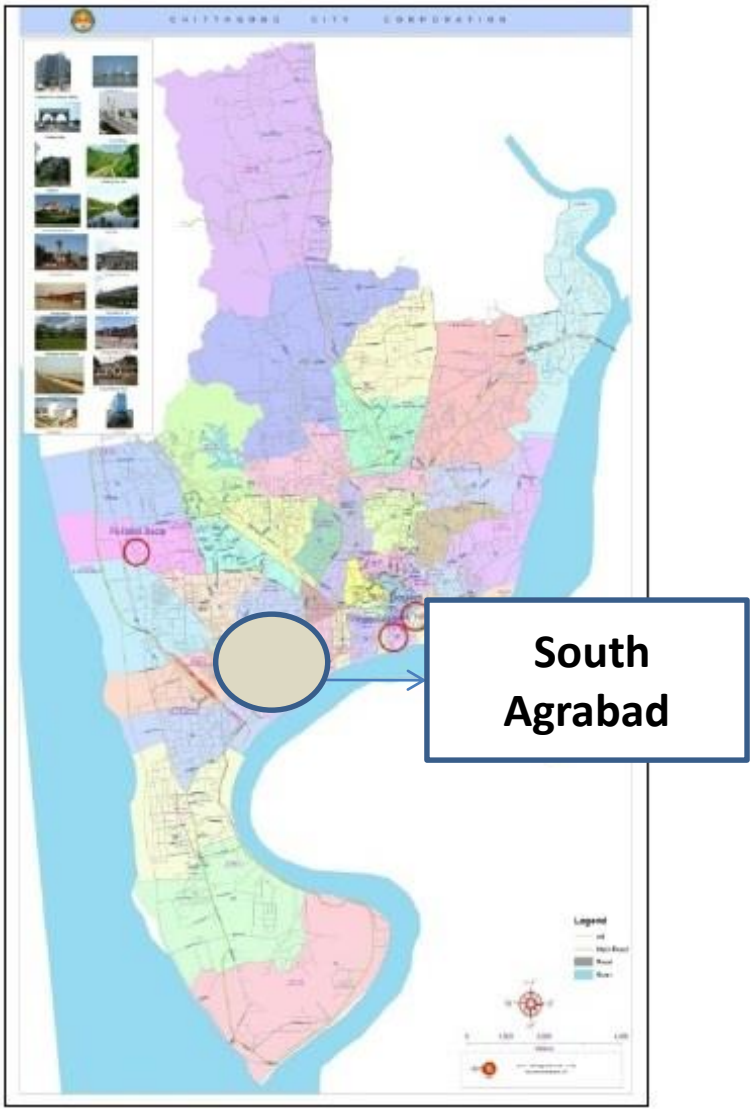


Figure 2.1.2: Location Map of the Proposed Commercial Complex at Ward 27 South Agrabad

The subproject site is situated in the developed urban area (residential area with commercial activities). The influence area of the subproject covers built-up semi-pucca and pucca houses and shops etc. There are residential houses and few road side shops with a buffer zone between the subproject site and its surrounding area. Especially educational and religious institutes, hospitals, nursing home etc. are far from the proposed subproject site. Hence, the subproject does not have any likely direct impacts on the surrounding environment.

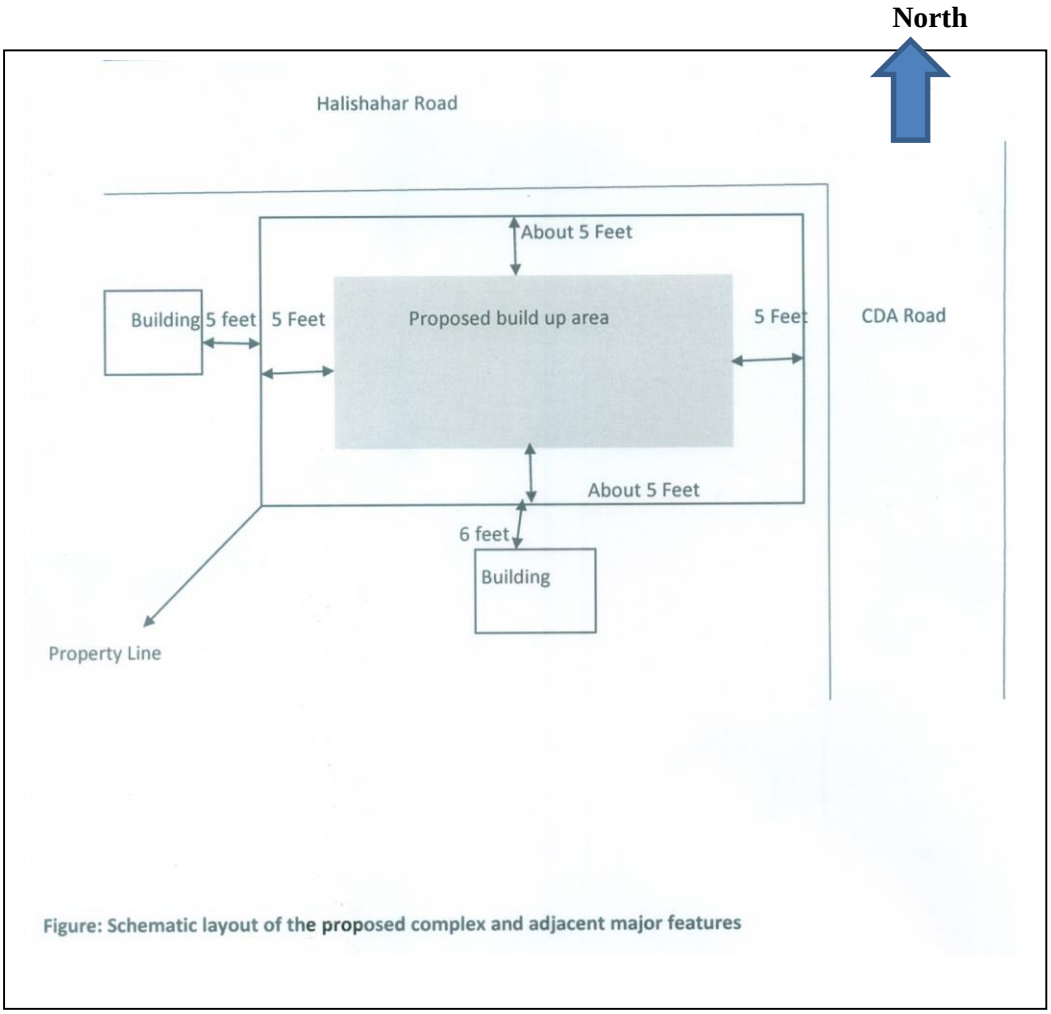


Figure : 2.1.3 Schematic layout of the proposed Complex and adjacent major Features

Like other parts of the City Corporation, in case of heavy rainfall in longer duration, currently South Agrabad area is also affected by the water logging problem in the monsoon.

2.2 Current Situation, Proposed Intervention and Need for the Subproject

The current infrastructure development especially multipurpose commercial building with various facilities of the City Corporation is not yet reaches its target. In addition, increasing population demands new facilities. More importantly, improved living standard, busy urban life and economic ability of the residents demand multipurpose commercial building to meet their requirement. Hence, this commercial complex with different facilities will definitely enhance quality of living standard of the residents.

The subproject site is located very suitable position for a commercial complex. There is a small building which is temporarily used as a councilor's Office and place for primary treatment (Charity Hospital). The

Councilor Office and Charity Hospital will be shifted permanently to another building (vacant place and ready for shifting) which is owned by City Corporation.

There is no water body like pond, ditch and low wet-land adjacent to the proposed site. Hence, the subproject activities do not have any likely impacts on the aquatic environment. However, there are 15 numbers of planted trees in the site that needs to be felled down for site clearing work which will have adverse impact on the ecological environment. There is no cultural and or historical site in the subproject area. The existing condition of the proposed site is further elaborated in the following ***Photographs 2.2.1***.

Photographs 2.2.1: Current Situation of the Subproject Site

Total land area of the proposed subproject is 2408.92sqm. Maximum ground coverage is 1160.78 sq.m and total built-up area is 15658 sq.m. It is planned to allocate one community center in the ground floor. First floor is allocated for plaza, lobby and lounge. It is planned to allocate super shops in the 2nd floor. 3rd floor is allocated for community center. It is planned to provide training room, teacher's room and library in the fifth floor. Sixth floor is designed for beauty parlor and day-care center. Seventh floor is designed for food court. It is planned to provide indoor exhibition in the eight floors. Ninth floor is allocated for workshop and computer lab. It is planned to provide prayer room, incubator and swimming pool in the tenth floor. Swimming pool, gym and yoga center will be located in the eleventh floor. Restaurant will be provided at 12th floor.

After construction, this commercial complex will be gathering place for community people (expected number of visitors are approximately 2500 to 5000 per day and it will gradually increase) for various reasons (shopping, day care facilities, swimming, gym, beauty parlor, indoor exhibition etc). The economic benefit of the proposed development work includes opportunity for local businesses and partnership, job creation, increased property values and tax revenues. The whole community people will be benefited directly and indirectly from this commercial complex. This will be an income generating source for the City Corporation. This income will enhance the revenue of the City Corporation that will be used in the other development activities. Furthermore, due to installation of the solid waste management system, availability of the modern water supply, sanitation, and drainage facilities will improve the quality of the environment. Hence, with the consideration of the potential benefit that will derive after construction, this subproject has been proposed for the implementation.

2.3 Envisaged Subproject Activities and Implementation Process

The general activities for the subproject includes: construction of the site office and construction of the labor shed with water supply, sanitation and other facilities. The major specific construction activities include:

- Site clearing work;
- Providing lay-out;
- Earthwork in excavation of foundation trenches;
- Foundation work;
- Earth filling work as per requirement;
- Compaction of earth;
- Fabrication, binding, bending of the ribbed or deformed bar;
- Mass reinforcement cements concrete work in grade beam, beam, and column and slab construction;
- Single layer brick flat soling in ground floor;
- Brick work in facing super structure;
- Fancy and ornamental screen work;
- Preparation of the door and window frames with seasoned wood;
- Fitting and fixing of the window and door with accessories;
- Fitting and fixing of the tiles;
- Plastering work;
- Distempering work;
- Painting work;
- Fixing of the railing;
- Construction of the toilets and rest room;
- Construction of the septic tank and soak well;
- Construction of the water tank:
- Beautification work;
- Fitting and fixing of the plumbing ,electrical accessories, installation of the lift etc;
- Tree plantation work.

The materials and resources to be used for the key activities: soil in earth work, sand, stone chips, brick chips, glass, cement, bricks, concrete, tiles, reinforcement, sanitary and electrical accessories.

The major equipment to be used for the implementation of the subproject: wooden drag, roof hoist, ladder, hammer, steel/ concrete hammer, excavator, concrete mixer machine, mechanical vibrator machine, MS sheet, steel cutter, steel shutter and dump truck.

2.4 Subproject Schedule

The tentative schedule of construction of the subproject is:

(a) Subproject duration (months): 15 months

(b) Tentative start date : December 2018

(c) Tentative completion date : March 2020

The daily construction hours will normally include regular working time. However, daily working hours may vary based on the on-site condition. The detailed work program will be prepared by the contractor with the assistance of the PIU, CCC. Then it will be shared with the PMU, BMDF. In addition, the detailed work program will also be shared with the Bank.

3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

3.1 Regulatory Requirements for the Project

Regulatory requirements toward protection and conservation of environment and various environmental resources and also toward protection of social environment from adverse impact of the subproject and activities associated with them have been enunciated by the GOB as well as the WB Pertinent requirements are summarized below.

3.2 GOB Environmental Policy, Regulations, and Guidelines

National Environmental Policy, 1992

Bangladesh has adopted a National Environmental Policy (NEP) in 1992 aimed at sustainable development. The NEP sets out the basic framework for environmental action together with a set of broad sectoral guidelines for action. Major elements of the policy are as follows:

- Maintaining the ecological balance for ensuring sustainable development;
- Protection of the country against natural disasters;
- Identifying and controlling activities which are polluting and destroying the environment;
- Ensuring environment-friendly development in all sectors;
- Promoting sustainable and sound management of natural resources; and
- Active collaboration with international initiatives related to the environment.

With regard to the transport sector, the environmental policy aims at prevention of pollution and degradation of resources caused by roads and inland waterways transport. The policy mentions that Environmental Impact Assessments (EIA) should be conducted before projects are undertaken.

National Environmental Management Action Plan, 1995

The National Environmental Management Action Plan (NEMAP) builds on the NEP and was developed to address specific issues and management requirements during the period 1995-2005. The plan includes a

framework within which the recommendations of a National Conservation Strategy (NCS) are to be implemented. The NEMAP was developed with the following objectives:

- To identify key environmental issues affecting Bangladesh;
- To identify actions to halt or reduce the rate of environmental degradation;
- To improve management of the natural environment;
- To conserve and protect habitats and bio-diversity;
- To promote sustainable development; and
- To improve the quality of life.

Environmental Conservation Act (ECA), 1995

The ECA is currently the main legislation relating to environment protection in Bangladesh.

This Act is promulgated for environment conservation, environmental standards development and environment pollution control and abatement.

The main objectives of ECA are:

- Conservation and improvement of the environment; and
- Control and mitigation of pollution of the environment.

The main focuses of the Act can be summarized as:

- Declaration of ecologically critical areas and restriction on the operations and processes, which can or cannot be carried out/ initiated in the ecologically critical areas (ECA);
- Regulations in respect of vehicles emitting smoke harmful for the environment;
- Environmental clearance;
- Regulation of industries and other development activities' discharge permits;
- Promulgation of standards for quality of air, water, noise and soil for different areas for different purposes;
- Promulgation of a standard limit for discharging and emitting waste; and
- Formulation and declaration of environmental guidelines.

Before any new project can go ahead, as stipulated under the ECA, the project promoter must obtain Environmental Clearance from the Director General (DG), DOE. An appeal procedure does exist for those promoters who fail to obtain clearance. Failure to comply with any part of this Act may result in punishment to a maximum of 5 years imprisonment or a maximum fine of Tk.100, 000 or both. The DOE executes the Act under the leadership of the DG. The Project will be undertaken in line with the aims and objectives of the Act by conserving the environment and controlling and mitigating potential impacts throughout the drilling program.

- **Environmental Conservation Act (Amendment 2000)**

The Bangladesh Environment Conservation Act Amendment 2000 focuses on ascertaining responsibility for compensation in cases of damage to ecosystems, increased provision of punitive measures both for fines and imprisonment and the authority to take cognizance of offences.

- **Environmental Conservation Act (Amendment 2002)**

The 2002 Amendment of the ECA elaborates on the following parts of the Act:

- Restrictions on polluting automobiles;
- Restrictions on the sale, production of environmentally harmful items like polythene bags;
- Assistance from law enforcement agencies for environmental actions;
- Break up of punitive measures; and
- Authority to try environmental cases.

- **Environmental Conservation Act (Amendment 2010)**

This amendment of the act introduces new rules & restriction on:

- No individual or institution (Gov. or Semi Gov, / Non Gov. / Self Governing) cannot cut any Hill and Hillock. In case of national interest; it can be done after getting clearance from respective the department;
- Owner of the ship breaking yard will be bound to ensure proper management of their hazardous wastes to prevent environmental pollution and Health Risk;
- No remarked water body cannot be filled up/changed; in case of national interest; it can be done after getting clearance from the respective department; and
- Emitter of any activities/incident will be bound to control emission of environmental pollutants that exceeds the existing emission standards.

Environmental Conservation Rules (ECR), 1997 and Amendments

These are a set of rules, promulgated under the ECA, 1995 and its amendments. The Environment Conservation Rules provide categorization of industries and projects and identify types of environmental assessment required against respective categories of industries or projects. The Rules set:

- The National Environmental Quality Standards (NEQS) for ambient air, various types of water, industrial effluent, emission, noise, vehicular exhaust etc.;
- The requirement for and procedures to obtain environmental clearance; and
- The requirement for IEE and EIA according to categories of industrial and other development interventions.

The Environment Conservation Rules, 1997 were issued by the GOB in exercise of the power conferred under the Environment Conservation Act (Section 20), 1995. Under these Rules, the following aspects, among others, are covered:

- Declaration of ecologically critical areas;
- Classification of industries and projects into 4 categories;
- Procedures for issuing the Environmental Clearance Certificate (ECC); and
- Determination of environmental standards.

Rule 7 of the 1997 ECR provides a classification of industrial units and projects into four categories, depending on environmental impact and location. These categories are:

- Green;
- Orange A;
- Orange B; and
- Red.

The categorization of a project determines the procedure for issuance of an Environmental Clearance Certificate (ECC). All proposed industrial units and projects that are considered to be low polluting are categorized under "Green" and shall be granted Environmental Clearance. For proposed industrial units and projects falling in the Orange-A, Orange-B and Red Categories, firstly a site clearance certificate and thereafter an environmental clearance certificate will be required. A detailed description of those four categories of industry/project is in Schedule-1 of ECR (1997). The Rules were essentially developed for industrial developments, but under Schedule 1 of the Guidelines (Clauses 63 and 64) the following falls into the Orange B Category.

The ECR'97 also contains the procedures for obtaining Environmental Clearance Certificates from the Department of Environment for different types of proposed units or projects. Any person or organization wishing to establish an industrial unit or project must obtain ECC from the Director General. The application for such certificate must be in the prescribed form (provided later in this chapter) together with the prescribed fees laid down in Schedule 13, through the deposit of a Treasury Chalan in favor of the Director General. Rule 8 prescribes the duration of validity of such certificate (3 years for green category and 1year for other categories) and compulsory requirement renewal of certificate at least 30 days before expiry of its validity.

Depending upon location, size and severity of pollution loads, projects/activities have been classified in ECR, 1997 into four categories: Green, Orange A, Orange B and Red respectively, to nil, minor, medium and severe impacts on important environmental components (IECs).

Bangladesh Climate Change Strategy and Action Plan

The GOB also prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and revised in 2009. This is a comprehensive strategy to address climate change challenges in Bangladesh.

Bangladesh Climate Change Strategy and Action Plan 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 climate change 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.
- **and Knowledge management** to predict that the likely scale and timing of climate change impacts on different sectors of economy and socioeconomic 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 government ministries, civil society and private sector to meet the challenge of climate change.

There are 44 specific programs proposed in the BCCSAP under the above six themes.

Bangladesh National Building Code (BNBC)

In order to ensure optimum return of substantial portion of national resource invested in building construction, in both public and private sectors and to achieve satisfactory performance of any building, construction needs to be controlled and regulated.

These instruments needed updating, rationalization and unification. It was therefore felt that a comprehensive building code would serve the purpose of a uniform national standard. The work to develop the Code began in 1992 and was completed by the end of 1993.

The purpose of the Code is to establish minimum standards for design, construction, quality of materials, use and occupancy, location and maintenance of buildings within Bangladesh in order to safeguard, within achievable limits, life, limb, health, property and public welfare.

Land Development Rules for Private Housing, 2004

This is a legal instrument for controlling land development in private sector housing. It provides procedures and guidelines for land development protecting the environment. It also spells out the percentages of land that must be kept for community facilities, amount of land to be sold out, school sites, road hierarchy and importantly planning standards, for example, allocation of land per 1000 population.

3.3 Relevant other Regulatory Requirements for the Subproject

The Government of Bangladesh has framed various laws and regulation for protection and conservation of natural environment. The legislation with applicability to this project is summarized below in ***Table 3.3.1***.

Table 3.3.1: Applicability of Key Environmental Legislation

No.	Act/Rule/Law/Ordinance	Responsibility / Agency-Ministry/ Authority	Key Features-Potential Applicability
1	Environment Court Act, 2000 and subsequent amendments in 2002	Ministry of Environment and Forest	GOB has given highest priority to environment pollution and passed Environment Court Act, 2000 for completing environment related legal proceedings effectively
2	The National Water Policy, 1999	Ministry of Water Resources	Protection, restoration and enhancement of water resources; Protection of water quality, including strengthening regulations concerning agro-chemicals and industrial effluent; Sanitation and potable water; Fish and fisheries; and Participation of local communities in all water sector development.
3	Water Pollution Control Ordinance 1970	Ministry of Water Resources	Prevents water pollution
4	Bangladesh Labor Law, 2006	Ministry of Labor	This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable working environment and reasonable working conditions.
5	National Land use Policy, 2001	Ministry of Land	The plan deals with land uses for several purposes including agriculture (crop production, fishery and livestock), housing, forestry, industrialization, railways and roads, tea and rubber. The plan basically identifies land use constraints in all these sectors.

6	National Biodiversity Strategy and Action Plan (2004)	MOEF	Conserve, and restore the biodiversity of the country; Maintain and improve environmental stability of ecosystems; Ensure preservation of the unique biological heritage of the nation for the benefit of the present and future generations; Guarantee safe passage and conservation of globally endangered migratory species, especially birds and mammals in the country; Stop introduction of invasive alien species, genetically modified organisms and living modified organisms.
7	The ground Water Management Ordinance 1985	Ministry of Water Resources	Focuses on management of Ground Water Resources.
8	Vehicle Act 1927 and Motor vehicle ordinance 1983	BRTA	Road/traffic safety Vehicular air and noise pollutions Fitness of vehicles and registration

Under the Environmental Conservation Act (1995) and Rules (1997), the project will be required to obtain a site clearance as well as an environmental clearance. The procedure for obtaining environmental clearance is given in the ***Figure 3.3.1***.

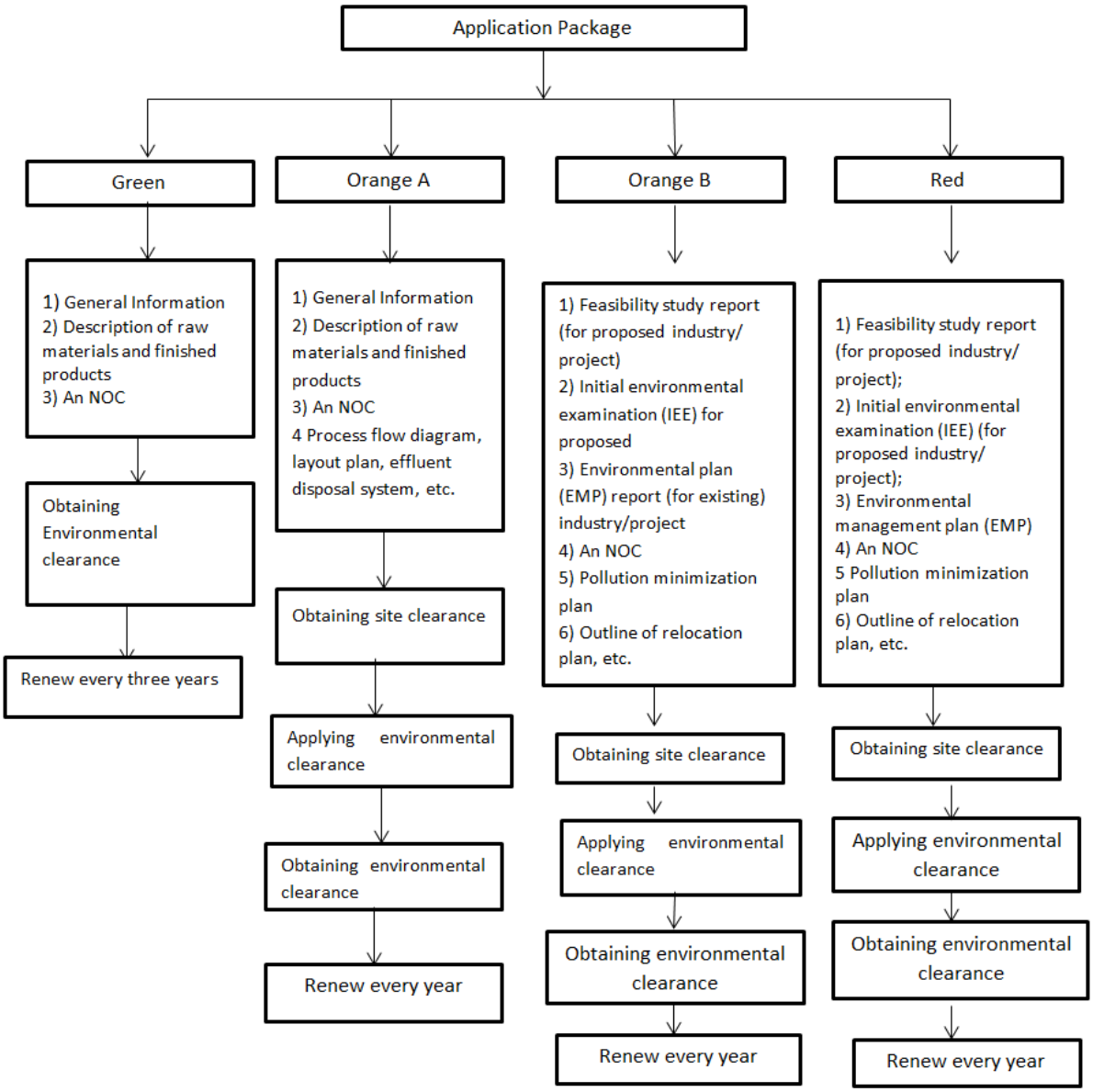


Figure 3.3.1: Procedure of Environmental Clearance

3.4 International Treaties

Bangladesh has signed most international treaties, conventions and protocols on environment, pollution control, bio-diversity conservation and climate change, including the Ramsar Convention, the Bonn Convention on migratory birds, the Rio de Janeiro Convention on biodiversity conservation and the Kyoto protocol on climate change. An overview of the relevant international treaties and conventions signed by GOB is shown in ***Table 3.4.1***.

Table 3.4.1: Relevant International Treaties, Conventions and Protocols signed by Bangladesh

Treaty or Convention	Year	Brief Description	Responsible Agency
On protection of birds (Paris)	1950	Protection of birds in wild state	DOE/DOF
Occupational hazards due to air pollution, noise and vibration (Geneva)	1977	Protect workers against occupational hazards in the working environment	MOHFW
Occupational safety and health in working environment (Geneva)	1981	Prevent accidents and injury to health by minimizing hazards in the working environment	MOHFW
Occupational safety and health in working environment (Geneva)	1981	Prevent accidents and injury to health by minimizing hazards in the working environment	MOHFW
International convention on climate changes (Kyoto Protocol)	1997	International treaty on climate change and emission of greenhouse gases	DOE/MOEF

3.5 World Bank's Safeguard Policies

The Bank requires environmental assessment (EA) of projects proposed for Bank financing to ensure that they are environmentally sound and sustainable, and thus to improve decision making. The World Bank's environmental assessment policy and recommended processing are described in Operational Policy (OP)/Business Procedure (BP) 4.01: Environmental Assessment. This policy is considered to be the umbrella policy for the Bank's environmental "safeguard policies" which among others include: Natural Habitats (OP 4.04), Forests (OP 4.36), Pest Management (OP 4.09), Physical Cultural Resources (OP 4.11)), and Safety of Dams (OP 4.37). The following are the relevant WB's environmental policy guidelines:

- OP/BP 4.01 Environmental Assessment;
- OP/BP 4.04 Natural Habitats;
- OP/BP 4.11 Physical Cultural Resources;
- OP/BP 4.12 Involuntary Resettlement.

OP/BP 4.01 Environmental Assessment

The Bank requires Environmental Assessment (EA) 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, sitting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse

environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. The 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 trans-boundary and global environmental aspects in overall subproject implementation. 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.

- *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 mitigation 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. Beyond screening, no further EA action is required for a Category C project;
- *Category FI:* A proposed project is classified as Category FI if it involves investment of Bank funds through a financial intermediary, in subprojects that may result in adverse environmental impacts.

OP/BP 4.04 Natural Habitats

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.

OP/BP 4.11 Physical Cultural Resources

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 environmental assessment (EA) process.

OP/BP 4.12 Involuntary Resettlement

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, resettlers 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 Resettlement Action Plan (RAP) including the list of their choices.

IFC Environmental, Health and Safety Guidelines

The Environmental, Health and Safety (EHS) Guidelines of the World Bank Group (WBG)/International Finance Corporation (IFC), 2008 is the safeguard guidelines for environment, health and safety for the development of the industrial and other projects. They contain performance levels and measures that are considered to be achievable in new facilities at reasonable costs using existing technologies. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The section 4 of EHS Guidelines for “Construction and Decommissioning” provides additional, specific guidance on prevention and control of community health and safety impacts that may occur during new project development, at the end of the project life-cycle, or due to expansion or modification of existing project facilities.

3.6 Occupational Health and Safety

During construction, the project will conform to the labor laws and occupational and health related rules as outlined in ***Table 3.6.1***.

Table 3.6.1: Relevant Occupational Health and Safety Laws and Rules

Title	Overview
Bangladesh Labor Act, 2006	Provides for safety of work force during construction period. The act provides guidance of employer's extent of responsibility and the workman's right to compensation in case of injury caused by accident while working.
Labor Relations under Labor Laws, 1996	General concerns during the project implementation state that the Project Manager must recognize labor unions.
public Health (Emergency Provisions) Ordinance, 1994	Calls for special provisions with regard to public health. In case of emergency, it is necessary to make special provisions for preventing the spread of disease, safeguarding the public health, and providing adequate medical service, and other services essential to the health of respective communities and workers during construction-related work.
The Employees State Insurance Act, 1948	Health, injury and sickness benefit should be paid.
The Employer's Liability Act, 1938	Covers accidents, risks, and damages with respect to employment injuries
The Employer's Liability Act, 1938	Covers accidents, risks, and damages with respect to employment injuries
Maternity Benefit Act, 1950	Framed rules for female employees, who are entitled to various benefits for maternity
Bangladesh Factory Act, 1979	Workplaces provisions: these Act and Labor Laws require medical facilities, first aid, accident and emergency arrangements, and childcare services to be provided to the workers at workplace.

3.7 EA Requirement

Legislative bases for Environmental Assessment in Bangladesh are the Environmental Conservation Act 1995 (ECA'95) and the Environmental Conservation Rules 1997 (ECR'97). Department of Environment (DOE), under the Ministry of Environment and Forest (MOEF), is the regulatory body responsible for enforcing the ECA'95 and ECR'97. It is the responsibility of the proponent to conduct an Environmental Assessment Study of development proposal and the responsibility to review the study for the purpose of issuing Environmental Clearance Certificate (ECC) rests on DOE.

The anticipated environmental impacts are very much site specific and significantly manageable through mitigation measures. Hence, according to the WB classification, it can classify as Category B. According to the ECR'97, construction of multi-storied building is considered as the 'Orange B' category. Since the proposed multistoried building will be 12 storied, for which GOB clearance will be applicable, accordingly this Environmental Assessment Report has been prepared.

4 DETAILED ENVIRONMENTAL AND LANDUSE FEATURES

The subproject site is situated within the jurisdiction of the 27 South Agrabad Ward, which is entirely developed urban area (residential area with commercial activities). The subproject site and its influence area cover built-up semi-pucca and pucca houses and shops etc. The subproject site is mostly bounded by roads, residential houses and few road side shops.

The important environmental and infrastructural features have been identified during site visit within influence area of the subproject. The key findings of the site inspection and investigation are given in ***Table 4.1***. (Tentative distance from proposed site of each features have been given in the Figure 2.1.3)

Table 4.1: Major Environmental and Infrastructural Features around the Proposed Site

Side/ Direction	Major Environmental and Infrastructural Features
North	Halishahar Road, Agrabad Access Road, Road side shops
South	Residential Building
East	Road,
West	Drain, Pucca Residential Houses

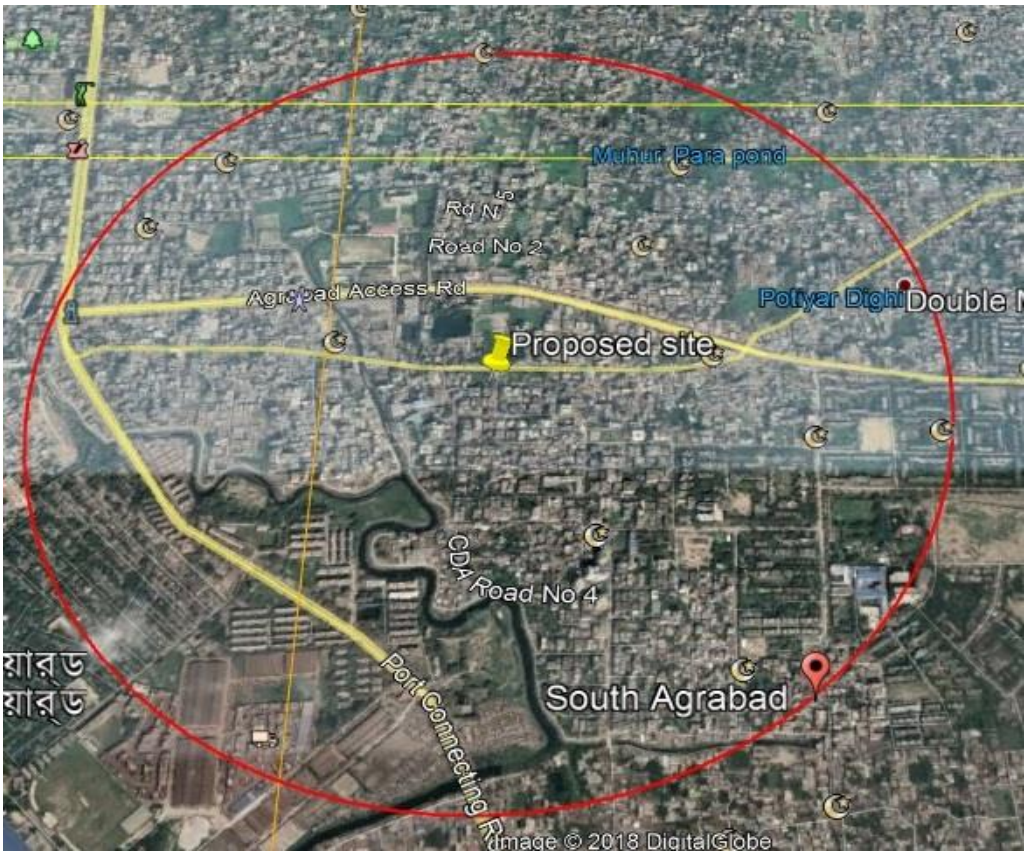


Figure 4.1.1: Sub-Project Influence Area Map (Source: Google)

5 BASELINE ANALYSIS OF ENVIRONMENTAL CONDITION

5.1 Physical Environment

Topography, Geology and Soils

The geomorphic character of Chittagong ranges from undulating hill topography to tidal mud flats. Based on land satellite and SPOT imageries, 3D-aerial photographic interpretation and ground surveys, eight major geomorphic units of the city have been identified: tertiary hills, piedmont and valleys, alluvial plains, old tidal plains, tidal mud plains, supra tidal plains, natural levees and sandy beaches. The general topography of the city can be divided into the undulating north and the plain south.

The predominant soil type in the coastal plains of Chittagong is grey piedmont soils, which occur extensively on the northern and eastern piedmont plains and locally on the Chittagong coastal plain. The other types are acid sulphate soils. This soil contains sulphidic materials, which become extremely acidic if exposed to air. The landscape of Chittagong is influenced by its hilly topography. It is bordered by the Karnaphuli River in the South and the Bay of Bengal in the west, hills in the north and flood and coastal plains in the middle part of the city extending in a north-south direction. The proposed site is located at 22°22'66.8"N (Latitude) and 91°51'20.5"E (Longitude) which is mostly flat land. The general soil classification of Bangladesh is shown in ***Figure 5.1.1***.

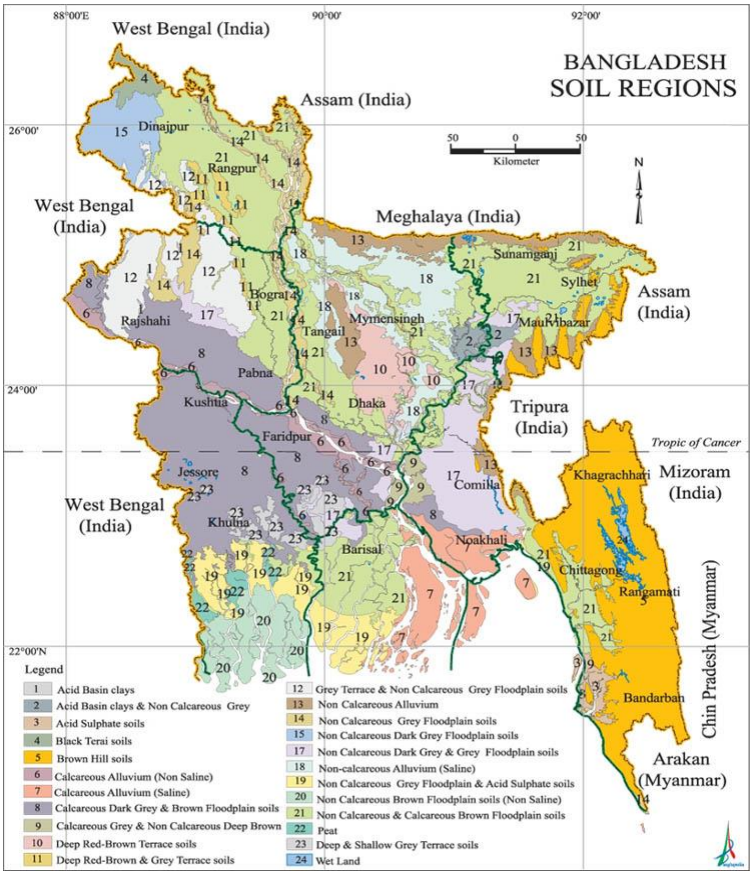


Figure 5.1.1: General Soil Classification of Bangladesh (Source: BSRDI)

Climate and Meteorology

Meteorological data is used to anticipate the dispersion and diffusion of pollutants, once discharged into the atmosphere.

Temperature

Seasonal variation in temperature in Chittagong is not significant. Monthly average minimum and maximum temperatures for the period 2008-2014 for Chittagong are given in below ***Tables 5.1.1 and 5.1.2*** (Source: Bangladesh Meteorological Department).

Table 5.1.1: Monthly minimum and average minimum temperature during Jan 2008 to Dec 2014

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2008	12.60	11.80	17.60	20.50	22.10	24.20	24.00	24.20	23.40	20.60	17.00	14.50
2009	12.80	14.00	18.20	18.80	21.40	22.20	24.00	23.90	23.70	20.80	16.00	12.50
2010	11.60	12.70	19.40	23.00	22.50	22.50	24.20	24.10	24.50	22.80	18.00	13.00
2011	10.20	13.50	16.00	20.50	21.10	24.00	23.50	23.00	23.80	21.40	18.00	12.20
2012	12.00	13.40	19.00	18.70	20.10	22.80	24.20	24.50	24.20	20.20	14.80	9.90

2013	9.00	13.90	14.50	20.00	20.80	24.00	24.90	24.50	24.00	21.40	17.10	12.30
2014	11.80	13.60	17.10	20.20	22.50	23.00	23.30	24.50	23.00	21.30	16.50	14.40

Table 5.1.2: Monthly maximum and average maximum temperature during Jan 2008 to Dec 2014

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2008	28.00	29.50	33.60	34.00	34.30	34.20	32.40	33.30	33.50	34.00	31.70	30.50
2009	29.50	31.00	34.00	34.30	35.00	34.20	34.50	33.00	33.90	33.00	33.30	29.40
2010	28.60	31.80	36.30	35.00	34.50	33.40	33.80	33.80	33.20	35.00	32.40	30.00
2011	30.20	33.00	33.50	33.60	33.70	34.40	33.20	34.00	33.40	33.40	31.00	30.20
2012	28.00	33.30	34.30	34.50	34.50	34.80	33.50	33.50	33.20	33.20	32.00	28.20
2013	30.00	32.50	33.30	33.60	33.60	34.50	36.50	31.80	33.80	33.00	30.20	28.20
2014	29.20	30.50	33.50	39.60	33.60	33.60	34.30	33.80	32.80	33.70	34.00	31.00

The data shows that the monthly minimum (average) temperature at Chittagong varies between 9.00 °C and 24.50°C and maximum temperature varies between 28.00°C and 36.50°C. The minimum and maximum temperature data indicates that December to February months are relatively cooler and March to May are the relatively hotter months.

Relative Humidity

The average relative humidity at Chittagong varies between 62 % in the month of February and 86 % in the month of June. The average relative humidity for the last 10 years for Chittagong is provided in ***Table 5.1.3***. The data shows that average humidity is relatively lower in December to February while it is relatively higher from June to September. Overall, the average humidity is relatively higher in Chittagong.

Table 5.1.3: Monthly average relative humidity during Jan 2005 to Dec 2014

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2000	77	69	76	79	82	84	85	85	85	85	81	76
2001	73	74	67	72	77	81	81	80	81	79	77	70
2002	71	67	66	72	75	78	83	80	76	74	73	69
2008	77	67	79	73	77	83	87	87	85	81	75	79
2009	71	67	72	79	79	82	87	86	84	80	74	73
2010	72	63	74	78	80	86	83	85	84	82	77	73
2011	68	67	69	77	80	85	84	87	85	80	74	77

2012	68	62	76	80	80	86	88	86	85	84	77	80
2013	72	64	77	77	85	84	84	86	84	85	78	77
2014	72	69	68	76	79	85	85	87	84	80	72	73

Rainfall

The average monthly rainfall data for Chittagong (obtained from BMD) is provided in ***Table 5.1.4*** below. The data shows that rainy season in Chittagong mainly prevail from June to September. The average monthly rainfall in Chittagong for the period Jan 2005 to Dec 2014 varied between 0 mm in the month of December and January and 1,268 mm in the month of June. The rainfall follows the general climate pattern with the highest rainfall in the summer from April to October and minimum rainfall in the winter from November to March.

Table 5.1.4: Monthly total and 10 years average monthly rainfall during Jan 2005 to Dec 2014

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2005	5	0	57	121	148	233	596	654	386	100	23	8
2006	0	0	0	50	859	288	495	138	438	91	16	0
2007	0	49	4	223	263	953	930	589	512	635	182	0
2008	56	13	14	1	272	618	962	809	266	216	43	0
2009	0	0	2	125	360	408	1025	589	261	321	39	0
2010	0	9	50	50	282	916	245	392	86	301	52	22
2011	0	0	35	117	355	454	613	748	740	66	0	0
2012	0	0	31	231	114	1268	662	300	221	445	3	0
2013	0	1	5	58	469	504	391	243	305	403	0	0
2014	0	40	32	30	368	1235	389	599	355	107	1	0

Wind Speed and Direction

Wind direction from October to February is the calm condition followed by wind speed of 1 to 2.5 m/sec. In the rest of the months, the predominant wind speed is 2.5-5 m/s. This indicates the weather conditions are favorable for the dispersion of the pollutants released in the air.

The monthly wind trend: NE and NW wind prevail in November to February; wind flows multi-directional in March and October; the predominant wind direction is south followed by SE and SW in April; in May the wind direction is south and SE, the predominant wind direction is SE followed by south in June to September.

Hydrology (surface water, ground water and rainwater)

Groundwater is the main source of potable water in the subproject area. Chittagong WASA is responsible for providing water supply facilities. Normally CWASA intakes ground water from deep tube-well and deep aquifer which are free from contamination. Rain water harvesting system is not common in and around the subprojects area. The recent ground water quality data is not available. However, prior to the construction work to be started, drinking water quality test will be carried-out. Adequate budget is included in the cost estimate for the quality test. Due to tidal effect, the salinity problem is very common in surface water.

The construction period is normally in summer season. During the summer season, generally the ground water level goes down. Therefore, ensuring the water requirements for the construction works and domestic uses are the key issue in dry summer. On the contrary, if the construction period also includes wet summer, there might be less complexity for ensuring the water requirements.

Seismicity

Bangladesh has long been one of the seismically active regions of the world, and has experienced numerous large earthquakes during the past 200 years. A seismicity map of Bangladesh and its adjoining areas has also been prepared by BMD and GSB. Bangladesh has been classified into three seismic zones with zone-3 the most and zone-1 the least vulnerable to seismic risks as indicated in ***Figure 5.1.2***. Chittagong City lies in Zone-2 which shows intermediate level of seismic activity.

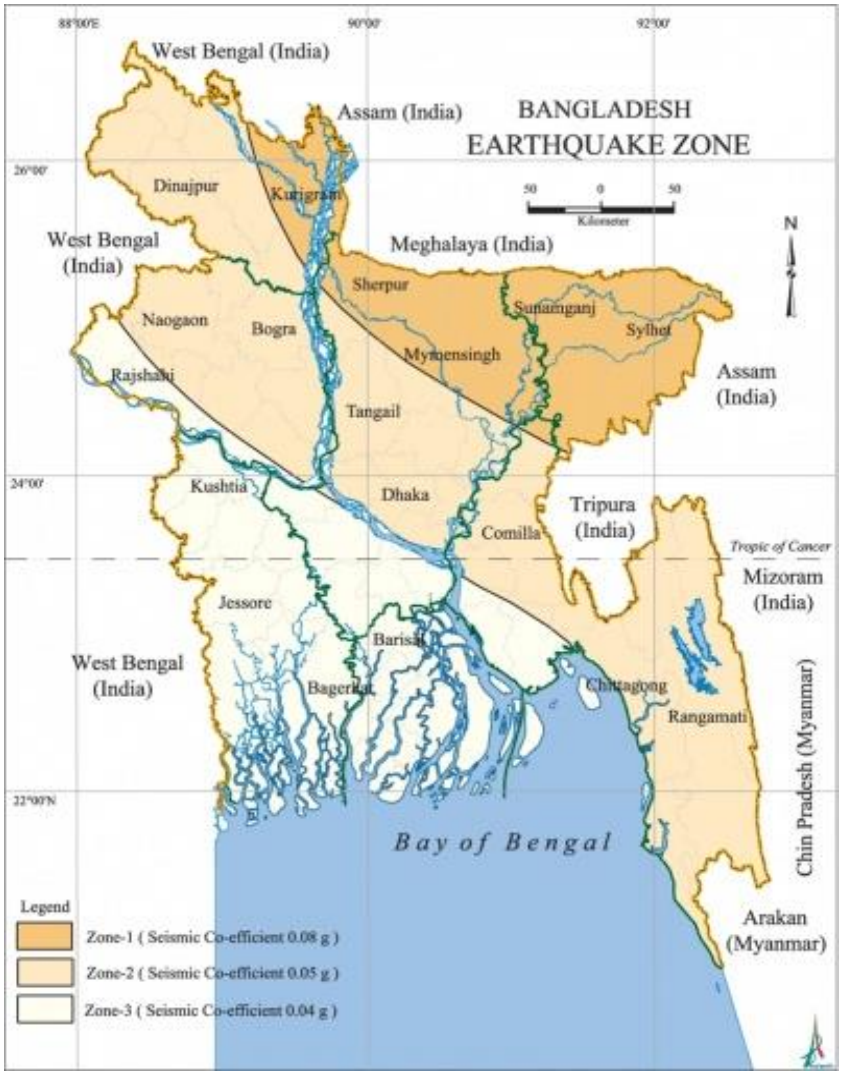


Figure 5.1.2: Seismicity Map of Bangladesh (Source: BMD)

Wind Hazard

Devastating cyclones hit the coastal areas of Bangladesh almost every year usually accompanied by high-speed winds, sometimes reaching 250 km/hr or more and 3-10 m high waves, causing extensive damage to life, property and livestock. Cyclones in the Bay of Bengal occur in two seasons, April-May and October-November – i.e. before and after the monsoon. Cyclones enter the Bay as the remnants that originate in the South China Sea. They gain moisture and latent heat from the Bay of Bengal, and consequently rejuvenate into full-blown phenomenon. Following a curvilinear path, they reach the coast of Myanmar, Bangladesh or East Coast of India. Because of the funnel shaped coast, Bangladesh repeatedly becomes the landing ground of cyclones formed in the Bay of Bengal. The Bay cyclones also move towards the eastern coast of India, towards Myanmar and occasionally into Sri Lanka. But they cause the maximum damage when they come into Bangladesh and West Bengal of India. This is because of the low flat terrain, high density of population and poorly built houses. Chittagong City lies in the wind risk area during cyclone and tornado.

Drainage Congestion, Water Logging and Floods

Chittagong is vulnerable to natural hazards including flash floods and storm surges. These natural phenomena are caused by hot and humid conditions during the pre-monsoon season between March and June. In recent years, due to inadequate and non-functional drainage system and siltation of the natural khals, drains and lost of the capacity of the outfalls create sever water logging problem in the City Corporation. As per flood zoning map of Bangladesh (shown in ***Figure 5.1.3***), Chittagong City Corporation is located at coastal tidal surge prone area.

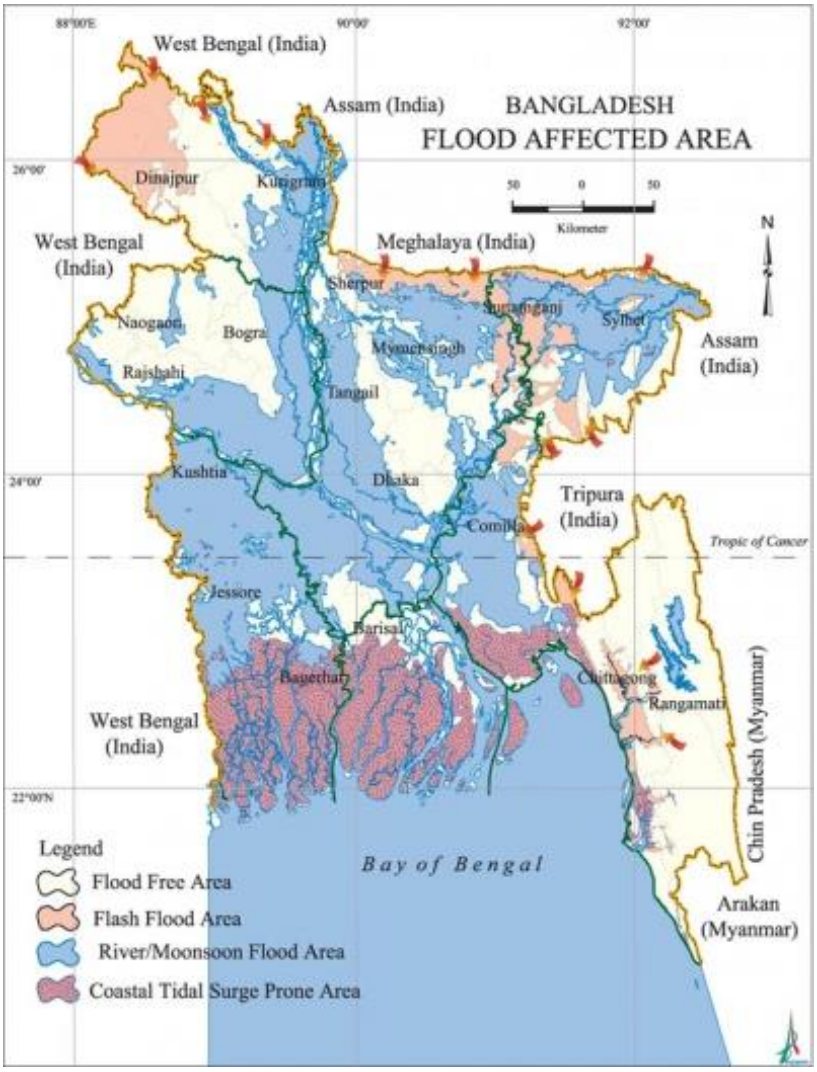


Figure 5.1.3: Flood Zoning Map of Bangladesh (Source: Department of Disaster Management)

Air Quality and Dust

In the City Corporation area, degradation of the air quality is mainly from black smoke emission from the vehicles, dust from the unpaved roads and wind-blown dust. In dry season dust is generated due to vehicles movement and windblown dust causes air pollution. In addition, black smoke emission from the vehicles degrades the quality of the air. There are no remarkable sources of air pollution such as heavy industries observed in the subproject area.

The subproject activities have impacts on the degradation of the air quality due to black smoke emission from the subproject vehicles used for transportation of the materials & equipments, using of the concrete mixer machine and vibrator machine etc. The generated dust due to subproject intervention also has impact on the degradation of the air quality.

In Chittagong, ambient air quality parameters are monitored on a regular basis by the DoE CAMS (Continuous Air Monitoring Stations) at Agrabad area. The data for six criteria pollutants (i.e. pollutants regulated by law) for the four months' period during December 2015 to March 2016 are shown in ***Table 5.1.5***.

Table 5.1.5: Air Quality Data (Agrabad CAMS, Chittagong)

Sl	Parameter	Unit	NNAQS	Period	Monthly Average Data				4 Months Average
					Dec 2015	Jan 2016	Feb 2016	March 2016	
1	$PM_{2.5}$	$\mu g/m^3$	65	24hr	140.44	177.96	126.89	100.90	135.55
2	PM_{10}	$\mu g/m^3$	150	24 hr	195.42	277.62	231.20	193.83	224.52
3	SO_2	ppb	140	24 hr	0.32	6.00	10.54	8.09	6.24
4	NO_2	ppb	53	Annual	7.68	20.90	22.00	14.98	16.39
5	CO	ppm	9	8 hr	1.47	2.17	1.14	1.25	1.51
6	O_3	ppb	80	8 hr	4.36	16.89	32.87	18.39	18.28

The data show that the concentration of $PM_{2.5}$ and PM_{10} are much higher than compared to the NNNQS. For the gaseous pollutants, the levels obtained are within NAAQS.

Noise Level

Noise is not a major impediment for the quality of the environment in the subproject area. Vehicles such as rickshaws, trolleys, pick-up, trucks, motor cycles, mini trucks, and private cars generally move on the road during day and night. These vehicles generate noise in the subproject area. However, they are within the tolerable limits in most cases. There are no other perceptible sources of noise generation such as heavy factories or industries were found near the subproject area.

The subproject activities have impacts on the noise level due to hydraulic horn from the subproject vehicles used for transportation of the materials & equipments, using of the concrete mixer machine, vibrator machine, steel cutter machine etc.

In Chittagong, noise levels are monitored on a regular basis by the DoE at different places of the City. The noise level data for the Agrabad Bazar area was found 72.5 dBA (measured in 2016) which is less than 75dBA (national standard).

Solid Waste Management

Though, it is not adequate and efficient; however, solid waste collection system is available in the City Corporation. Like Dhaka and other big City Corporation, Chittagong City Corporation is also facing challenges to provide effective solid waste management system in the City. At present, house to house collection through community participation is available in the City Corporation area. In the recent years, City Corporation has improved their capacity. But still there is open dumping, road side dumping, and blockage of the natural and artificial drains due to the disposal of the solid wastes are very common.

The construction activities will generate solid wastes, construction debris and construction wastes that will degrade the quality of the surrounding environment if not properly disposed-off in the designated dumping site.

In CCC, household wastes are mainly collected by the rickshaw vans. Then these rickshaw vans are either unloaded directly to the dump trucks and or some designated secondary collection points. In CCC, MSW are usually collected by the waste trucks from 5.30 am to 6.00 pm in seven different routes. Due to limited number of secondary transfer station (STS) and vehicles, the waste collection is not satisfactory. At present, there is no sanitary landfill site in the Chittagong City Corporation area. However, Chittagong City Corporation has two dumping site (Anondo Bazar area and North Middle Halishohor known as T.G).

5.2 Biotic Environment

Flora and Fauna

There is no water body like pond, ditch and low wet-land around the site. Hence, there is no aquatic flora and fauna in the subproject site. There are few planted trees in the site. The trees are mainly: Mango, Palm Tree, Coconut, Debdaru, Jhika, Koroi, etc. There are few common local birds in the subproject area which includes: Shalik, Doyel, Tuntuni, Bulbuli etc.

Biodiversity Status

The local people informed that there are no special or site specific terrestrial and aquatic ecosystems heavily disturbed by the development activities of this area. In addition, they mentioned that populations of the floral and faunal species have declined generally due to the regional and national climate change (low rainfall, high temperature, high humidity, short winter period, and long dry season) due to the over exploitation, poor management, demographic pressure and natural calamities.

5.3 Socio-economic and Socio-cultural Environment

Land Use, Status of Housing and Built-up Infrastructure

At present, the subproject area is entirely developed. The major built-up infrastructure includes semi-pucca, pucca shops and residential houses. There is no adjacent agricultural land in the subproject site. The proposed site is bounded by bituminous carpeting road, residential houses and few road side shops.

Beneficiary Population

The subproject has direct and indirect beneficiaries. It will enhance revenue generation and City Corporation can use the earned revenue for the development of the other infrastructure. The subproject brings direct benefit for the whole community people.

Education

In the subproject area, literacy among the population is about 65.00%. This is higher than the national average (51.8%).

Tribal Communities

There is no indigenous or tribal people settlement in the subproject area. Therefore, there is no measure needed for indigenous peoples' safeguard.

Land Acquisition and Resettlement

Private land acquisition is not needed. There is a small building which is temporarily used as a councilor's Office and place for primary treatment (Charity Hospital). The Councilor Office and Charity Hospital will be shifted permanently to another building (vacant place and ready for shifting) which is owned by City Corporation.

Principal Livelihoods and Economic Activities

The subproject area is now inhabited by the mixed occupational people. Most of the people are engaged in the traditional professional activities such as small business, enterprises, jobs, transport vehicle ownership and operation etc. Presently, a significant number of people work in small trades, private sector jobs, and government jobs and transport operations.

Cultural Heritage and Protected Areas

There are no protected areas and no important cultural or historical sites identified in the subproject influence area.

Social Conflicts and Development Activities

There are no visible conflicts between the local communities regarding the subproject implementation. The local people welcome the subproject. There are some ongoing subprojects under City Corporation funded by government and different donor agencies. However, there is no visible conflict between these donors and agencies.

6 ENVIRONMENTAL SCREENING

Environmental Screening (ES) for the subproject has been conducted with the purpose of fulfilling the requirements of Government (GOB) and World Bank (WB) for the preparation of subproject appraisal. Environmental Screening Checklist, as adopted in Appendix C of the Environmental Management Framework (EMF) of the MGSP, was administered for identifying the impacts and their extents.

The screening data and information have been formulated and are shown in below.

i) Potential Environmental Impact during Construction Phase:

(a) Ecological Impacts:

➢ Felling of the trees	Significant □	Moderate □	Minor □√	Number of trees 15
➢ Clearing of the vegetation	Significant □	Moderate □	Minor □√	
➢ Potential impact on species of aquatic (i.e., water) environment	Significant □	Moderate □	Minor □√	

The proposed commercial complex will be constructed at the land which is mostly developed. There are only 15 trees to be felled down and very few vegetation will be cleared for the site clearing work. There is no water body around the site. Hence, there will be no impact on aquatic environment. Considering the number of trees to be felled down, the impact on the ecological environment due to subproject intervention is insignificant and minor.

(b) Physicochemical Impacts:

➢ Noise pollution	Significant □	Moderate □√	Insignificant □
➢ Air pollution	Significant □	Moderate □√	Insignificant □
➢ Drainage congestion	Very likely □	Likely □ √	Unlikely □
➢ Water pollution	Significant □	Moderate □	Insignificant □√
➢ Pollution from solid/ construction wastes	Significant □	Moderate □√	Insignificant □
➢ Water logging	Significant	Moderate	Insignificant □√

The subproject will have temporary and localized negative impact on noise during construction phase from welding and steel cutter machine, concrete mixer and vibrator machine etc. Black smoke emission from the concrete mixer machine and vibrator machine may degrade the air quality as well. In case of pile foundation, pile driving work and or cast-in-situ pile work will also have impact on the air quality and noise. In addition, mobilization of the equipments and transportation of the materials will have impacts on the air quality and noise due to black smoke emission from the vehicles & equipments and un-due use of the hydraulic horns by the vehicles. Since the activities do not require heavy equipments, it is anticipated that noise nuisance will be moderate and will be limited within the subproject boundary. However, residents of the adjacent residential buildings may be disturbed by the generated noise if proper measures are not taken. The generated dust, particulate matters etc. due to the construction activities may also degrade the air quality if proper measures are not taken. Prior to the construction work existing small building needs to be demolished. Hence, removing of the existing building will generate solid wastes, debris, construction wastes etc. that have temporary and localized impacts on the surrounding environment if not properly re-use and or disposed-off. Anticipated impact on the drainage congestion & water logging due to the subproject activities will be insignificant because pumping facilities will be there to discharge storm water if required. Primarily, the subproject will have no adverse impact on the other physicochemical components.

(c) Socio-economic Impacts:

➢ Traffic congestion	Very likely □	Likely □√	Unlikely □
➢ Health and safety	Significant □	Moderate □√	Insignificant □
➢ Impact on archaeological and historical	Significant □	Moderate □	Insignificant □√
➢ Employment generation	Significant □√	Moderate □	Insignificant □

The access road and internal road network in the subproject area is adequate to cope with the situation. Hence, it is anticipated that if proper measures are taken, there will be no traffic congestion due to subproject intervention. At construction phase, vehicles movement for carrying construction materials and mobilization of the equipment may have limited and temporary adverse impacts on the local traffic system if proper measures are not taken. If there is no material storage as well as any work on the road and road side area, the impact on the local traffic system will be minimal. There is no adjacent archaeological and historical site. Hence, the subproject intervention does not have any impact on archaeological and historical site. The construction work will follow simple procedure with commonly used equipments. Hence, anticipated impact on health and safety is moderate. However, the subproject will have temporary negative impact in health and safety during construction phase due to likely accidents from the construction activities. The subproject has positive impact by generating work opportunities for the local people and supplying of the construction materials, equipments, food and other necessary stuffs to the campsite.

ii) Potential Environmental Impact during Operational Phase:

(d) Ecological Impacts:

➢ Potential impact on species of the aquatic (i.e., water) environment	Significant □	Moderate □	Minor □√

The subproject activities do not have any likely impacts on the ecological environment during operation phase. However, improper discharge of waste water from the commercial complex into the existing drain may marginally degrade the quality of the aquatic environment of the outfall; if it carries pollutants, toxic elements and nutrients.

(e) Physicochemical Impacts:

➢ Potential air quality	Significant □	Moderate □√	Insignificant □
➢ Noise level	Significant □	Moderate □ √	Insignificant □
➢ Drainage congestion	Improvement □√	Minor Improvement □	No Impact □
➢ Waste water disposal	Significant □	Moderate □	Minor □ √
➢ Pollution from solid wastes, and other sorts of wastes	Significant □	Moderate □	Insignificant□√

During operation phase, black smoke emissions from the increasing vehicles degrade the air quality. The moving vehicles will also generate dust. Commercial complex is a place for public gathering for various purposes which obviously will generate noise though it is mainly limited within the complex. During operation phase, public gathering and possible use of loud speaker for the advertisement of the products, loud speaker from conference room, training room and music from the food courts, restaurants etc. may create noise nuisance to the users and shoppers. However, residents of the adjacent residential buildings may be disturbed by the generated noise due to late night operation of the complex. Installation of the trash bins will minimize the environmental degradation due to improper disposal of solid wastes and other sorts of wastes. However, if the trash bins will not be

used properly and wastes are thrown here and there, it may pollute the surrounding environment. The new surface drain will be constructed around the site which will improve the existing drainage facilities. The generated waste water will be discharged by separate pipe line and will be settled at retention tank and necessary treatment will be done. So it will have minor impact on surface water.

(f) Socio-economic Impacts:

- Traffic Significant □ Moderate □√ Minor □
- Safety Issue (fire hazard, Short-circuit etc) Significant □ Moderate □√ Minor□
- Employment generation Significant □√ Moderate □ Minor □

It has significant positive impact by providing job & business activities and community interaction. During operation phase, it may create traffic congestion due to improper parking of the vehicles at the road and ignoring of the traffic rules. Possible accidents and social risks due to fire hazard & short-circuit and other vulnerability may also have negative socio-economic impacts. Eve teasing to the girls and women, pick-pocketing and other social vandalism also have adverse social impacts.

iii) Summary of the Possible Environmental Impacts of the Subproject:

From the above study, it seems that the ecological impact is minor and insignificant. The construction activities may degrade the air quality and noise level. In addition, solid wastes generation from the construction activities may temporary degrade the quality of the surrounding environment. Improper storage of the construction materials, stockpiles of the un-used soils, debris and other forms of the waste materials due to construction activities may create localized hazard for the local people and the workers. However, the anticipated impact on physicochemical components is mainly site specific and limited within the subproject boundary & only during construction period. During construction phase, possible failure of the equipment such as roof waist, ladder, steel cutter and concrete mixer may create severe accidents to the workers. It is noted that the subproject does not require any heavy equipments and complex procedure. Hence, the overall impacts on health and safety is anticipated as moderate.

During operation phase, due to public gathering and possible using of loud speaker may create noise nuisance to the users and shoppers. On the contrary, beautification work such as tree plantation will enhance the ecological condition. In addition, installation of the trash bins also will minimize environmental degradation due to solid wastes. Wastes generation in the operation phase is one of the key issues which should be handled and disposed-off properly by placing waste bins. This subproject has positive impacts in terms of the generation of the employment opportunities due to construction activities, supplying of the materials at construction phase and by providing business activities and maintenance work at operation phase. Furthermore, to resist earth quake impact, the design and construction work will follow BNBC Code.

7 SPECIFIC IMPACT, MITIGATION AND ENHANCEMENT MEASURES

The likely impacts of the subproject are mainly caused by the activities required for the implementation of the subproject, and materials, resources and equipment to be used to perform the activities. This section describes some specific impacts due to the subproject activities and their mitigation measures.

7.1 Labor shed Construction

The proposed location for the labor shed is at City Corporation owned open place at CDA 15 no. road. Prior to the commencement of the work, the contractor will construct the labor shed (male shed-15ft x 30ft and female shed 12ft x 15ft with living arrangement) at the designated place proposed by the City Corporation. The contractor is also responsible for providing other relevant facilities at the labor shed such as water supply, sanitation, waste disposal facility by providing bins, electricity, mosquito net, cooking arrangement, separate place for prayer etc. Unhygienic condition at the labor shed and generation of sewage and solid waste at the labor shed may cause degradation of the surrounding environment.

Recommended measures:

- The contractor will ensure no labor room should be overcrowded;
- The labor shed should have adequate ventilation facilities and standard living condition;
- Construction of sanitary latrine considering 15 persons for one toilet at the labor shed and separate toilet for male and female;
- The contractor will ensure drinking water supply facilities;
- The contractor will provide separate waste bins for organic and inorganic wastes at the labor shed;
- The workforce should comply with requirements of Government of Bangladesh Labor law of 2006 and all applicable laws and standards on worker's Health and Safety.

7.2 Material Transportaion, Handling and Storage and Pollution from the Construction Materials

The construction materials transportation, handling and storage should follow standard guidelines to minimize any risks associated to the occupational health and safety. Improper stockpiles of the construction materials also may degrade the surrounding environment. On the other hand, dumping of the construction spoils, including accidental leakage of the oil, grease, and fuel in equipment yards is a significant hazard. These substances can be washed-out by the storm water and can be discharged in the surface water. Even the people to be engaged for the construction activities and local communities might endanger the physical and human habitats of the area.

Mitigation Measures

- Construction activities may result in a significant increase in movement of heavy vehicles for the transport of construction materials and equipment increasing the risk of traffic-related accidents and injuries to workers and local communities. The incidence of road accidents involving project vehicles

during construction should be minimized through a combination of education and awareness-raising, and the adoption of procedures described in WBG EHS Section 3.4 (Traffic Safety).

- Safe transport, storage, and disposal of the construction materials, and the equipment have to be carried out in order to avoid the accidental spillage and loss and to minimize any health risk;
- Fuels, lubricants, and other hazardous materials should store over raised platforms and not directly on the ground;
- Maintain adequate moisture content of sand during transportation, compaction and handling;
- Carry the materials especially loose soil and sand with adequate cover;
- Avoid head loads for carrying soil, construction materials and construction equipment;
- Disposal of the wastes at the designated dump site Anondo Bazar area (North Middle Halishohor known as T.G).

7.3 Demolition of the Existing Structures and Demolition Wastes Disposal

The existing single storied pucca building needs to be demolished for site clearing work. The hazards and environmental impacts associated with demolition works are mainly function of-location of the structures, type of structures, method of demolition, the area of building being demolished, amount of solid wastes, dust and traffic being generated and duration of the demolition work.

There is a buffer zone between the existing building and the adjacent residential building and surrounding area. In addition, the existing structure is small single story. Therefore, the demolition of the existing small structure does not have any significant environmental impacts and pollution on physical, biological and socio-economic environment of the surrounding area. In fact, demolition work needs simple procedure and commonly used manual equipments-hammer with mechanical drill machine and steel cutter. Therefore, this is not massive demolition work and anticipated impacts are not severe. The generated solid wastes and dust will be very less. In addition, demolition materials such as reinforcement, debris, wooden door, window etc. are reusable. Importantly, the demolition work will require very less time (even lesser than 15 days).

Potential environmental impacts in connection with demolition works are taken seriously and corresponding mitigation measures are formulated adequately. The potential environmental impacts in connection with demolition works are: noise & vibration, dust, traffic congestion, generation of demolition wastes including door, windows, wood, metal frames, concrete, debris& reinforcement and visual & aesthetic impacts.

As per BNBC, demolition of building and structures shall require permit from the relevant authority in accordance to provisions made in Sec 3.6 of part 3 and building construction act 1952 (amended 1987). The authority may require the permittee to submit the plans and schedule of demolition.

Mitigation Measures

- Ensure protection of adjoining property of the owner of each property adjacent to the building to be demolished.
- Demolition work should avoid at schooling time and at night time and should follow normal working hour;
- Cautionary signs will be used before starting of the demolition work;
- The City Corporation will inform the local people about the demolition work as per Sec 4.1.5 ;
- The demolition works shall be taken not any nuisance by the way of noise, dust and vibration to the surrounding environment;
- Ensure re-use of the materials and disposal of the wastes materials at the designated dumping site;
- No wastes materials and debris shall be burned on the site;
- No encroachment of demolition wastes on adjacent road side area and any private property;
- The demolition wastes will be properly re-use and disposed-off in such a way that it will not have any adverse impact on the surrounding environment;
- Cover the exposed loose wastes with much fabric;
- Moisturizing the waste materials by sprinkle of the water to avoid spreading of dust;
- Electric power and all services should be shut off within the structure before demolition work to be started;
- Demolition work should be started from roof and then side brick wall;
- Wooden and metal window & door and other furniture should be relocated for re-use;
- Site should be fenced and screened to protect site from strong winds and to contain dust;
- Proper location of equipment and machinery on site;
- Ensure use of the personal protective equipments where applicable;
- Ensure careful operation of the machineries and equipments;

7.4 Site Preparation and Earth Work (Excavation Work and Filling Work)

The substructure includes excavation work, filling work and compaction work and clearing of the un-used materials. These works may lead dust blowing, improper disposal of the wastes, noise and vibration which may disturb the surrounding environment.

Mitigation Measures

- Proper care will be taken by the contractor during excavation work, filling work, compaction work and disposal work to avoid any undue disturbances to the environment;
- In case of filling work, no loss of agricultural top soil and any production land;
- Use personal protective equipments where applicable;
- Cover the exposed earth works with fabric;
- Disposal of the generated wastes at the Anondo Bazar area (North Middle Halishohor known as T.G).

7.5 Rainwater Harvesting Reservoir

Water will be consumed in the construction phase and as well as operation phase. In the construction, phase, water will be consumed in the construction activities and as well as by the workers at the labor shed and work site. Hence, rain water harvesting will partially meet the demand especially rain water can be used in the construction activities. Provision of roof top rainwater harvesting (RWH) system and rainwater harvesting reservoir at the ground should be included in the design of the building as a part of the water supply system. Provision for separate piping for rain water supply has been kept in the ducts of the building

7.6 Basement and Foundation Work

Construction of the basements requires deep excavation work. Except south side of the proposed boundary, three other sides are bounded by roads and drains. There is a residential building at the south side which is 5-6 feet far way from the boundary of the proposed site. The existing structure will not be affected due to the basement work as all safety and security measures will be taken as per BNBC. The soil type of proposed land is lean clay with sand. The PMU Structural Engineer has calculated the soil bearing capacity and found that at 7.2m depth it is around 1.0 Tsf. The soil bearing capacity is acceptable for construction of the proposed market.

Safeguard Measures:

- Fencing of the construction site and restrict unauthorized entrance;
- Bracing has been considered along with shore piling for the stability of excavated earth. Details has been given in the structural drawing (Pages S-102 to S-109)
- Providing adequate drainage systems to minimize and control infiltration
- Using of sheet pile to form cofferdam to support excavation;
- Availability of the adequate lighting facilities for basement work;
- Check availability of the adequate ventilation for basement work;
- Provide sump pit inside the lowest level of the basement to collect water and remove by pump. Ground water can be kept out either permanently such as for long term waterproofing for a basement, or temporarily such as to ease work during excavation;
- Generated waste should be properly handled, transport, re-sue if possible and disposed-off immediately;
- Use ladder and ramp for the workers safe movement from the ground to the basement and basement to the ground;
- Mechanical ventilation has been provided in the fires detection system (Section H-0 to 05in drawing and BoQ) for gases and fumes likely to be present in trenches. All personnel working there shall be provided with protective respiratory equipment. All trenches/tunnels shall be provided with emergency exits (BNBC Section 3.10.2.6 and Section 3.10.3)
- All shore piling and deep foundation operations shall be supervised by a competent foreman and shall be responsible to ensure all precautionary measures. For working at night, lighting of at least 100 lux intensity shall be provided at work site.

- Design and construction of the basement should follow BNBC, ACI and other standard code.
- Soil type and soil bearing capacity information has given in the "Geotechnical Investigation Report" which is provided with technical report.

The foundation will be mat type. The anticipated impacts due to the foundation works are:

- Noise pollution due to use of the equipment; Using noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, and exhaust muffling devices for combustion engines.
- Potential occupational health and safety risks and accidents;
- Air and dust pollution due to black smoke emission from diesel based equipments.

The key activities associated to the cast-in-situ pile work-boring work, cutting and welding of the reinforcement, placing of the pile reinforcement ring into the bore hole and RCC work for Pile casting and demolition of the pile head etc. have environmental impacts on the physicochemical components. The anticipated impacts due to cast-in-situ Pile works are:

- Noise pollution due to use of rig machine, winch machine, concrete mixer machine, vibrator machine, steel cutter and welding machine;
- Muddy water and clay generation due to boring work;
- Potential occupational health and safety risks and accidents from steel cutter, welding machine, rig machine, and winch machine;
- Air pollution due to black smoke emission from diesel based rig machine, concrete mixer machine and vibrator machine.

Mitigation Measures

- Boring work and RCC should avoid at schooling time and at night time and should follow normal working hour;
- Establishment of pucca tank (two chambers) to collect muddy water and mud;
- Disposal of the mud at dumping site and re-use of the mud and clay for filling work if applicable;
- Avoid using of steel cutter, wielding machine, concrete mixer machine, vibrator machine, rig machine and winch machine at night;
- Avoid prolonged exposure to noise (produced by equipment) by workers;
- Ensure use of the personal protective equipment's (helmet, goggles, gloves, safety boot) (Follow Safety Standard (BDS 1265, 1266, 1360 as mentioned in the BNBC safety during Construction)
- Availability and access to first-aid equipment and medical supplies in case of any accidents;
- Carefully operation of the steel cutter, rig machine and winch machine;
- Ensure proper joint between two reinforcement rings to avoid any possible damage;
- Avoid operation of the concrete mixer and vibrator machine at night;
- Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission.

7.7 Air Quality and Dust

During construction phase, air pollutants will be emitted from the equipment, subproject activities and construction vehicles are expected to remain low. Local residents in the vicinity of the work sites will be temporarily disturbed by the limited dust pollution. The overall impacts, however, are expected to remain low.

Mitigation Measures

- Water should be sprayed at the work site and camp site area for dust control;
- Ensure sprinkle and cover stockpiles of the loose materials (e.g., fine aggregates);
- Maintain adequate moisture content of sand for transportation, compaction and handling;
- Avoid use of dust generating equipment (which produce significant amount of particulate matter) far from the local residents;
- Regular maintenance of the concrete mixer and vibrator machine to avoid any black smoke emission;
- Ensure that all subproject vehicles are in good operating condition.

7.8 Noise and Vibration

Noise and vibration caused by the equipment, subproject activities and movement of the construction vehicles may temporarily disturb nearby environment though the impacts are anticipated to be limited and within the subproject boundary.

Mitigation Measures

- Transportation of the construction materials have to be carried during the scheduled times, and mainly during the day in off-peak time;
- Avoid prolonged exposure to noise (produced by equipment) by workers;
- Avoid operation of the concrete mixer and vibrator machine at night.

7.9 Solid Waste Disposal

During operation of the commercial complex, there are possibility of degradation of the environment due to improper disposal of the vegetables waste from kitchen, meat wastes and other sorts of wastes at shops, food courts and kitchen. Considering the solid waste generation trend, it has estimated that during operation of six storied market, there will be approximately 68 kg solid waste will generate per day.

Mitigation Measures:

- Introduce waste bins and inspire users to use waste bins properly;
- Timely collection of solid waste by waste collector and dispose to nearest secondary dumping container which will be set at the west side the proposed market

- Collection of solid waste from container to CCC's land fill areas at Halishohor by Municipal dumping truck.
- Biodegradable wastes (vegetable, chicken, beef, fishes and other wastes) and other forms of solid wastes should be dumped at the Anondo Bazar area (North Middle Halishohor known as T.G);

7.10 Waste Water Disposal

During operation of the commercial complex, waste water from the complex (especially from food courts restaurants, community centers) will generate approximately 2300 liter/day. This volume of waste water should not discharge into the existing drain which may marginally degrade the quality of the aquatic environment at the outfall; if it carries pollutants, toxic elements and nutrients if any.

Mitigation measures:

- Provision sparate sewer lines for bath room and toilet facilities;
- Provision of retention tank and chlorination system for waste water discharge
- Avoid direct discharge of the waste water from the complex in to the existing drains.

7.11 Fecal Sludge Management

There will sufficient number of toilets for male, female and disabled people. All floors should have provision for disable people's toilets. Other than disable, all floors will have separate toilets for male and female. It will generate significant volume of sludge. Possibility of bad odor and environmental degradation due to improper collection of fecal sludge from septic tank & improper handling, transportation and disposal of the fecal sludge.

Mitigation measures:

- In the design, all floors have separate toilets for disabled people, male and female users.
- The lift in the building has provision of accommodate disabled wheel Chair
- Now the building will be six storied excluding basements and ground floor. The existing septic tank has been designed for 12 storied building which has sufficient capacity (5603 m3) to store the generated sludge. There is a provision for Sewage Treatment Plant (STP) which will be installed after completion of proposed 12 storied building. (Figure 7.1 showing proposed STP location)
- Ensure use of closed container/vacuum tanker with sucker machine for the collection of fecal sludge from the septic tank;
- Disposal of the sludge at the existing dump site and place the other waste materials over the sludge to minimize bad odor;
- There Use the fecal sludge in the treatment plant if any located in the nearby area for the treatment, re-use and disposal.

Figure 7.1: Proposed STP location

7.12 Solar Energy and Glass Wall

As a part of the electricity demand, roof top solar energy system should be included in the design of the building. Using of the glass wall at the external parts of the building will provide adequate access for natural lighting facilities that will partially reduce the consumption of the electricity. Energy saving lights like LED and other similar low energy consumed

7.13 Occupational Health and Safety

Over-exertion, and ergonomic injuries and illnesses, such as repetitive motion, over-exertion, and manual handling, are among the most common causes of injuries in construction and decommissioning sites. Recommendations for their prevention and control include

The most important risks associated with the construction activities are listed below:

- Training of workers in lifting and materials handling techniques in construction and decommissioning activities, including the placement of weight limits above which mechanical assists or two-person lifts are necessary
- Planning work site layout to minimize the need for manual transfer of heavy loads
- Implementing administrative controls into work processes, such as job rotations and rest or stretch breaks

- To aware workers of about risk of falling from heights by providing temporary fall prevention device, personal fall arrest system, identifying proximity of fall hazard zones and monitoring
- Risks of using of the machineries in motion such as steel cutter, glass cutter etc;
- Risk of falling from the height during chipping, plastering work, painting work etc;
- Risk from drop down of the materials from the height during chipping, plastering work, painting work etc;
- Risk from mechanical failure of the equipment;
- Risk from the traffic collision or accidents during operation of the equipment such as hydraulic excavator, steel cutter, welding machine and vehicles movement for the transportation activities of the subproject;
- Risks from head loads for carrying soil, construction materials and construction equipment;
- Risk associated to the sudden bad weather working conditions such as storm, thunder storm and earth quake etc.
- Exposure to the sunlight- workers are being exposed to the sun for long hours;
- Exposure to the high temperature, and humidity for a long time resulting in dehydration;
- Contact with the hazardous substances and wastes pose risks of the infections and diseases.

Requirements for the Workers' Health and Safety

The key salient features of the general requirements for the workers' health and safety stated are presented in ***Table 7.10.1***.

Table 7.10.1: General Requirements for the Workers Health and Safety

Issues	Requirements
Site fencing, ladder, scaffolding and pulley	• Site should be fenced and screened to protect site from strong winds and to contain dust; • Ladder should be placed and scaffolding should be provided for the site protection work and for chipping, plastering, painting etc; • Provide jute netting for avoiding any drop down of the materials to the ground; • Use mechanical equipments such as pulley for the lifting of the materials to the roof and other floors.

Issues	Requirements
Health and Hygiene	• Cleanliness at the site premises and workers living places and at the Labor Shed; • Arrangement of the proper ventilation and temperature at the Labor Shed; • Protection against dust and furnace by using of the nose masks and covering of the head and body; • Proper disposal of the wastes and effluents; • Provision of the adequate latrines and separate toilet for the women; • Sufficient dustbins for the solid waste management system.
Safety and First Aid Box	• Using of the personal protective equipment (helmet, gloves, goggles, nose mask, safety boots); • Precautions during work on or near machineries in motion; • Head loads are prohibited; • Ensure first aid box; • First aid facilities should be provided and maintained; • The first aid kit should include adhesive bandages, regular strength pain medication, gauze, and low grade disinfectant.
Compensation for Accidents at Work	• Contractors will bear medical treatment costs. If any severe accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation- (the amount of the compensation should be fixed considering the type of accidents).
Dust and Fumes	• For any dust, fumes, or other impurities likely to be injurious to the workers, effective measures shall be taken to prevent their accumulation and its inhalation by the workers.
Overcrowding	• No labor room should be overcrowded.
Latrines and Urinals	• Sufficient latrines shall be provided; • Latrines shall be maintained in clean and sanitary condition; • Latrines shall be adequately lighted and ventilated.
Disposal of Wastes and Effluents	• Proper disposal system for the solid waste and effluent is required.

7.14 Impacts on Social Environment and Common Property Resources

Through comprehensive study, it is revealed that impacts are expected not to be severe and to be largely manageable. The following ***Table 7.11.1*** presents impacts on socio-economic environment and common property resources.

Table 7.11.1: Impacts on Social Environment and Common Property Resources

Social Components	Impacts on IECs	Impact Significance
Community Perception	The local community people welcome this subproject and there is no visible objection from them.	Significant (+ve)
Employment and Business Opportunity	Community feels happy because generally the local contractor will be engaged for the construction works which will create work opportunity for the skilled and non-skilled labor. The subproject will create business opportunity for the equipment and materials suppliers.	Significant (+ve)
Community Order and Security	This subproject activity does not create any severe security problems to the local community and community people.	Minor (-ve)

Social Components	Impacts on IECs	Impact Significance
Possible damage to existing infrastructure and facilities	Possible damage of the existing road infrastructure by the construction equipment and vehicles used in this subproject.	Minor (-ve)
New infrastructure and facilities	Construction of the commercial complex will provide new infrastructure facilities.	Moderate (+ve)
Landscape and Aesthetics	This subproject activity temporarily will degrade landscape and aesthetics values of the subproject area to a limited extent.	Minor (-ve)
Labor Habitat	It is anticipated that the outsider workers will stay at the Labor shed which will have impacts on the environment relates to the generation of the solid wastes, effluent, and water consumption.	Moderate (-ve)
Health Care	Workers may suffer from the dehydration problems, respiratory problem, and other health hazards.	Minor (-ve)
Accident	In case of road accidents by the vehicles to be used for the transportation and possible accidents from subproject activities may have serious negative impact.	Significant (-ve)

Mitigation Measures

- Conduct dissemination with the local community about the subproject details;
- Continue liaison with the community leaders in order to maintain the community support;
- Engage local contractor and local people as much as possible for positive perception of the local community;
- Follow traffic rules to avoid any accidents;
- Transportation and mobilization of the equipments and construction materials avoiding peak hours and scheduled time;
- Ensure first aid facilities and effective use of personal protective equipments where applicable.

7.15 Labor Influx and Anticipated Impacts

The labor force and associated goods and services required for construction of infrastructure civil works under this subproject cannot be fully supplied locally. The migration to and temporary settlement of laborers in the subproject, referred to as labor influx, carries an array of potentially positive and negative impacts in terms of demands on public infrastructure, utilities, housing and sustainable resource management and the strain on social dynamics.

Labor influx effects on host communities include positive impacts such as:

- The subproject activities will generate work opportunities for the local people and supplying of the construction materials, equipments, food and other necessary stuffs to the campsite;
- Improved infrastructure and public service access and availability whereby subproject investment catalyzes larger allocation of resources to a region, stimulating the development or expansion of infrastructure and public services.

Critical negative social risks include:

- Increase in criminal activity and alcohol and drug abuse, domestic violence, political attachment and violence, smuggling and robbery etc;
- Increase in gender-based violence, including eve teasing, sexual harassment etc;
- Increases in communicable diseases, including respiratory problems, diarrheal diseases, vector-borne diseases (e.g., malaria), and sexually transmitted infections (e.g., HIV/AIDS, syphilis, gonorrhea, hepatitis B);
- Conflicts arising from increased demand on existing infrastructure, services, and utilities, including transportation, health, education, water and sanitation, waste management, public utilities and community, religious, and recreational facilities and loss of land for access routes.

The general environmental impacts of labor influx include pressure on the natural resources such as using of the water, electricity, other fuel for cooking, loss of land for the labor establishment, depletion of the water supply, sewage and waste water generation, degradation of the air quality, waste generation, increased demands on the local energy and resources and noise pollution effects. The number of local and migrated people involved in the subproject activities can be only identified in the construction phase. Hence, these specific impacts will be quantified during construction work and environmental assessment report will be modified accordingly. However, the following safeguard measures are recommended to avoid any risk of labor influx:

- Inform local people about the subproject activities;
- Liaison with the community leaders in order to get community support;
- Engage local people as much as possible to minimize workers from outsiders;
- Monitor workers attitude and behavioral matter;
- Monitor the workers movement for avoiding any unexpected social activities (robbery, crime, political attachment and conflicts, drugs abuse);
- Inform and use local administration to get support if needed;
- Inform local utilities service providers;
- Ensure effective use of natural resources such as water, electricity, fuel, wood etc.

7.16 Impacts on Traffic Movement and Safeguard Measures

The access road and internal road network in the subproject area is adequate to cope with the situation. If there is no material storage as well as any work on the road and road side area, the impact on the local traffic system will be minimal.

During construction phase, interruption of the traffic movement and impact on the local traffic system due to the subproject activities will be monitored closely. Then separate traffic management plan will be provided if required. However, the following safeguard measures are recommended to minimize the impacts associated to the traffic movement:

- Inform local people about the subproject activities;
- Avoid any materials storage and any work on the road;
- Ensure schedule deliveries of material/ equipment during off-peak hours;
- Place traffic sign/cautionary sign to avoid undue traffic congestion and associated traffic control measures to limit possible disruption;
- The place of construction works should be fenced off with fences if required and should be isolated from general public access and marked with signs to ensure safe movement.

Traffic parking during operation:

There are two basements and first floor where car will be parked. The car parking has been calculated as per Imarot Nirman Bidhimala (INB) 2008. A total number of 96 car provision already designed where 11 cars will be parked in the designated surface park area within the proposed market premises and located in the architectural design.

7.17 Drainage Congestion

Construction of the proposed multi-storied building could create adverse impact on the existing drainage system through impedance to natural flow conditions. Temporary drainage congestion could occur especially during monsoon period due to excavation of earth from the basement and foundation trench. In addition, drainage congestion resulting in to stagnant water or local flooding also may be occurred in the places such as construction yard and labor's camp. In fact, the drainage system on the surrounding of the proposed building area can be affected by construction activities.

Mitigation Measures

- Temporary storm water drainage congestion in the proposed building area due to rainwater should be removed by pumping from the basement and foundation trench;
- Drainage congestion at the labor camp and construction yard should be removed by temporary earth or brick drain;
- Alternative temporary surface drain close and inside the boundary should be provided to connect with the existing drain;
- In the detailed design, surface drainage system should be included.

8 ENVIRONMENTAL MANAGEMENTPLAN (EMP)

The purpose of the Environmental Management Plan (EMP) is to ensure that the activities are undertaken in a responsible and non-detrimental manner. The EMP will guide the environmentally sound construction of the subproject and ensure efficient lines of communication between the PMU (BMDF), Chittagong City Corporation, WB and the contractors.

8.1 Access to Information

The environmental assessment report should be translated into Bengali and disseminated locally. The copies of the report (both in English and Bengali) will be sent to all the concerned personnel responsible for subproject implementation. It will also be made available to the public. The final assessment report should also be uploaded in the BMDF website and the World Bank website after approval.

8.2 Grievance Redress Mechanism

The project-specific Grievance Redress Mechanism (GRM) has been established at Chittagong City Corporation to receive, evaluate, and facilitate the solution of APs concerns, complaints, and grievances concerning the social and environmental performance of the subproject. The GRM aimed to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the subproject.

The grievance mechanism is related to resolve the risks and adverse impacts of the subproject. It addresses APs' concerns and complaints promptly, using an understandable and transparent process that is also gender responsive, and culturally appropriate. It is readily accessible to all the segments of the affected people at no costs and without retribution. The mechanism should not impede access to the country's judicial or administrative remedies. The affected people will be appropriately informed about the mechanism.

BMDF also should have its own Grievance Redress Procedure (GRP), which should operate to address any dissatisfaction and complaints by the local people regarding its activities. This Grievance Redress Procedure is being applied to address any complaints or grievances through negotiations with the community leaders and representatives of APs during implementation of the MGSP.

8.2.1 Grievance Redress Committee (GRC)

The discussions and negotiations will be conducted by the Project Implementation Unit (PIU) of Chittagong City Corporation, and will be involved the APs and Grievance Redress Committee (GRC) headed by the City Mayor. With the facilitation of PMU (BMDF), the City Mayor nominated the GRC members and included representative from Government Agencies, local NGO and Civil Society. The GRC has been formed and established at Chittagong City Corporation. A complaints box has already been provided in the City Corporation Office. The grievance response focal point is available at City Corporation for instant response to an aggrieved person. The Focal Point will collect the written complaints or suggestions from the box, and produce them to the GRC for hearing and resolution. The GRC members are as follows shown in ***Table 8.2.1***:

Table 8.2.1: List of GRC Committee Members

SL. No.	GRC Members Name	GRC Designation	Position
1	A. J. Mohammad Nasiruddin	Chairman	Mayor, Ctg. City Corporation

2	Representative of the District commissioner	Member	-
3	Mr. Utpal Barua (local NGO representative)	Member	Bright Bangladesh Forum
4	Mrs. Monowar Jahan Moni	Member	Principal, Kapasgola City Corporation Mohila College
5	Mr. Mohsin Chowdhury, Representative from Society	Member	Ex. General Secretary , Ctg. Press Club
6	Councilor	Member	Respective ward number of the subproject
7	Councilor	Member	Respective ward number of the subproject
8	Chief Engineer	Member Secretary	Chief Engineer, Chittagong City Corporation

8.2.2 Grievance Resolution Process

All complaints and suggestions will be received formally in the City Corporation Office by the GRC Member Secretary. A sample Grievance Redress Form will be prepared and sent to Chittagong City Corporation prior to the implementation of the subproject.

An intake register will be maintained at the Office of the Member Secretary. Member Secretary will record the details of the grievances in the intake register for documentation and ensure impartiality, fairness, and transparency. The intake register will have data and information columns including (i) Case no., (ii) date of receipt, (iii) name, type of complaint, grievance, (iv) father's name, husband's name, (v) sex, (vi) complete address of the person raising the complaint, grievance, (vii) main objection (loss of land, property, or entitlement), (viii) detailed complaint story, (ix) expectation with documentary evidence and previous records of similar grievances, etc.

No GRC members are allowed to contact the aggrieved persons in advance. Rather, the concerned persons are informed to attend the formal hearings at an appointed date. The GRC committee will sit for hearing the complaints of the aggrieved persons. The GRC will record salient points presented by the aggrieved person and will examine documentary evidence submitted during informal hearings. A resolution register will be maintained by the Member Secretary at the Chittagong City Corporation office. The resolution register will contain (i) serial no., (ii) case no., (iii) name of complaint, (iv) complaint story and expectation, (v) date of hearing, (vi) date of field investigation (if any), (vii) results of hearing and field investigation, (viii) decision of GRC, (ix) progress (pending, solved) and (x) agreement or commitments. Closing register will keep records such as, (i) serial no., (ii) case no., (iii) name of complaint, (iv) decision and response to complaints, (v) mode and medium of communication, (vi) date of closing, (vi) confirmation of complaintant's satisfaction, and (vii) management actions to avoid recurrence.

The GRC will decide within 30 days of receiving a complaint. There will also be an appeals procedure where, if a person is dissatisfied with the ruling of the GRC, he or she or a representative may attend their next meeting to present the case again. The committee will then reconsider the case in private, after which

their decision is final. If the appellant is still not satisfied, then GRC will refer the complaint with the minutes of the hearings to the MD-BMDF for further review. If the case at this level is again found unacceptable by the aggrieved person/s, BMDF will advise the City Corporation to drop the sub-project. Chittagong City Corporation should publish the outcome of the cases on the public notice boards. All costs involved in resolving the complaints (meetings, consultations, communication, and information dissemination) will be borne by the Chittagong City Corporation.

8.3 Institutional Arrangement for the Safeguard Compliances

In the institutional arrangement procedure, Managing Director and Project Manager will directly involve. The Managing Director and Project Manager will be supported by an environmental safeguard specialist and social management specialist. The City Corporation Officials, especially members of PIU, would be responsible for supporting the construction supervision as well as environment and social management with the facilitation of the PMU, BMDF consultants. The civil works contractors will implement these environmental mitigation measures through hiring of two Environmental Specialists. The PMU (BMDF), with the facilitation of environment and social management specialist, will submit the monthly and quarterly progress reports on environmental and social compliances to the World Bank. A tentative Environmental and Social Management Team with specific roles (shown in ***Figure 8.3.1 and Table 8.3.1***) has been formed for ensuring environmental safeguard in the overall subproject implementation.

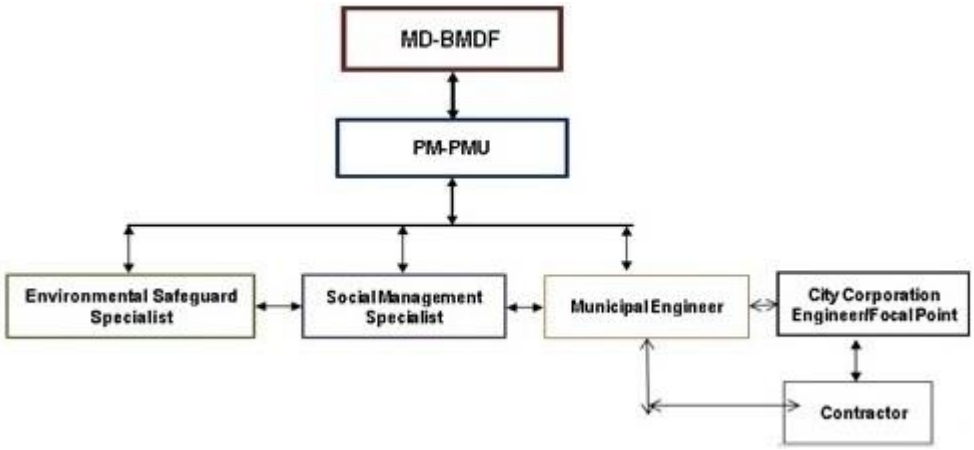


Figure 8.3.1: Environmental and Social Management Team (Tentative)

Table 8.3.1: Specific roles and responsibilities of environmental management organization

Position	Responsibility
MD-BMDF/PM-PMU, BMDF	▪ Analyze and evaluate the report coming from environmental specialist, PMU and or PIU, CCC. ▪ Provide suggestions and inputs as per requirement; ▪ Give feedback to WB.
Environmental Specialist-PMU, BMDF	▪ Supervise the overall environmental compliances in the subproject; ▪ Ensure that environment, health and safety regulatory requirements are met and EMP and monitoring plans are properly implemented; ▪ Give adequate training to PIU, CCC on EMP and monitoring plan.
Municipal Engineer, PMU-BMDF	▪ Responsible for overall supervision of the construction works.
PIU, CCC Safeguard concern/focal point for environmental safeguard	▪ Responsible for supervision and monitoring of the EMP implementation and deliver monitoring report to ES-PMU, BMDF as per schedule.
Contractor	▪ Responsible for implementation of the EMP, visual and analytical monitoring.

8.4 Capacity Building

A demonstration training program has already been conducted by PMU, BMDF at Chittagong City Corporation on 8 November 2017. Similar training program will be conducted in the same venue prior to the commencement of the work. The training program will include introductory course for the training of the City Corporation Officials and contractor's field staffs, preparing them on: (i) EMP implementation, including environmental monitoring requirements related to the mitigation measures; and (ii) Taking immediate action to remedy unexpected adverse impacts or ineffective mitigation measures found during the course of the implementation. The contractor should be also included in the training program to enhance the Environmental awareness and orientation among the workers.

A detailed training manual has already been developed by the Environmental Specialist and Social Management Specialist of PMU, BMDF prior to the demonstration training program in Chittagong. Hence, for next training program, the existing manual will be reviewed and modification will be done as per requirement.

8.5 Emergency Response and Disaster Management

Disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular the preparedness, response, and recovery to lessen the impact of disasters. Emergency Preparedness Planning (EPP) and Contingency Planning (CP) are the processes of disaster management plan for developing strategies, arrangements, and procedures to address the humanitarian needs of those adversely affected by the crisis. There are four main types of disasters, namely: Natural disasters, Environmental Emergencies, Complex Emergencies, and Pandemic Emergencies.

For subproject activities, City Corporation Officials would identify the immediate needs, prioritize the tasks, and identify resource requirements to address the humanitarian needs of those adversely affected by the crisis.

There are four forms of disaster, which may affect at any time. These are:

- Fire;
- Sudden Tidal Surge and Cyclone;
- Sudden Flooding;
- Earth Quake.

The following specific disaster management plan should consist of preventive measures including, among others, the following:

Fire

- Provision of emergency fire escape has been considered in the design of the building
- Use fire extinguisher;
- Do not touch electrical appliances with wet hands;
- Do not use faulty or malfunctioning electrical products;
- Place a leaflet of cautionary measures in front of the entrance for the awareness of the users.
- Automatic shut down system of the should be introduced;
- Continues monitoring the fire detection system;
- Sprinkler system in whole campus area;
- Separate water reservoir for firefighting has been kept in the design as per BNBC
- Immediate response team should be prepared;
- Arrangement of immediate rescue operation facilities;
- Emergency contact number and address and hospital facility should be readily available.

Cyclone, Sudden Tidal Surge and Flood

Recommended Measures:

- Design consideration should include wind velocity and thrust from heavy wind;
- Design consideration should consider highest flood during tidal surge and flash flood;
- Automatic shut down system of the electricity, gas, water and other utility services should be included in the design;
- There is considerable risk of cyclone and associated tidal surge. The committee responsible for operation and maintenance of the complex should have update information about the weather forecast;
- During heavy rains or emergencies of any kind, suspend all work;
- During cyclone, high winds and heavy stormy weather the complex should be closed;
- Cautionary signs with measures required for safety during cyclone, tidal surge and flash flood should be disseminated by the complex committee;
- Emergency contact number and address and hospital facility should be readily available.

Earthquake

Recommended Measures:

- BNBC has been followed for the earthquake resistant design of the proposed building
- Automatic shutdown system of the utility facilities should be introduce in case of high intense earthquake;
- Immediate response team should be prepared;
- Arrangement of immediate rescue operation facilities;
- Place a leaflet of cautionary measures in front of the entrance for the awareness of the users;
- Emergency contact number and address and hospital facility should be readily available.

8.6 Environmental Management Action Plan

The environmental management action plan has been outlined in ***Table 8.6.1 and 8.6.2***. The mitigation measures as well as monitoring program of the EMP are also incorporated in the environmental management action plan.

Table 8.6.1: Anticipated Environmental Impacts during Construction Phase and Corresponding Mitigation and Enhancement Measures

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Demolition of Existing building	Safety risk of labors and suurounding coomunity during demolition	• Ensure proper demolition methodology and the safety measures as stipulated in the section 7.3 to ensure the protection of the worker, general public, and adjacent property.	Contractor Monitoring- by Ctg. City corp.
Construction and operation of labor shed for the workers (Workforce and labor shed management)	• Generation of sewage and solid waste may cause water/ environmental pollution	• Ensure construction of the labor shed and stockyard at the designated place (at City Corp. owned open place at CDA 15 no. road); • Construction of sanitary latrine considering 15 persons for one toilet at the labor shed and separate toilet for male and female; • Erection of "no litter" sign, provision of waste bins (introduce separate waste bins for organic and inorganic wastes); • Ensure wastes (solid wastes and other forms of the wastes) disposal at the dumping yard is located at the Anondo Bazar area (North Middle Halishohor known as T.G). Establish a suitable place at the proposed site and or nearby suitable location from the City Corporation owned land as a secondary dumping site from where the wastes can be transported by the dump truck; • Ensure emptying and cleaning of the waste bins regularly; • Drum trucks are available in the City Corp. Hence, drum truck should be used for transportation of the wastes; • At present, the City Corp. has improved their waste management capacity. Hence, use the existing facilities for the subproject activities for the effective waste management.	Contractor Monitoring- Primarily by Ctg. City corp.

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	• Health of workers	• Comply with requirements of Government of Bangladesh Labor law of 2006 and all applicable laws and standards on worker's Health and Safety; • Conduct formal and unofficial discussion to increase awareness about hygiene practices among the workers; • Ensure availability and access to PPEs, first-aid equipment and medical supplies for the workers as per BNBC and EHS of WBG	Secondarily by PMU, BMDF
	• Possible development of labor camp into permanent settlement	• Contractor to remove labor camp at the completion of contract.	
	• Outside labor force causing negative impact on health and social well-being of local people	• Ensure that contractor employ local work force to provide work opportunity to the local people and conduct formal and unofficial awareness program for the health and social well-being of the local people; • Regular monitoring of the workers to minimize any potential impacts due to labor influx.	
• Basement work	• Safety risk of labors and suurounding coomunity	• The safety measures for surrounding site protection should be taken as described in the section 7.6	Contractor Monitoring- by BMDF and Ctg. City corp
General construction works	• Air pollution	• Check regularly and ensure that all the subproject vehicles are in good operating condition; • Ensure contractor spray water on dry surfaces of the compound and adjacent area regularly to reduce dust generation; • Maintain adequate moisture content of sand for transportation, handling and storage; • Ensure contractor sprinkle and cover stockpiles of loose materials (e.g., fine aggregates).	Contractor Monitoring- Primarily by Ctg. City corp.
	• Traffic congestion, effect on traffic and pedestrian safety	• Ensure schedule deliveries of material/ equipment during off-peak hours; • Avoid road side storage of the construction materials; • Place cautionary sign for the pedestrian and safety traffic movement.	

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	• Noise pollution	• Check and maintenance the equipment properly; • Avoid using of construction equipment (such as pilling equipment if any, brick breaking machine, steel cutter, welding machine etc.) producing excessive noise at night; • Avoid undue use of hydraulic horns by the subproject vehicles.	Secondarily by PMU, BMDF
	• Water logging	• Adequate provisions of storm water drainage and provision of the pumping-out/bailing out of the storm water if needed; • Proper maintenance of the existing drain adjacent to the site.	
	• Accidents	• Ensure fencing/safety barriers around the construction site until the completion of the construction work; • Conduct formal and informal discussion for creating awareness about the accident; • Maintain the register to record accidental events if occur; • Provides PPEs and ensure using of the personal protective equipment by the workers; • Regular checking of the mechanical equipment such as roof hoist, vibrator machine, concrete mixer machine, steel cutter, drill machine, hammer etc. • Provision of jute netting to avoid any undue fall down of the construction materials; • Ensure using of the safety belts during chipping, plastering, painting, glass fitting etc.	
	• Spills and leaks of oil, toxic chemicals and soil pollution	• Prevent discharge of fuel, lubricants, chemicals, and wastes into soil; • Use jute netting to prevent possible drop down of the cemented materials to the ground; • Collection and disposal of spills.	Contractor
All construction works	• Beneficial impact on employment generation	• Employ local people in the subproject activities as much as possible; • Give priority to poor people living within subproject area in subproject works (e.g., excavation and other works, which do not require skilled manpower);	Monitoring- Primarily by Ctg. City corp.
	• Possible complaints and suggestion from the local people and stakeholder about the subproject activities	• Use existing grievance registrar and complaints box that has been already delivered in the Pourashava.	

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
	• General degradation of the environment	• Ensure environmental enhancement measures - 75 trees will be planted to compensate the felled down trees and to enhance ecological condition and beautification.	Secondarily by PMU, BMDF
Environmental impact due to the key construction activities and corresponding mitigation measures			
Site clearing / foundation work	• Generation of solid and construction wastes; • Generation of loose soil.	• Cover exposed loose soil, construction debris etc. before disposal; • Re-use the generated soil/ wastes generated from the foundation work; • Disposal of un-used soils and construction wastes at the dumping yard is located at the Anondo Bazar area (North Middle Halishohor known as T.G).	
	• Accidents	• Operate the machineries carefully to be used for foundation work; • Operate the hammer and other accessories carefully for the removing of the existing structures. • Precautionary measures ensure during work at heights	
Sand filling work/filling work if any	• Air and dust pollution affecting nearby settlements	• Maintain adequate moisture content of sand during transportation, compaction and handling; • Carry the materials especially loose sand with adequate cover.	
	• Noise pollution	• In case of sand filling/filling if any; use the equipments carefully to avoid un-due generation of noise.	
Cutting, welding of the reinforcement and shuttering work	• Noise Pollution	• Avoid using of steel cutter and wielding machine at night and prayer time.	
	• Health and Safety	• Ensure use of the PPEs; • Availability and access to first-aid equipment and medical supplies.	
RCC (reinforcement concrete) work	• Air pollution due to black smoke emission from concrete mixer machine and vibrator machine	• Regular maintenance of the concrete mixer and vibrator machine.	
	• Noise pollution	• Avoid operation of the concrete mixer and vibrator machine at night and prayer time; • RCC work should be carried-out at regular working hour.	
	• Health and Safety	• Carefully operate the mechanical equipment (concrete mixer machine, mechanical vibrator machine etc.); • Ensure use of the PPEs; • Availability and access to first-aid equipment and medical supplies.	

Activity / Issues	Potentials Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Chipping, plastering, painting and glass fitting etc.	• Possible health and safety issues such as fall down from the height	• Use ladder/scaffolding, safety belts, helmet and other safety equipment; • Use jute netting to avoid fall down of the materials during chipping, plastering, painting and glass fitting work.	
-Fitting and fixing of the sanitary and electrical accessories; -Setting up electrical connection	• Potential health and safety risks due to mechanical and electrical equipment	• Ensure use of the PPEs as per requirement.	
• Traffic management plan	• Traffic congestion	• The traffic management plan for ongoing vehicles and construction transports need be prepared and implemented by contractor before commencement of construction, so that surrounding communities and business activities would not be disturbed.	Contractor. Ensured by Ctg. City corp

Table 8.6.2: Anticipated Environmental Impacts during Operation Phase and Corresponding Mitigation and Enhancement Measures

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Air quality degradation	• Black smoke emission, dust from the vehicles and bad odor from the wastes materials may degrade the air quality; • Bad odor from the waste bins also will degrade the air quality.	• Ensure effective traffic management; • To avoid any likely bad odor generated from the waste materials, ensure effective waste management facilities; • Waste bins should be covered and emptied regularly.	Monitoring- Primarily by Ctg. City corp.
Noise Nuisance	• Use of hydraulic horns by the vehicles may create noise nuisance; • Use of loud speaker and overcrowd may create noise nuisance;	• Ensure effective traffic management and create awareness to avoid undue use of horns; • Ensure limited use of loudspeaker; • Avoid use of loud speaker at prayer time and after 10.00 P. M.	
Drainage congestion	• Due to lack maintenance, the surface drain can be silted-up which may cause drainage congestion	• Periodic and regular cleaning of the surface drain by the CCC from their operation and maintenance program; • Avoid throwing/dumping of the wastes materials in to the drain.	
Solid Wastes generation	• Possible degradation of the environment due to improper disposal of the vegetables, kitchen, meat wastes and other sorts of wastes at shops, food courts and kitchen.	• Introduce waste bins and inspire users to use waste bins properly; • Timely collection of solid waste by waste collector and dispose to nearest secondary dumping station • Collection of solid waste from secondary dumping station to land CCC's land fill areas at Halishohor. • Biodegradable wastes (vegetable, chicken, beef, fishes and other wastes) and other forms of solid wastes should be dumped at the Anondo Bazar area (North Middle Halishohor known as T.G); •	
Traffic congestion	• Increase traffic volume and improper parking of the vehicles may create traffic congestion	• Ensure effective traffic management; • Use car parking zone for the proper parking; • Avoid any car parking on the road.	
Possible accidents and social safety risks due to fire hazard, short-circuit etc.	• Fire hazard, short-circuit and earth quake etc. may create accidents and safety risks; • Possible social vandalism due to eve teasing, robbery, pick pocketing etc	• Use fire extinguisher and ensure adequate space at staircase; • Conduct programs for awareness rising of the community people especially for the young people to minimize social vandalism.	

Activity/Issues	Potential Impacts	Proposed Mitigation and Enhancement Measures	Responsible Parties
Waste water/ sewage disposal	• Improper disposal and leakage of sewage may degrade the surrounding environment; • Waste water from the complex (especially from food courts and restaurants) into the existing drain may marginally degrade the quality of the aquatic environment of the outfall; if it carries pollutants, toxic elements and nutrients if any.	• Separate sewer lines for bath room and toilet facilities • Bath room water will discharge to a retention tank for settling and after chlorination then discharge to municipal drainage system. • Toilet waste will be discharged to septic tank through separate pipe line • Avoid discharge of the waste water from the complex in to the existing septic tank.	
Fecal sludge management	• Possible bad odor and environmental degradation due to improper collection of fecal sludge from septic tank & improper handling, transportation and disposal of the fecal sludge.	• Ensure use of closed container/vacuum tanker with sucker machine for the collection of fecal sludge from the septic tank until installation of STP • Disposal of the sludge at the existing dump site and place the other waste materials over the sludge to minimize bad odor; • Use the fecal sludge treatment plant if any located in the nearby area for the treatment, re-use and disposal.	

8.7 Environmental Monitoring Plan

Environmental Monitoring Plan for this subproject will help to evaluate the extent and severity of environmental impacts against the predicted impact and the performance of environmental protection measures. The following ***Table 8.7.1*** and ***Table 8.7.2*** have been prepared for the key environmental indicators.

Table 8.7.1: Matrix Table of Monitoring Plan (Visual observation during construction phase)

Monitored Parameter/ Issues	Monitoring Method/ Key Aspects	Location of Monitoring	Period & Monitoring Frequency
Safety orientation and training of workers	Frequency of training & orientation of workers for safety	Subproject site	• Once in a month • Reporting: Once in a month
Personal Protective Equipment	Ensure every single person involved in the activities wear and use safety equipment	Subproject site	• Daily • Reporting: Once in a month
Worker's health	Monitoring process of worker's health	Subproject site	• Daily • Reporting: Once in a month
Sanitation & drinking water facility to the workers	Availability of safe drinking water and sanitation to the workers	Subproject site	• Daily • Reporting: Once in a month
Incident record and reporting	Documented record of all incident, accident, its remedial process	Subproject site	• Daily • Reporting: Once in a month
Site security/ Fencing at the site	Isolation of site from general access by fencing, restriction of the un-authorized entry in the site.	Subproject site	• Daily • Reporting: Once in a month
Bulletin/ announcement boards/ prohibition signs	Visible in good condition or not	Subproject site	• Daily • Reporting: Once in a month
Equipment /vehicles	-Switched-off diesel engines when not in use; -Search any possible leakage; -Fuelling.	Subproject site	• Daily • Reporting: Once in a month
Dust	Dust is visible or not	Subproject site	• Daily • Reporting: Once in a month
Oily waste generation and disposal	Quantity of oily waste, storage and disposal	Subproject site	• Daily • Reporting: Once in a week
Solid waste generation	Quantity of solid wastes and disposal	Subproject site	• Daily • Reporting: Once in a month
Gender equity	No discrimination regarding payment	Subproject site	• Daily • Reporting: Once in a month
Child labor	No child will be engaged in the activities	Subproject site	• Daily • Reporting: Once in a month
Handling of hazardous materials	Fuelling, storage, operation	Subproject site	• Daily • Reporting: Once in a month

A separate monitoring checklist will be prepared and submitted prior to the construction work.

Table 8.7.2: Matrix Table of Monitoring Plan (Analytical Monitoring during construction phase)

Monitored Parameter / Issues	Monitoring Method/Key Aspects	Location of Monitoring	Period & Monitoring Frequency
Air quality (SPM, $PM_{2.5}$, PM_{10}, CO_2, SOx and NOx) measurement	• Appropriate instruments and analyzers	Subproject site	• Twice (at dry season and monsoon) during construction phase; • Reporting immediately after getting tests result.
Noise level measurement	• Through digital noise level meter	Subproject site	• Three times during construction period; • Reporting: Immediately after measurement and once in a month as a regular basis.
Drinking water quality parameters	• Appropriate instruments and analyzers	Ground water at subproject site/labor camp site/CWASA supply water	• Twice during construction phase; • Reporting: Immediately after getting test result.

8.8 Environmental Management Budget

Considering the environmental impacts and their mitigation measures for the subproject, several items are included in the BOQ for the environmental management. ***Table 8.8.1*** presents the estimated cost for the environmental management.

Table 8.8.1: Environmental Management Budget during Construction Phase

Item No.	Description of Item	Unit	Quantity	Unit Rate (BDT)	Cost (BDT)
	Overall environmental management				
	Safe demolition		To be included in civil work		
	Safe basement work		To be included in civil work		
	Traffic Mangement		To be included in civil work		
1	Establishment of labor camp (male shed-15ft X 30 ft and female shed 12 ft x 15 ft) with living arrangement, drinking water facilities, cooking arrangement, mosquito net, waste bins etc.	No.	1.00	100,000.00	100,000.00
2	Dust suppression measures by water spraying throughout the construction period in and around the subproject site, uncovered aggregates and loose materials such as stockpiles of the sand, excavated earth, construction wastes etc. and overall construction works (at least 2 times/day during dry season and as per requirement)	LS	–	–	25,000.00
3	Masonry pucca platform (at least 100 sq. ft size) providing brick soling and net cement finishing for keeping fuel and lubricants for machineries for prevention of spillage and leakage of the polluting materials in the soil and open places	No	1	15,000.00	15,000.00

4	Campsite (labor shed) wastes disposal facility during the construction period (collection, transportation, and dumping of the wastes at City Corp. designated dumping site at the Anondo Bazar area (North Middle Halishohor known as T.G): 6 nos. bins and 400 liter size (3 no. for the organic wastes and 3no. for the inorganic wastes disposal facility)	Nos.	6	7,500.00	45,000.00
5	Providing safety gear packages like hand gloves, spectacles for eye protection, helmets, ear plug, masks, visible jacket, safety shoes for at least 45 workers and 5 visitors	Set	1.5	100000	150,000.00
6	Two first aid box with necessary accessories (contractor will provide necessary medicines, saline as per requirement during construction period)	Set	2.00	2,500.00	5,000.00

	Providing and maintaining adequate potable water supply and sanitation facilities at camp site and work site				
1	Campsite water supply facilities: Provision for 2 nos. of tube well at the labor campsite and or CWASA supply water facilities (Depending on the site /layer condition and PIU safeguard concern will assist the contractor for selecting the option)	Nos.	2.00	20,000.00	40,000.00
2	Campsite sanitation facilities: 3 nos. of the toilets preferably sanitary toilets at the labor campsite (1 no. for women and 2 no. for men)	Nos.	3.00	12,500.00	37,500.00
	Environmental measures to compensate the felled down trees and clearing of the vegetation and to enhance the ecological condition in the subproject area				
1	Tree plantation (including protection, fencing and conservation during project defect liability period) around the site and anywhere suitable places within the influence area of the site to compensate the felled down trees and to enhance the ecological condition- 75 nos. of the trees (preferably local fruits, flowers, medicinal and ornamental trees-City Corp. will select the type of trees to be planted and will select location during tree plantation)	Nos.	75.00	500.00	37,500.00
	Environmental enhancement measures				
1	Cautionary signs-4 nos.	Nos.	4.00	4000.00	16,000.00
2	Installation of waste bins from ground floor to 12th floor preferably near stair and within the premises and near main entrance (See appendix for detailed design waste bin. Location will be finalized by CCC prior to the installation of the waste bins)	Nos.	38.00	8,000.00	304,000.00
3	Traffic control measures for the subproject	Nos.	1	10,000.00	10,000.00
	Environmental monitoring-analytical				
1	Air quality (SPM, $PM_{2.5}$, PM_{10}, CO_2, SO_x and NO_x) measurement. It can be measured from the recognized environmental survey company/ public institute/ university twice (at dry season and monsoon) during construction phase (24 hours continuous monitoring with the help of appropriate instruments and analyzers) (Sampling-6 parameters & two times measurement is recommended)	Parameters and frequency	2.00	30,000.00	60,000.00
2	Noise level measurement. It can be measured from the recognized environmental survey company/ public institute/ university three times during construction phase for overall construction activities (actual monitoring time will be decided by the City Corp. based on the specific activities)	Per measurement	3.00	8,000.00	24,000.00
3	Drinking water quality parameters-ground water/CWASA supply water (pH, Color-true or apparent, turbidity, total hardness, Cl, TDS, Mn, As, Fe, TC, FC) measurement. It can be measured from the recognized environmental survey company/ public institute/ university twice during construction phase (Sampling-1 & two times measurement is recommended)	Sampling, parameters and frequency	2.00	3,000.00	6,000.00
	Total				**875,000.00**

After approval to revise the cost estimate has lengthy complex procedure. Hence, as per project EMF- PMU, BMDF suggestion and experience from other projects, adequate budget has been allocated for the environmental management for the mitigation and enhancement measures. The subproject activities have temporary and localized negative impact on noise level during construction phase due to movement of the subproject vehicles and equipments. Hence, budget includes analytical monitoring for noise level. The construction activities have impact on the air quality. Hence, environmental management budget also includes

analytical monitoring for air quality. For solid waste management adequate waste bins will be installed. It should be noted that the contractor will be paid as per actual work done.

In the operation phase, quality testing of rainwater reservoir, monitoring of noise level measurement, traffic monitoring, waste water disposal and solid waste disposal requires budget. This budget can be included in CCC's operation and maintenance costs. ***Table 8.8.2*** shows the estimated cost for the environmental management during operation phase.

Table 8.8.2: Environmental Monitoring Costs during O&M Phase

Component	Stage	Description/Items	Total Costs(BDT)
Noise level measurement	During operation	It can be measured from the recognized environmental survey company, public institute/ university once in a year	To be defined by PIU of the CCC and source of fund is operation and maintenance budget of the City Corporation
Traffic monitoring	During operation	The CCC should assign a person to monitor traffic behaviors.	To be defined by PIU of the CCC and source of fund is operation and maintenance budget of the City Corporation
Maintenance and cleaning of the soak pit and septic tank and waste water disposal and fecal sludge management	During operation	The CCC is responsible for cleaning the soak pit, septic tank each year as per requirement.	To be defined by PIU of the CCC and source of fund is operation and maintenance budget of the City Corporation
Solid waste disposal	During operation	The CCC is responsible for proper collection and disposal of the wastes. The damaged trash bins also need to be replaced in time.	To be defined by PIU of the CCC and source of fund is operation and maintenance budget of the City Corporation
Drain waste water quality	During operation	Measurement of pH, DO, BOD_5, NH_3, NH_4N, PO_4. One sample from drain at complex area in each year	To be defined by PIU of the CCC and source of fund is operation and maintenance budget of the City Corporation

8.9 Environmental Codes of Practice and Key Responsibility of the Contractor

This section identifies and specifies environmental management guidelines and practices to be followed by the contractor for sustainable management of all environmental issues. The Contractor shall carry out the subproject related activities as specified in contract agreement. Chittagong City Corporation shall ensure that contractor take due responsibility to mitigate those negative impacts. Environmental awareness creation, particularly about the direct construction impacts and for the health, pollution and safety issues will be Contractor's responsibility. Clauses that may be incorporated in the tender documents are:

- ECoP-1 (Overall Environmental Protection): The Contractor shall take all steps to subproject environment and avoid causing public nuisances of all types during implementation;
- ECoP-2 (Ensuring Regularity Requirements): Contractors shall comply with the existing statutes and regulations concerning the execution of works as per requirements of DoE and donor's environmental guidelines. Contractor shall be responsible for familiarizing with the legislation relating to environmental protection that is relevant to activities;
- ECoP-3 (Labor shed Management): Contractor shall maintain the work camp and construction sites in clean and tidy conditions and shall ensure standard facilities in the labor shed;
- ECop-4 (Workforce Environment): Contractor shall engage local people as much as possible where applicable and ensure prohibition of the child labor (less than 18 years) and aged labor (more than 65 years) in heavy works. Contractor shall pay to the workers regularly and ensure no discrepancy in the wages between men and women for similar works;
- ECoP-5 (Waste Management): Contractor shall be responsible for the safe transportation and disposal of the wastes generated due to the subproject activities in such a way that no environmental pollution or hazard to health is caused to the workers and local people;
- ECoP- 6 (Workers Health and Safety): Contractor shall be responsible for providing personal protective equipments and first aid facilities as per requirements.
- ECoP-7 (Compensation for Accidents): Contractor shall bear medical treatment costs for any accidents. If any severe accidents such as loss of hands, legs or loss of working ability or any case of death needs compensation- (the amount of the compensation should be fixed considering the type of accidents);
- ECoP-8 (Implementation of the Mitigation Measures): Contractor shall responsible for the implementation of the mitigation measures mentioned in the EMP and follow the guidelines in the daily activities of the subproject;
- ECoP-9 (Spill Prevention, Fuels and Hazardous Substances Management): Contractor shall take preventive measures for spill prevention and fuels and hazardous substances management. Contractor shall not allow waste oil, lubricant or other petroleum derivatives to be used as dust suppressants and shall take all reasonable precautions to prevent accidental spillage;
- ECoP-10 (Restoration of the Facilities): The contractor on completion of the contract shall remove the equipment, surplus materials, and rubbish and temporary structures of all types and shall leave sites in clean condition to the satisfaction of City Corporation Officials and local people;
- ECoP-11 (Conducting Analytical Monitoring): Contractor shall responsible for conducting analytical monitoring as per EMP and submit the reports to the City Corporation;
- ECoP-12 (Hiring of the two environments, health and safety supervisor): The contractor will hire at least two environments, health and safety supervisor for this subproject for ensuring safety of work as per EMP and as stipulated in the Labor Act-2006 and BNBC codes of Bangladesh.

9 ANALYSIS OF ALTERNATIVE

a. The Proposed Development Alternative

This EA report will be presented to the Department of Environment (DOE) and WB. This study will help in evaluating and examining the effects of the subproject on the environment. After the evaluation and under the proposed development alternative, an Environmental Clearance Certificate (ECC) would be issued. This way, DOE and WB would approve for the implementation of the subproject. However, the development has to ensure that all environmental measures are complied during the construction period and during operation. The alternative consists of the proponent's final proposal with the inclusion of the DOE and WB guidelines and regulations and procedures. This is as stipulated in the Environmental Conservation Rule (ECR) of 1997 and OP/BP 4.01 Environmental Assessment, which aims reducing environmental impacts to minimum extent practicable.

b. Analysis of Alternative Locations

At the moment, there are no alternative sites for the proposed development (i.e. the project proponent doesn't have an alternative site). This means that the proponent has to look for the land if relocation is proposed and land is not available and if available it will be too expensive for the proponent to realize its dream. Looking for the land to accommodate the scale and size of the project and completing official transaction on it may take a long period. In addition, it is not a guarantee that such land would be available. It's also worth noting that the said project is already underway in terms of seeking development approvals.

The proposed subproject site has already been developed by City Corporation. Hence, there is no activity to be needed for the land development work. The proposed site is also very suitable for commercial complex because it is located adjacent to the residential area with commercial activities. Considering the minimal adverse impacts on the socio-ecological environment, and physico-chemical environment, this site has been selected. Therefore, analysis of the alternatives location is not really applicable.

c. Analysis of Alternative Designs and Inclusion of Environmental Design Considerations

Construction Material and Sources

Sand: River sand quite abundant in the various riverbeds in Bangladesh. For this subproject sand will be collected from these sources.

Brick: It is better to collect the brick from environmental friendly brick field. To minimize self weight of the building hollow brick and or environmentally friendly brick demonstrated by National Housing and Research Authority can be used.

Concrete Aggregate: Stone aggregates from Sylhet quarries are commonly used for the manufacture of normal and high strength concrete and it is proposed to be used for the proposed subproject.

Cement and Steel Reinforcement: Bangladesh produces different classes of EN and ASTM standard cement and high strength deformed bar of 40, 60 and 75 grades. These materials are readily available in the City corporation area.

Glass Wall: Instead of brick masonry wall, glass wall can be used in order to access the sunlight inside the building.

The following environmental design consideration should be included in designing of the commercial complex with urban facilities to confirm trans-boundary or global issues:

- Provision of roof top rainwater harvesting (RWH) system as a part of the water supply system;
- Roof top solar energy system for a part of electricity supply;
- Provision of adequate waste bins to introduce waste management systems;
- Provision of roof top and terrace side and ground plantation as a part of beautification work;
- Provision of surface drain for drain-out the storm water and wash-out waste water;
- Adequate provisions for optimum traffic circulation.

d. Analysis of the Alternative Technologies/ Methods of the Construction

Based on the available technologies in Bangladesh and with the assistance of the consultant of PMU, BMDF, the City Corporation Officials will examine the method of the construction. However, to minimize occupational health and safety risks and for effective use of the human labors, it is highly recommended to adapt mechanical system where possible for instance concrete mixer machine for casting, pile driving machine for pile work if any, mechanical vibrator machine, and other electro-mechanical equipment as per requirement.

e. The No Action Alternative

The No Action Alternative in respect to the proposed project implies that the status quo is maintained. This option is most suitable alternative from an extreme environmental perspective as it ensures non- interference with the existing conditions. However, the project activities have already been started. This option will however, involve several losses both to the project proponent and the donor organization. The property will remain under-utilized. The No Project Option is the least preferred from the socio-economic and partly environmental since if the project is not done.

- After completion, the subproject has significant benefits to the community people. Without subproject there is no positive benefit;
- The economic benefits especially during construction i.e. provision of jobs for skilled and non-skilled workers will not be realized;
- There will be no generation of income by the developer to the Government;
- The local skills would remain under-utilized;
- No employment opportunities will be created for Bangladeshi who will work in the project area;

- Discouragement for donors to allot this level of standard and affordable developments.

From the analysis above, it becomes apparent that the No Project Alternative is not the appropriate alternative to the local people, and the Government of Bangladesh.

10 PUBLIC CONSULTATION AND PARTICIPATION

10.1 Methodology

In the context of preparing the Environmental Assessment (EA), participatory public consultation was conducted for the subproject. The City Corporation Mayor, Officials, Engineers and local individuals as well as BMDF and Consultant participants participated. Informal Focus Group Discussions (FGD) and a formal CIP were conducted involving the participants (Participant list is shown in ***Appendix-2***). In addition, walk-through informal group consultations and individual interviews were also held. The evidence of the consultation meeting is shown in the ***Photographs 10.1.1***. The local communities were informed about the subproject intervention including their benefits. Suggestions made by the participants were listed and incorporated in the EMP accordingly.

Photographs 10.1.1: Consultation Meeting at City Corporation

10.2 Issues Raised by the Participants

The participants raised the issues related to the infrastructure development of Chittagong City Corporation. The anticipated environmental and social impacts due to construction works have also been raised and discussed. The participants also discussed about the potential benefit from the subproject.

10.3 Feedback, Suggestions, and Recommendations of the Participants

The participants were presented with feedback, suggestions, and recommendations listed below:

- The consultation results confirmed that an improved communication network is needed for future development of Chittagong City Corporation;
- The participants stated that the public water supply facilities, sanitation facilities, and access road are not adequate;
- The participants stated that construction works should be scheduled properly;

- ❖ Local people also showed expectation for the increased opportunities for the employment for unskilled or semi-skilled labor in the construction work.

11 CONCLUSIONS AND RECOMMENDATIONS

Activity wise environmental impacts of all the elements of the subproject have been assessed and were identified in relation to subproject site, construction, and operation phases. The study has been conducted through identifying the potential impacts, assessing them and recommending possible mitigating and enhancing measure for negative and positive impacts, respectively.

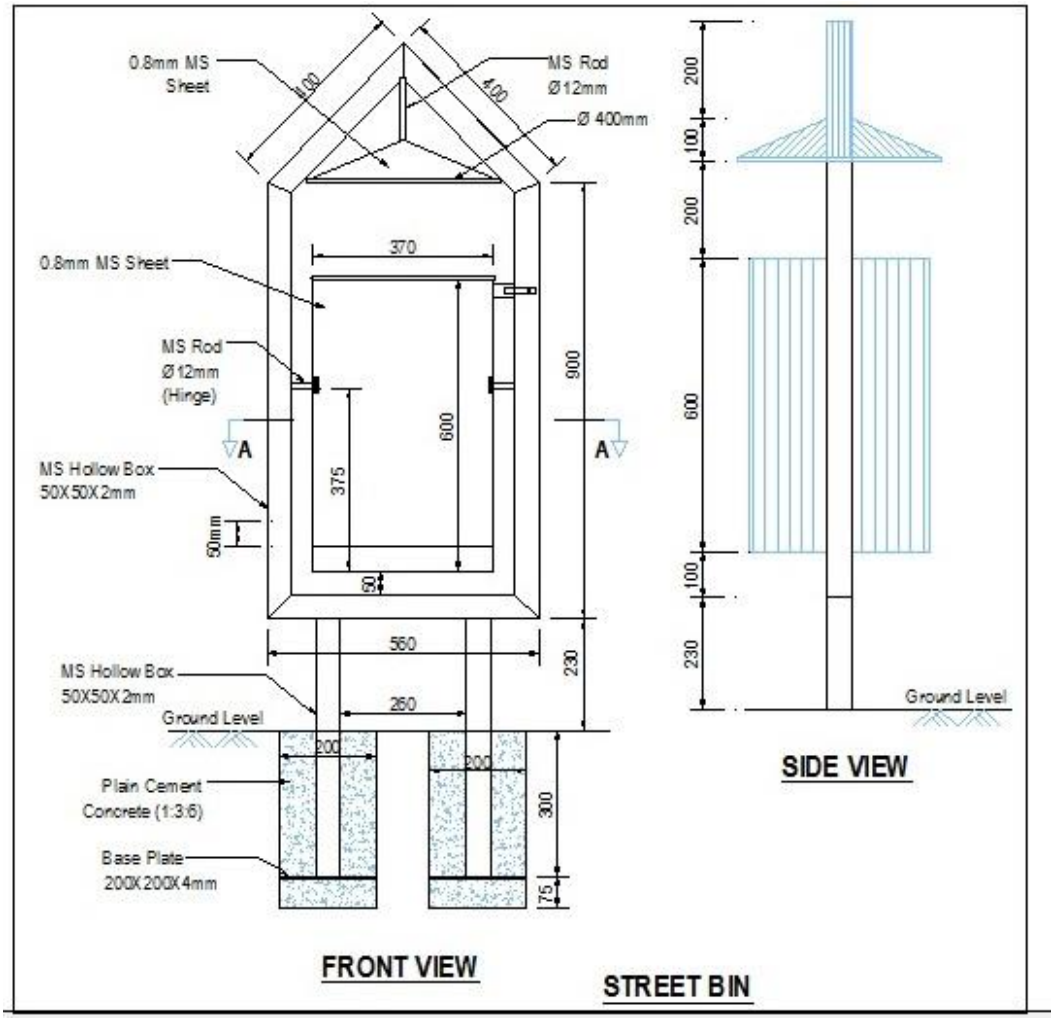
The ecological impact due to the subproject intervention is insignificant. The adverse impacts on the physicochemical components such as air quality, noise level, traffic congestion, solid waste generation etc will be localized and limited during construction period. It is also anticipated that the overall adverse impacts due to the subproject activities is manageable through mitigation measures. In fact, the anticipated impacts due to the subproject activities are relatively minor in comparison to the significant benefits that will derive due to the implementation of the subproject. Thus, it can be concluded that the proposed subproject is environmentally acceptable and will bring economic, social and environmental benefits to the local community.

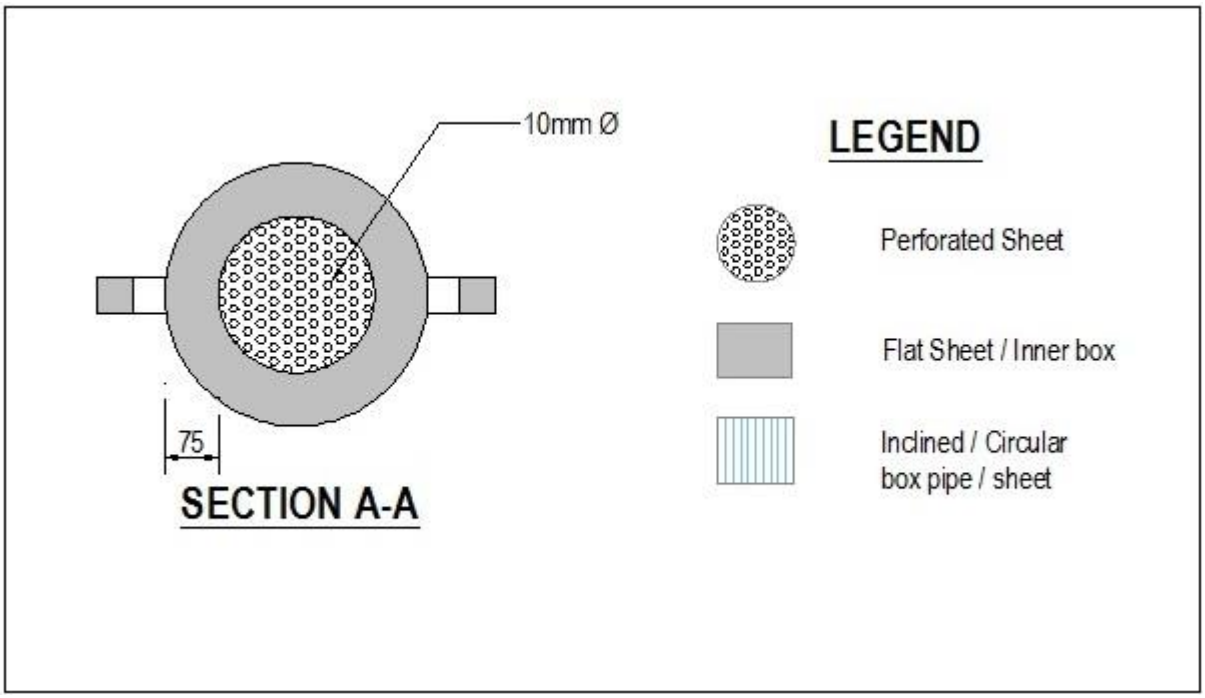
A few key recommendations are outlined below:

- The City Corporation should inform the local people about the subproject intervention prior to the construction works to be started;
- The construction work should be followed structured work program;
- The City Corporation will ensure availability of the EMP at subproject site during construction phase;
- All mitigation and enhancement measures proposed in this report need to be followed;
- Visual and analytical monitoring should be carried-out as per EMP and with the facilitation of the City Corporation Officials;
- Contractor will ensure availability of the PPEs and first-aid, water supply and sanitation facilities to the workers;
- Contractor will hire two Environmental Specialist to ensure EMP and to monitor the workers behavioral matter to avoid any undue issues associated to the labor influx;
- Location of the septic tank, water reservoir and solid waste collection areas should be clearly marked in the drawing;
- The EMP shall be made binding on contractor operating the site, and will be included in the contractual clauses.
- Considering this subproject as “orange B” category under GOB and category B as per WB, this study is sufficient as the environmental assessment for this subproject. Other than updating during detailed design if required, no further detailed studies are required.

APPENDIX

Appendix-1: Design of the Waste Bins




10mm Ø
75
SECTION A-A
LEGEND
Perforated Sheet
Flat Sheet / Inner box
Inclined / Circular
box pipe / sheet

Appendix-2: Lists of the Key Attendants of the Consultation Meeting

CHITTAGONG CITY CORPORATION

Date- 20-11-2017

Name of the Subproject: 1) Construction of Multistoried Multipurpose commercial Building at 27 NO. south Agrabad Ward
2) Construction of sports complex at Bakalia, 35 NO. Boxirhat Ward.

Name of the ULB: Chittagong City Corporation Upazila: District: Chittagong

Mauza: Ward/ Mahalla: 1) 27 NO. south Agrabad Ward
2) 35 NO. Boxirhat Ward.

Attendance of Local Participants in the Screening Exercise
Local Stakeholders, Community Members and WC/CBO

Sl. No.	Name	Gender (M/F)	Social Status	Contract Number	Signature
1	A.J. MOHAMMAD NASIRUDDIN	M	MAYOR	01713120860	
2.	Md. Shamsuddoha	Male	CEO, CCC	01711196668	
3	Mohammad Abul Hossain	Male	Secretary, CCC	01556561098	
4.	H. M. SHOHEL	Male	Councillor	01711444016	
5	H.O NURUL. Haque	M	C. C. C.	01815590199	
6	AFROZA KALAM	Female	"	01819-940392	
7	LUTFUNNESA DOVASH BABY	Female	COUNCILLOR	01819380450	
8	Engr Rafiqul Islam	M	Addl CE & PD Ctg City Corp.	01819 328023	20/11/17
9	Engr. Biplab Das	M	XEN. Ctg. City Corp.	01819-349087	
10	Abu Sadat Md. Tayeb	M	XEn/CCC	01758-313144	20/11/17
11	Ar. Abdullah Al Omar	M	Architect, CCC	01717117913	
12	Anowar Jahan	M	AE, CCC	01670317374	
13	Ekhlasuddin Ahmed	M	E.O, CCC	01913-631751	