Initial Environmental Examination

June 2019

[DRAFT]

BAN: Skills for Employment Investment Program (Tranche 3)
Construction of Two New Training Centers

Prepared by the Skills Development Coordination and Monitoring Unit
For Skills for Employment Investment Program (SEIP)
Finance Division, Ministry of Finance
Government of Bangladesh

CURRENCY EQUIVALENTS
(as of 17 June 2019)

Currency Unit	–	Taka (Tk)
Tk1.00	=	$0.01182
$1.00	=	Tk84.555

ABBREVIATIONS

ADB	–	Asian Development Bank
BARC	–	Bangladesh Agricultural Research Council
BBS	–	Bangladesh Bureau of Statistics
BCCSAP	–	Bangladesh Climate Change Strategy and Action paper
BACI	–	Bangladesh Association of Construction Industry
BITAC	–	Bangladesh Industrial Technical Assistance Center
BMD	–	Bangladesh Meteorological Department
BMET	–	Bureau of Manpower, Employment and Training
CSE	–	Construction Supervision Engineer
DOE	–	Department of Environment
EA	–	executing agency
EARF	–	environmental assessment review framework
ECR	–	Environmental Conservation Rules
EIA	–	environmental impact assessment
EMP	–	environmental management plan
IA	–	implementing agency
IEE	–	initial environmental examination
GPS	–	global positioning system
GRC	–	grievance redress committee
MEWOE	–	Ministry of Expatriates' Welfare and Overseas Employment
SEIP	–	Skills for Employment Investment Program
SPS	–	Safeguard Policy Statement

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EXECUTIVE SUMMARY

1. The Skills for Employment Investment Program (SEIP) supports the Government of Bangladesh for its skills development agenda anchored in the 2011 National Skills Development Policy, financed by the Asian Development Bank (ADB). The SEIP aims to enhance the employability and productivity of the growing young workforce with industry relevant skills training for the country's priority sectors. It supports large-scale private sector involvement in training, as well as public training institutes, to help scale up skilling of new entrants and upskilling of existing workers to meet emerging demands in domestic and overseas markets. The SEIP has adopted the multitranche financing facility (MFF) modality to assist the government's strategic road map that intends to transform its skills development system both quantitatively and qualitatively over the 10-year period. The SEIP is being supported by three tranche loans, and two tranches are currently supporting the SEIP with Project 1 (2014–2019) and Project 2 (2017–2021).

2. For Tranche 3, SEIP will support the construction and renovation of two training facilities: one by the Bangladesh Industrial Technical Assistance Centre (BITAC) at Tejgaon, Dhaka, and another by the Bangladesh Association of Construction Industry (BACI) at Uttara, Dhaka. This initial environmental examination (IEE) report, including the environmental management plan (EMP), has been prepared for the proposed sites. This IEE report presents potential environment issues related to the proposed constructions and renovation of training facilities. The IEE has been carried out according to the SEIP's environmental assessment and review framework (EARF), which outlines required steps for IEE and EMP according to government environment regulations and ADB's Safeguards Policy Statement (SPS;2009).

6. The proposed BITAC site is within the Tejgaon campus of BITAC. The current campus has limited space and the proposed site covers the existing hostel. The hostel will be demolished to make space for the new building. The proposed building has a 20ft wide road adjacent to it. The campus is well connected to the main road, which is 120ft wide. The site is above flood level and well drained. The BACI site is located in Uttara Sector 16, a barren area under development by Rajuk authority of Bangladesh Government. The Rajuk is implementing the Uttara Residential town (third phase) near the site. The site is situated approximately 20 km from the zero point of Dhaka City.

3. For Tranche 3, there may be some additional renovation, upgrading, or repairing works for other training centers, but those have not been identified yet. Therefore, this IEE covers only the two training centers of BACI and BITAC, for which the designs have been prepared.

4. The project has been categorized as B for environment under the ADB's SPS. The environmental category of the subproject is not listed in Schedule–1 of ECR. However, the construction of training center is relevant to the multistoried building, hotel etc. which is listed in Schedule–1 of ECR and falls in Orange B.

Beneficial Impacts

8. SEIP will contribute positively to the local environments of the selected training sites by developing healthy and safer environments around the training centers, which include natural light and well-ventilated classrooms, structures resilient to environmental extremes (including climate variability such as severe storms and geophysical hazards such as earthquakes and landslides), improved hygiene among trainees, and provision of clean drinking water. Capacity building of stakeholders in environmental safeguards, solid waste management, and preparation of resilient

infrastructure will enhance the knowledge and awareness of sustainable infrastructure development for other facilities as well as training sites.

Negative Impacts

9. The construction, repairing, renovation, demolition, and removal activities may cause some adverse environmental impacts, including dust and noise pollution. Although impacts may be minor and insignificant in scale, the activities may also cause disruption of natural ecosystem, occupational health hazards, risk from poor sanitation system, and contamination in land and water.

10. **Traffic Congestion.** BITAC site is on busy premises. Expected impact may arise from traffic movement (heavy vehicles) during construction works.

11. **Air pollution.** Conducting works at a dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons), which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

12. **Top soil loss followed by soil erosion.** Significant excavation, cut, and fill is expected. Construction will also require concrete mixing, although the required duration may not exceed a couple of weeks. The proposed sites are on relatively flat land: the BITAC site is on enclosed built-up area and the BACI site is on a sand-filled developed area. Therefore, significant soil erosion is not expected. The impacts are negative but short- or medium-term, site-specific within a relatively small area and reversible by mitigation measures.

13. **Noise Impacts.** Construction noises may hamper daily educational activities of students and teachers at the BITAC site. Temporary increases in noise level and vibrations may be caused by excavation equipment and by the transportation of equipment, materials, and people. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

14. **Water Pollution.** Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result in silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water, especially at the BACI site.

Measures for Mitigation and Environmental Enhancement

15. The potential negative impacts along with mitigation measures are discussed in the environmental management plan (EMP) in **Table 10** and **Table 11**. Some environmental enhancement measures are also suggested in **Table 12.**

16. A well-defined grievance redress and resolution mechanism needs to be established to resolve grievances and complaints in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through a public information campaign. The grievance redress process includes three levels.

17. Students and representatives from BITAC and BACI were consulted to get their views and concerns. As part of the process, they were also provided with relevant information on the project

prior to discussions. These stakeholders included the central and local authorities and the local communities to hear their views on the project's potential impact. Attendees in the consultation meeting were apprised of the processes through which the project will proceed for implementation, the environmental impacts that may arise during implementation, and steps to be taken toward mitigating the impacts. They were told about the impacts, all of which could be easily mitigated. The audience expressed satisfaction of such mitigation measures. The public consultations were held during field visits on 7 and 8 April 2019.

18. The executing and implementing agencies (EA/IA) will send a written endorsement to ADB for disclosing these documents on the ADB website. The Skills Development Coordination and Monitoring Unit (SDCMU), serving as the project's main project management unit, will provide relevant safeguards information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. Disclosure will follow ADB's Public Communication Policy, 2011.

19. This report assessed various existing environmental parameters in and around the SEIP's proposed construction under Tranche 3 project. While some adverse impacts may be generated during the construction, the impact will be minor and insignificant. The mitigation actions are outlined to minimize any significant negative impact. None of the SEIP training sites is located in a sensitive ecosystem and is not significant from the historical and cultural perspective. SEIP will not cause any significant adverse environmental and social impacts during the construction, repair, or renovation phase. The positive impacts arising from SEIP operations will more than outweigh the potential negative impacts, which are likely to be insignificant.

I. INTRODUCTION

A. Background

1. The Skills for Employment Investment Program (SEIP) supports the Government of Bangladesh's reforms in skills development according to the National Skills Development Policy, 2011 financed by ADB. It supports large-scale private sector involvement and public–private partnerships, as well as public training institutes, to train skilled workers. The aim is to enhance productivity and meet skills needs in the labor market. The SEIP helps the government to scale up skilling of new entrants and up-skilling of existing workers that will contribute to higher growth in priority sectors. The impact of the project will be increased income and productivity of the working population aged 15 years and over. The outcome will be increased inclusive access to basic, mid-level, and advanced skills training in priority sectors. There are four targeted outputs: (i) market responsive inclusive skills training delivered; (ii) quality assurance system strengthened; (iii) institutions strengthened; and (iv) monitoring and management for skills development enhanced. The SEIP has adopted the multitranche financing facility (MFF) modality to assist the government's strategic road map that intends to transform its skills development system both quantitatively and qualitatively.

2. The proposed Tranche 3 aims to strengthen ongoing partnerships for industry-relevant entry- and mid-level skills training. It also builds a pathway for sector-related skills acquisition by incorporating advanced course to meet emerging Industry4.0 skills requirements. For this purpose, Tranche 3 project will support the renovation and transformation of BITAC training facilities to offer higher-end job-ready training courses in precision engineering, mechatronics, and electrical engineering. The BITAC renovated center is also envisaged to focus on R&D for innovation and prototype product development in cooperation with the engineering industry. Tranche 3 project will also support the construction of training workshops for BACI to respond to increasing demand for skilled workers in the construction industry. This IEE report, along with EMP has been prepared for proposed sites.

B. Purpose of the report

3. The IEE has been prepared based on the Environmental Assessment and Review Framework (EARF) developed by the ADB and endorsed by Bangladesh Government. The IEE also follows the guidelines of the Department of Environment (DOE) as required by the Environmental Conservation Rule (ECR) 1997 (amended 2002, 2010 and 2017) and in accordance with the Safeguard Policy Statement 2009 (SPS 2009) of ADB and will be disclosed in the websites of the ADB and the implementing agencies. This document shall serve as the base of environmental assessment of the proposed sub-project to be implemented by the executing agency and guideline for environmental management activities on-site.

C. Scope of this report

4. The Project require that any proposed development will require that the laws and regulations of Bangladesh are applied in full. The Project is then subject to approval under the Government of Bangladesh's Environment Conservation Act (1995) (ECA) and Environment Conservation Rules (1997).

5. The IEE report aims to provide guidance on safeguard screening, assessment, institutional arrangement and process to be followed for components of the project, where design

takes place after Boards approval. This report also fulfils the requirements of IEE under the provisions of the ECR.

6. The scope of this report and the subsequent IEE is specific to the sub-project. It does not provide any assessment for any other/future developments or activities at the location or anywhere else within Dhaka or other project areas. Should any further development be planned as result of either this Project or other related work, additional planning and assessment to the requirements of the Government of Bangladesh must be carried out specifically in relation to that proposed development.

D. Approach and methodology

1. Purpose and Approach

7. The primary purpose of the IEE is to investigate and describe impacts of the proposed subproject to the existing environmental elements. Specifically, the study aims to predict the potential impacts of the project activities and recommend mitigation and abatement measures for impacts (in the pre-construction, construction and operational stages of development) that are considered potentially adverse to the surrounding environment.

2. Data sources of IEE

8. The following documents were used as reference in the preparation of the IEE report:
- Available technical reports from various organization
- Available laws, rules, regulations, acts, policies from Bangladesh Government websites
- Maps from open sources and various governmental and non-governmental websites
- Data from secondary literatures in including books and relevant websites

3. Scoping and gathering baseline data

9. Scoping of issues to be addressed in the IEE was conducted early in the assessment process (i.e. Field visit) to collect the appropriate baseline information so that collected and the IEE report/study can focused on the relevant issues needed.

10. The objectives of undertaking the scoping activities were:
- To provide an early link among the implementing agency, the recipient and affected community and the IEE preparer;
- To ensure that the IEE will address only relevant issues and concerns;
- To present the scope of environmental studies, issues and alternatives that requires thorough examination and consideration in the master plan; and
- To ensure complete coverage of potential environmental and social issues that is required under the ADB Environmental and Social Considerations.

II. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

A. Introduction

11. This section of the IEE details the Administrative Framework for the Project, covering national requirements as well as applicable international treaties and conventions. The intent of this section is to lay out the regulatory and non-regulatory performance requirements for all stages

of the Project. For the purposes of this report, only those regulatory elements directly relevant to the proposed Project will be discussed.

B. National Environmental Legislation Framework

1. Overview of the project approval process

12. Key legislation governing the environmental approvals process for the proposed Project is the Bangladesh Environmental Conservation Act, 1995 (BECA, 1995)[1] and the Environmental Conservation Rules (ECR, 1997)[2].

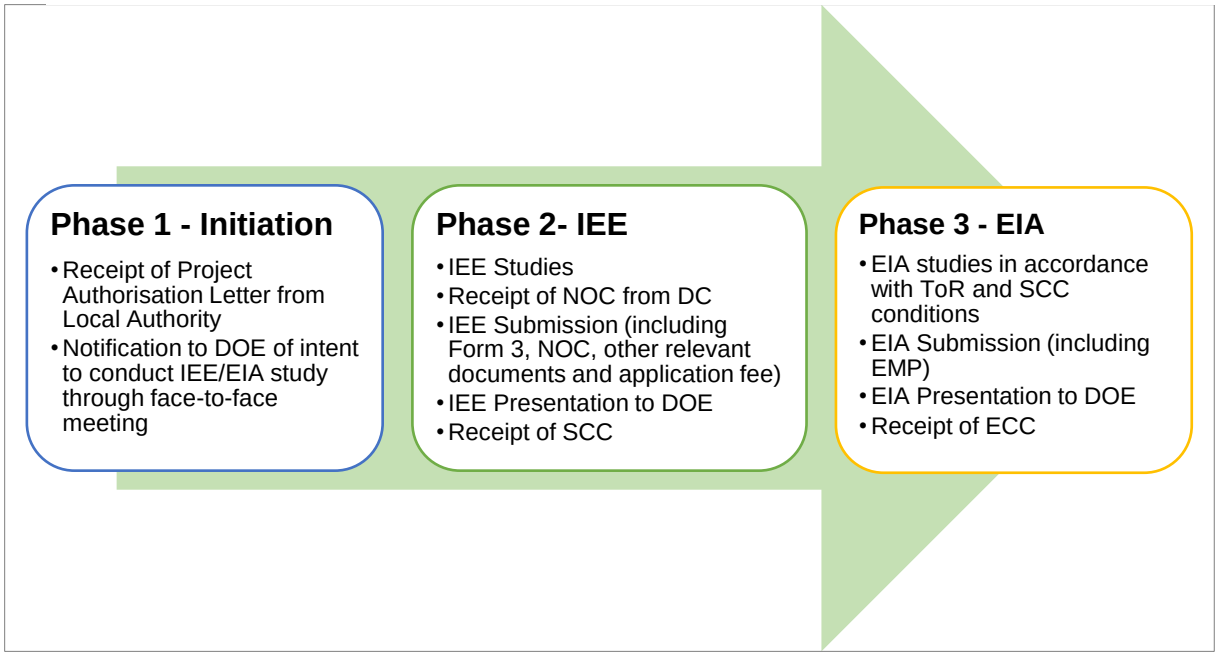
2. Environmental Approval Framework

13. Key milestones in the approvals process are outlined in **Figure 1**. These comprise:

- **Project Authorization Letter.** Formal authorization of the Project by the Finance Division, Ministry of Finance is required in order for the environmental approvals process to formally commence.
- **No Objection Certificate (NOC).** A NOC must be received from the Deputy Commissioner in the sub-project area before the SCC application can be made.
- **Site Clearance Certificate (SCC).** A SCC will be issued by DOE upon approval of the IEE study (note that the IEE submission is to include the Project Authorization Letter, NOC and SCC application form). The SCC will include a ToR for the IEE/EIA study, and typically provides authorization for site establishment works to commence.
- **Environmental Clearance Certificate (ECC).** The ECC will be issued by the Department of Environment (DOE) upon approval of the IEE/EIA study (including associated EMP). The ECC allows project construction to commence and contains specific approvals requirements for matters such as pollution control and environmental monitoring.

[1] The Act was amended by Act Nos. 12 of 2000, 9 of 2002, and 50 of 2010.
[2] The ECR was amended in 2002, 2005, 2010, and 2017.

Figure 1: Environmental Approval Framework in Bangladesh



14. **Table 1** provides an overview of key Bangladesh legislative approvals requirements which are relevant to the Project, and the permissions required under this legislation in order to undertake the subproject works.

Table 1: Required Permissions for Project under Bangladesh Legislation

Legislation	Permission Required	Purpose	Permission Given By
Environment Conservation Act (1995) Environment Conservation Rules (1997)	SCC and ECC	DOE will issue an SCC to allow for a detailed EIA as per Section 12 (ECA), Rule- 7 and Form -3 of the ECR.	Director General of the Bangladesh DOE
Acquisition and Requisition of Immovable Property Act (1982)	NA	NA	NA
Bangladesh Electricity Act (1910) and Regulations	Permission /licence required	Laying down or placement of electricity supply lines.	Rural Electrification Board/Power Development Board

C. National relevant policies and strategies

15. This section summarizes the National Laws and describes the procedure for obtaining environmental permits to allow project implementation. Over the years the Government of Bangladesh has enacted environmental acts, rules, policies and regulation toward imposing restrictions facilitating minimization / mitigation of likely impacts due to development projects. The most important Act is Environmental Conservation Act, 1995 (ECA, 1995) and Environmental Conservation Rules (ECR, 1997).

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

Table 2: Summary of Environmental Legislations Applicable to the Proposed Project

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
1	National Environmental Policy, 1992	Ensure that development components do not pollute the environment or degrade resources. It sets out the basic framework for environmental action together with a set of broad sectoral action guidelines.	• Restriction on operations which cannot be initiated in ecological critical areas • Regulation on vehicles emitting smoke which is harmful to the environment • Follow standards on quality of air, water, noise and soil • Sets limits for discharging and emitting waste	Ministry of Environment and Forests, and Climate Change
2	National Environmental Management Action Plan (NEMAP), 1995	An action plan to identify key environmental issues affecting Bangladesh, identifies actions for reducing the rate of environmental degradation and improve quality of life.	Sectoral agencies to coordinate with MOEFCC in preparing environmental guidelines	Ministry of Environment and Forests, and Climate Change
3	Environment Court Act, 2000 and subsequent amendments in 2003	Establishment of Environment Court for trial of an offence or for compensation under environmental law, such as environment pollution.	Option to affected persons for grievances related to environment safeguards.	Ministry of Environment and Forests, and Climate Change
4	National Safe Drinking Water Supply and Sanitation Policy of 1998	Ensures access to safe water and sanitation services at an affordable cost	• Pourashavas and water sanitation authorities will take actions to prevent wastage of water. They will take necessary steps to increase public awareness to prevent misuse of water • Pourashavas shall be responsible for solid waste collection, disposal and their management	Ministry of Local Government, Rural Development, and Cooperatives
5	National Water Act 2013	Ensures Bangladesh water sources are free from any type of pollution. Pollution from water in urban outfalls and reservoirs, e.g. lakes, canals, ponds and ditches may result in amenity losses, fisheries depletion, health problems and fish and aquatic species contamination.	Secure clearance certificate on water resource development subprojects	Ministry of Water Resources
6	Wetland Protection Act 2000	Advocates protection against degradation and resuscitation of	Some construction will be done close by waterbodies and	Ministry of Water Resources

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
		natural water-bodies such as lakes, ponds, beels[3], khals, tanks, etc. affected by man-made interventions or other causes. Prevents the filling of publicly-owned water bodies and depressions in urban areas for preservation of the natural aquifers and environment. Prevents unplanned construction on riverbanks and indiscriminate clearance of vegetation on newly accreted land.	wetlands. Interventions with the waterbodies and stream network will be so that they do not restrict stream flow and drainage.	
7	Bangladesh Labor Law, 2006	• It is a comprehensive law covering labour issues such as: conditions of service and employment, youth employment, benefits including maternal benefits, compensation for injuries, trade unions and industrial relations, disputes, participation of workers in company's profits, regulation of safety of dock workers, penalty procedures, administration and inspection. • This Act pertains to the occupational rights and safety of factory workers and the provision of a comfortable environment for working. It also includes rules on registration of labourers, misconduct rules, income and benefits, health and fire safety, factory plan	• Compliance to provisions on employment standards, occupational health and safety, welfare and social protection, labor relations and social dialogue, and enforcement. • Prohibition of employment of children and adolescents.	Ministry of Labor and Employment
8	Bangladesh Labor Rules, 2015	Includes rules on registration of laborers, misconduct rules, income and benefits, health and fire safety, factory plan	• Contractors to implement occupational health and safety measures • Contractor will be liable for compensation for work-related injuries	Department of Labor
9	Bangladesh Climate Change Strategy and Action Plan of 2009	Enhances the capacity of government ministries, civil society and private sector to meet the challenges of climate change	Integrate adaptation measures for buildings in consideration of extreme climatic events	Ministry of Environment, Forests and Climate Change
10	Building Construction (Amendment) Act and Building Construction Rules, Bangladesh National Building Code	Regulates technical details of building construction and to maintain standards of building construction	Follow specifications to ensure structural integrity of buildings	Ministry of Housing and Public Works
11	The National Energy Policy (1996 and Updated 2004)	Ensures environmentally sound sustainable energy development programs causing minimum damage to the environment, to encourage public and private sector participation in the development and management of the energy sector and to bring the entire country under electrification.	Public and private sector participation in the development and management of the energy subprojects. Provides guidelines for renewable energy subprojects	Ministry of Power, Energy and Mineral Resources

[3] A beel is a billabong or a lake-like wetland with static water (as opposed to moving water in rivers and canals - typically called khaals), in the Ganges - Brahmaputra flood plains of the Eastern Indian states of West Bengal, and Assam and in the country of Bangladesh.

No.	Environmental Legislation / Act	Objective	Relevance to the Project	Responsible Institution
12	Standing Order on Disaster, 1999 (Updated 2010)	Enhances capacity at all tiers of government administrative and social structures for coping with and recovering from disasters	Advice from the concerned District Committee should be obtained prior to final decision	Ministry of Disaster Management and Relief
13	National Disaster Management Act of 2012	Establishes a framework for managing disasters in a comprehensive way.	Setting-up emergency response procedures	Ministry of Disaster and Relief

D. Applicable International Agreements

17. Aside from the legal framework on environment, Bangladesh is also a party to several international conventions, treaties and protocols related to environmental protection. The applicable international conventions, treaties and protocols are described in **Table 3**.

Table 3: Applicable International Conventions, Treaties and Protocols

	Conventions	Signed	Ratified/ Accessed (AC) /Accepted (AT)	Relevance
1	Convention on Wetlands of International Importance, 1971 (Ramsar Convention)		20.04.1992 (ratified)	Protection of significant wetland and prevention of draining or filling during construction
2	Convention Concerning the Protection of World Cultural and Natural Heritage (Paris, 1972)		03.11.1983 (ratified)	Prevention of damage or destruction of culturally and/or historically significant sites, monuments, etc.
3	United Nations Framework Convention on Climate Change, 1997	11.12.1997	22.10.2001 13.11.2003 (amended)	Reduce greenhouse gas concentrations in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system

E. Environmental Categorization and Standards

1. Safeguards requirements of ADB

18. All projects funded by ADB must comply with ADB's SPS (2009) and Operations Manual (2003). ADB's SPS (2009) include operational policies that seek to avoid, minimize, or mitigate adverse environmental and social impacts, including protecting the rights of those likely to be affected or marginalized by the development process.

19. ADB environmental safeguards are triggered if a project is likely to have potential environmental risks and impacts. The initial process of categorization involves filling out a sectoral Rapid Environmental Assessment (REA) checklist. A project is classified as one of the four environmental categories (A, B, C, or FI) based on the most environmentally sensitive component. The project has been categorized as B for environment under the ADB's Safeguards Policy Statement 2009 (SPS).

2. Environmental Category: Bangladesh

20. For the purpose of issuance of Environmental Clearance Certificate, the industrial units and projects shall, in consideration of their site and impact on the environment, be classified into the following four categories: (a) Green; (b) Orange – A; (c) Orange – B; and (d) Red. The Industries and projects included in the various categories are specified in sub-rule (1) have been

described in Schedule – 1. The ECA indicates that all industrial units or projects must obtain a Location Clearance Certificate (LCC) and Environmental Clearance Certificate (ECC) from the Department of Environment (DOE). No industrial unit or project shall be established or undertaken without obtaining environmental clearance from DOE in the manner prescribed by the rules.

21. The environmental category of the sub-project is not listed in Schedule – 1 of ECR. However, the construction of Training centre is relevant to the multi-storeyed building, hotel etc. which is listed in Schedule – 1 of ECR and falls in Orange B. **Table 4** describes possible DOE classification for training centre.

Table 4: DOE Classification of Construction Project According to ECR 1997

Sl. No	Components	Items in Schedule-1 of ECR	DOE Classification
1	Hotel, multi-storied commercial and apartment building	No. 8	Orange-B

Source: ECR 1997.

F. Institutional Capacity

22. **Implementation Arrangements:** The Finance Division of the Ministry of Finance is the executing agency of the SEIP. For previous two tranche projects—Project 1 (2014–2019) and Project 2 (2017–2021)—four other ministries have been involved in the SEIP implementation: (i) Ministry of Education (Directorate of Technical Education); (ii) Ministry of Expatriates' Welfare and Overseas Employment (Bureau of Manpower, Employment & Training); (iii) Ministry of Industries (Bangladesh Industrial Technical Assistance Centre) and (iv) Ministry of Youth and Sports (Directorate of Youth). In addition, 13 industry associations, Bangladesh Bank-Small and Medium Enterprise Department (BB-SME), and PKSF have been engaged to deliver skills training programs for 10 priority sectors for Projects 1 and 2.

23. Project management and coordination functions for the project are handled by SDCMU. SDCMU is also responsible for providing secretarial support to the Project Steering Committee and ensuring overall coordination for implementation of the SEIP. The SDCMU is headed by an Executive Project Director (EPD), supported by 4 Deputy Executive Directors and 10 Assistant Executive Project Directors. SDCMU has in total about 55 project staff working on the SEIP.

24. The proposed new constructions will be procured by the SDCMU in close coordination with BITAC and BACI management. BITAC and BACI will organize a committee to manage the project construction site and supervise the construction sites. SDCMU will also set up a construction supervision team to monitor all construction related activities. Each of BITAC and BACI committees will have a focal person to monitor the implementation of EMPs and compliance monitoring by project consultants. SDCMU will also appoint a safeguard specialist in the supervision team to support and monitor the implementation of EMPs. Thus, the government has sufficient capacity in implementing ADB requirements and strengthening of capacity. ADB will provide necessary capacity building support for SDCMU, BITAC, and BACI, if required.

III. DESCRIPTION OF THE ACTIVITIES

A. Introduction

25. The proposed project will involve the construction of two multi-storeyed buildings for training facilities by BACI and BITAC at Uttara and Tejgaon within Dhaka.

26. BITAC training center is located in Tejgaon industrial area of Dhaka. The location of the construction site is within the boundary of the existing BITAC infrastructures; therefore, no new land will be needed for construction. However, BITAC has limited space. The renovation will require demolishing the existing structures to make room for new construction. See **Figure 2** for a satellite image of the site location of BITAC.

Figure 2: Location Map of the Proposed Construction of Training Centres at BITAC

27. BACI will be constructing their training center at Uttara Sector 16 in Dhaka. The proposed site has been allocated by the Government of Bangladesh for this specific construction. The construction has already been designed according to the allotted place. See **Figure 3** for a satellite image of the site location of BACI. The site is within the site under development by the Rajuk Development Authority of Bangladesh Government and planned to be developed as a mix of residential and service area.

28. Designs of the proposed training centers are specific to BITAC and BACI. The BACI construction proposal in brief is:

- Ground floor: 7,506 sqft
- First and Second Basement areas: 23,350 sqft
- First, Second, and Third Floor areas: 28,461 sqft

29. The BITAC proposal is a 11 storied building with a basement for common car parking areas. The basement plinth area proposed is 834 sqm. Each floor includes various laboratory for students.

Figure 3: Location Map of the Proposed Construction of Training Centres at BACI Proposed Site

B. Construction of Training Centers at BACI and BITAC

1. BACI proposal

30. The BACI training center will be located at Sector 16 Uttara, outskirt of Dhaka City. The land measures about 30m x 45m and was allocated to BACI by the government. The proposed building will have two basements of 1,085 sqm area each, and four floors each having a total combined floor area of about 3,130 sqm (33,690 sqft). The total built up area will be 5,300 sqm (57,000 sq ft).

31. The ground and first floors together house seven trades; the second floor will have classrooms, library, computer center and offices; and the third floor accommodates a canteen, a common room and a multipurpose hall. Each trade will accommodate 30 trainees and will operate for two shifts, and therefore the expected occupancy of the building will be about 300 persons including staff and accounting for some overlapping of shifts.

32. The basements are to be used for parking about 50 cars and 30 two wheelers and will contain building services. There will be an underground water tank having a capacity of 100 Kilo liters. The building has been specifically designed to meet the requirements of training centers and is provided with wide ramp to basement, floor to floor height of 4.8m in the training areas, elevators for passengers as well as a service elevator. Sufficient corridor and door widths have been maintained in order to facilitate easy movement of materials and equipment.

33. The proposed BACI training centre will be 4 storied with 2 basements. The design has been done using building codes of Bangladesh which accommodated large circulation and green

areas, The scope of work of the proposed training centre by BACI is shown in **Table 5** below. Proposed designs are shown in **Appendix I**.

Table 5: Proposed Scope of Work for BACI Training Center

Sl. No	Feature	Specification
1	Basement	2 basements: BASE area 11675 sqft
		Car parking, drive way
		Central warehouse
		Loading-unloading area, driver's waiting areas
2	Ground Floor	Floor area: 7506 sqft
		Mason workshop
		Rebar and Scaffolding workshop
		Drive way
		Ramps for disabled, security rooms, fire exits
3	First floor	Welding workshop: 1515 sqft; tiles workshop: 1480 sqft; Paint and aluminum workshop: 1160 sqft; plumbing workshop: 1105 sqft; Electrical workshop: 1017 sqft
		Separate male female toilets for students and trainers
		Air circulation area: 2840 sqft
		2 lifts each carrying capacity of 24 persons
		Freight lift
4	Second floor	Computer lab: 719 sqft; class room (1 + 1) : 568 sqft each; office block : 2678 sqft; library: 1195 sqft; clinic: 580 sqft
		Air circulation area: 2809 sqft
		Separate male female toilets
		2 lifts each carrying capacity of 24 persons
		Freight lift
5	Third floor	Canteen with kitchen: 1624 sqft
		Student's common room: 454 sqft
		Prayer room: 462 sqft
		Multipurpose hall: 1300 sqft
		Separate male female toilets
		Air circulation: 3001 sqft, pot garden

2. BITAC Proposal

34. The proposed training centre is located in the Tejgaon industrial area, Dhaka City, and occupies an area of about 4 acres. The complex presently accommodates several single storied training buildings (engineering), hostels and an office block. A multi storied building is under construction.

35. As BITAC will be transformed into an advanced engineering training center for the areas of precision engineering, electrical engineering, and mechatronics; it is proposed to construct a 11 storied building with basement in this campus. The development of this project will entail the demolition of old existing single storied sheds in order to accommodate the building which measures 55.6 m x 15 m and has a floor area of 834 sqm (8,974 sqft). The land utilised for this

building has been kept to a minimum so as also allow for the future construction of a boys' hostel to the east of the proposed building.

36. There will be a single basement which will accommodate building services and parking for 20 cars as well as 20 two wheelers, there will also be an underground water tank of 100 Kilo liters. All floors are typical and the total built up area of the basement plus eleven floors is 10,008 sqm (107,686 sqft). Ten floors are devoted to training facilities and the topmost floor is for offices, conference hall, canteen and prayer hall. The ground floor has a floor to floor height of 5.4 m and the other training floors have a floor to floor height of 4.2m, ensuring sufficient operating headroom for equipment. Two elevators are proposed along with two staircases, and the ground floor lobby has been kept sufficiently large so as to ensure adequate waiting space. Since the training facilities are primarily for precision engineering and electronics most parts of the building will be centrally air conditioned.

37. The building is expected to accommodate about 500 persons (students and trainers). The building design, floor loading, electrical provisions and specifications have been specially tailored for the requirements of engineering training. The proposed BITAC Advanced Training Center will be 11 storied with 1 basement. The design has been done using building codes of Bangladesh which accommodated large circulation and green areas, the scope of work of the proposed training center by BITAC is shown in **Table 6** below. The building has been designed with ample space for air circulation providing a 2.7m wide space at each floor which will reduce fire vulnerability. Each floor will be equipped with firefighting equipment. Proposed designs are shown in Appendix II.

Table 6: Proposed Scope of Work for BITAC Training Centre

Sl. No	Feature	Specification
1	Basement	Total area 834 sqm
		Car parking, waiting area for drivers, drive way, air flow control
2	Ground floor	Plinth area 834 sqm., precision engineering floor
3		Lift: 2 nos.; office, reception, workshop, staircase, 3.59 wide corridor for air flow and people movement, locker room, ramp, staircase for fire escape, separate male and female toilet
4	1st floor	Total plinth area 834 sqm
		CAD room, CNC simulation lab, conventional turning workshop, conventional milling workshop, conventional grinding workshop, material prep room
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
5	2nd floor	Total plinth area 834 sqm
		Basic electrical lab, hydraulic lab and pneumatic lab
		6staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
6	3rd floor	Basic electronic lab, modular manufacturing system, Vison lab and sensor lab, CAD
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
7	4th floor	Mechatronics project lab
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
8	5th floor	Electronic lab, domestic electrical laboratory

Sl. No	Feature	Specification
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
9	6th floor	PLC and control, CAD, Industrial electrical technology
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
10	7th floor	Alternative energy lab
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
11	8th floor	Project lab electrical technology
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
12	9th floor	Conference room, hall room, locker rooms
		staircase for fire escape, general staircase, Lift: 2 nos., separate male and female toilet
13	10th floor	Conference room, offices, prayer room, lunch room, pantry, wash room
		Staircase for fire escape, general staircase, lift: 2 nos, separate male and female toilet
14	General	2.7 wide corridor for air circulation and fire escape Pot Shrub plantation

IV. DESCRIPTION OF BASELINE ENVIRONMENT

A. Location Setting and Extent

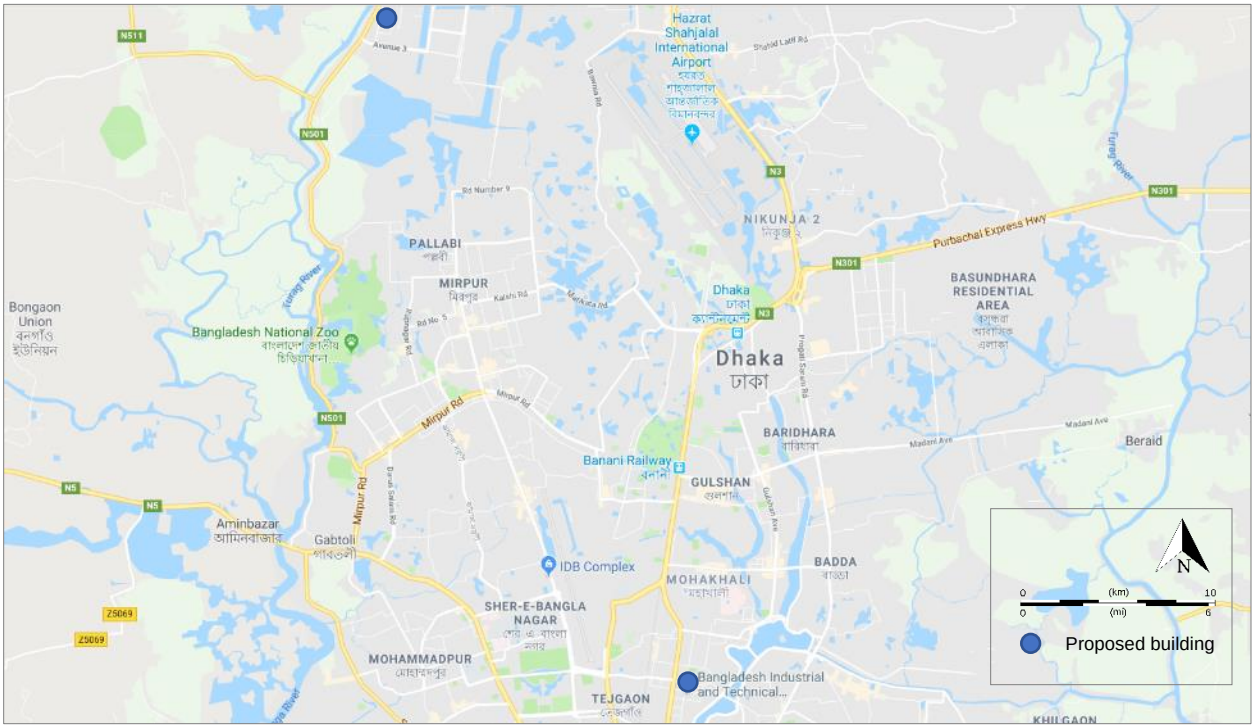
1. BITAC site

38. The BITAC site is within Tejgaon Industrial area of Dhaka. Tejgaon Industrial Area (Dhaka metropolitan) area is 4.38 sq km, located in between 23°45' and 23°46' north latitudes and in between 90°23' and 90°25' east longitudes. It is bounded by Gulshan Thana[4] on the north, Ramna and Tejgoan Thanas on the south, Gulshan, Rampura and Ramna Thanas on the east, Tejgaon and Cantonment Thanas on the west. The BITAC site is located within its own compound in Tejgaon. Location map of BITAC construction site is given in **Figure 4**.

2. BACI site

39. The BACI site is located in Uttara Sector 16, a barren area under development by Rajuk authority of Bangladesh Government. The Rajuk is implementing the Uttara Residential town (third phase) near to the site. The site is situated approximately 20 km (12 mi) from the zero point of Dhaka City. Uttara is a northern Thana and a suburb of Dhaka, the capital of Bangladesh. It lies on the road to Gazipur, and adjoins Shahjalal International Airport. Location map of BACI construction site is given in **Figure 4**.

Figure 4: Location Map of the Construction Projects



[4] Thana is a Bengali word, stands for a police station within Dhaka the City Corporations.

B. Existing Condition

40. **BITAC site:** The proposed site is within the Tejgaon campus of BITAC. The campus has limited space and the proposed site covers the existing hostel (See **Figure 5**). The hostel will be demolished to make space for the new building.[5] The proposed building has a 20ft wide road adjacent to it. The campus is well connected to the main road, which is a 120ft wide road. The site is above flood level and well drained. Rainwater runoff and waste water from the campus drains into the municipal drain adjacent to the main road. Within 100m of the campus lies a lake called “Hatir Jheel”. The site is close to many educational institutes. Bangladesh University of Textiles, Dhaka Polytechnic Institute, Government Science College, Holy Cross College, Tejgaon College, Tejgaon Govt High School, Tejgaon Government Girls' High School, Green University of Bangladesh, B.A.F Shaheen College are the most well-known.

Figure 5: Existing Condition at the BITAC Site

41. **BACI site.** The proposed BACI site is located in Uttara, Dhaka which is under development of Rajuk authority. The land is barren, devoid of vegetation except wild grasses. The proposed site is located within the embankment that protect Dhaka city from flooding. The area is in low-lying wetland. The area has been developed by Rajuk and is being protected from river water by a solid embankment at a distance of 100m. The access road is 60ft wide. Facilities like government or private services are yet to be developed in the area. **Figure 6** presents a photographic view of the project location and its access road.

42. No existing drainage has been found. A natural lake is about 1.5km away from the site. Sine municipal drainage system is absent, constructing in this site will have to consult with the Rajuk masterplan for future development of drainage system and design the drainage system accordingly.

[5] The current hostel can accommodate a maximum of 100 students, although the current actual capacity is only about 20–30 students. And the facility is in poor condition. Only those students from outside have been using it mostly for temporary accommodation until they find more suitable places.

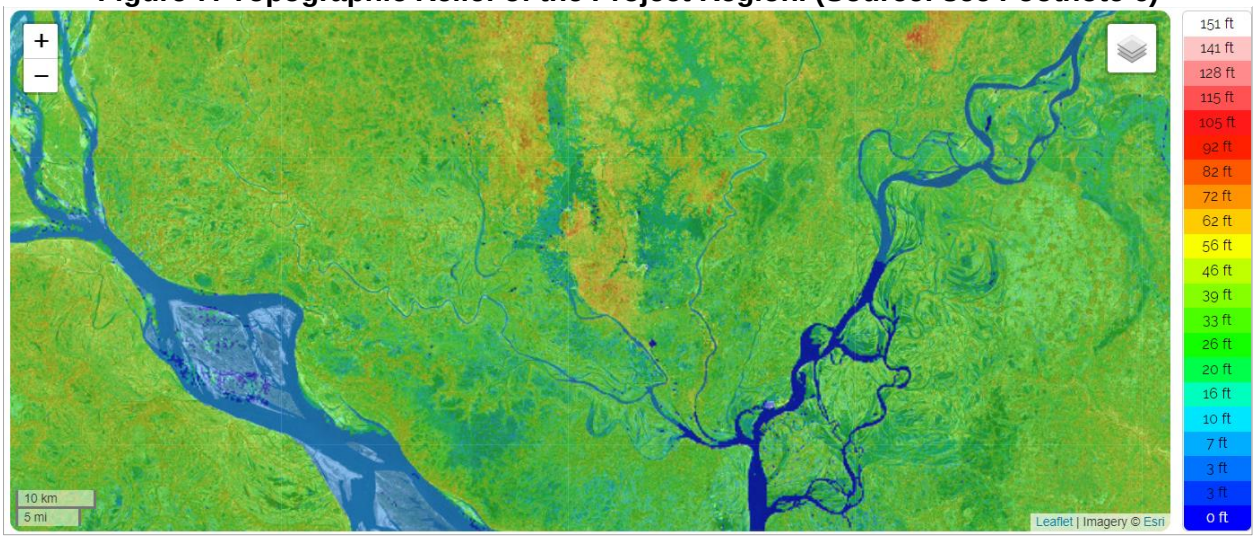
Figure 6: Existing Condition at the BACI Site and its Access Road

C. Physical Environment

1. Landform

43. Topography of Tejgaon and Uttara of Dhaka is flat in nature, as the surface area ranges between 6 and 8 metres (calculated from topographic map)[6]. In general, the surface elevation of the area Dhaka are ranges between 1 and 14m and most of the built-up areas located at the elevations of 6-8m. The land area above 8 meters msl covers about 20 square kilometers. The land ranging from 6-8 meters while 170 square kilometers of Greater Dhaka is below 6 meters (FAP 1991[7]). See **Figure 7** for topographic relief of the project region.

Figure 7: Topographic Relief of the Project Region. (Source: see Footnote 6)



[6] Web. https://en-gb.topographic-map.com/maps/lpj4/Dhaka/ (accessed 11 June 2019).

[7] Japan International Cooperation Agency. 1991. *Master Plan Study for Greater Dhaka Protection Project: Study in Dhaka Metropolitan Area of Bangladesh Flood Plan*. Dhaka.

44. Uttara, the BACI site is a new developing low-lying flat land near to the embankment. In general, the land slopes gradually towards the south and east. Although the proposed site is in low flooding risk according to Rajuk[8], some development blocks identified by the Rajuk to the its north and south are highly vulnerable to flood hazards. However, the BITAC site located in Tejgaon is already on a built-up land and faces low risk of flooding.

2. Hydrology and drainage

45. Dhaka city is surrounded by four major river systems. The south of Dhaka city is surrounded by the Buriganga River. The western part of Dhaka is bounded by the Truag River which is connected by a small Tongi Khal on the north. The eastern part of Dhaka is bounded by the Balu River which is also hydrologically connected with Tongi Khal.

46. With regard to drainage system in Uttara[9], the overall situation is appalling. The absence of a proper drainage system leads to environmental pollution of water, soil and air. About 82.5% of the household had no drainage system at all. Only 2.6% of the households had pucca drains in front of the residence. About fifteen percent (14.9%) had kutcha drainage but a substantial number of households of this area had no drainage at all. Though negligible, still Dakshinkhan had 1.1% of pucca drainage in front of residence but in Uttarkhan and Mausair, the percentage was zero. Dakshinkhan had the highest percentage of the households living in houses with kuthca drainage system (7.4%), followed by Joarsahara (3.9%). Mausair had no drains at all.

47. The drainage system in Tejgaon is well developed and connected to the municipal drainage system. The BITAC site has a drainage system which is connected to the main road side drainage system which are well drained.

48. The surface water area of Dhaka City is about 10-15% of total land area. The major lakes are Dhanmondi lake, Ramna lake, Gulshan lake and Crescent lake. It has been known from different government and non-government organizations and available surface water drainage map that there were more than 35 canals within Dhaka city area (Khan 2001[10]). The conditions of some of the canals are very critical at present and some of them are already vanished. The major canals which are till used as open channel is Begunbari Khal, Abdullahpur Khal, Diabari Khal, Manda Khal, Digun Khal, Meradia-Gazaria khal and Kallyanpur Khal (DOE, BCAS and UNEP 2006[11]).

3. Ground water table

49. The maximum depth to water table in the central part of the city i.e. Tejgaon and Sabujbagh areas, observed from BWDB piezometers, is about 67 to 57m below ground surface that is about 55m at Mirpur and 20-34m at Mohammadpur, Dhanmondi and Sutrapur areas close to the river periphery. The depth of the water table moves seasonally with annual recharge and discharge conditions. No data from Uttara is available from BWDB. The amount of seasonal fluctuations varies from less than a meter to more than 10m depending on the local hydrological conditions, amount of ground water abstraction and natural discharge of ground water. In recent

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8 Rajdhani Unnayan Kartipakkha (RAJUK). *Final Report Preparation of Detailed Area Plan (DAP) for Airport-Demra Bypass Area (Location-6), RAJUK*.

9 See footnote 8.

10 Khan, N. 2001. *Assessment of Water Logging Conditions Using Integrated GIS and Remote Sensing Techniques: A Study of Dhaka Mega City, Oriental Geographer.*

11 UN Environment. 2005. *Dhaka City State of Environment 2005*. Dhaka.

years, there is a declining trend in the water table due to large amount of ground water withdrawal (Bangladesh Water Development Board, 2007[12]).

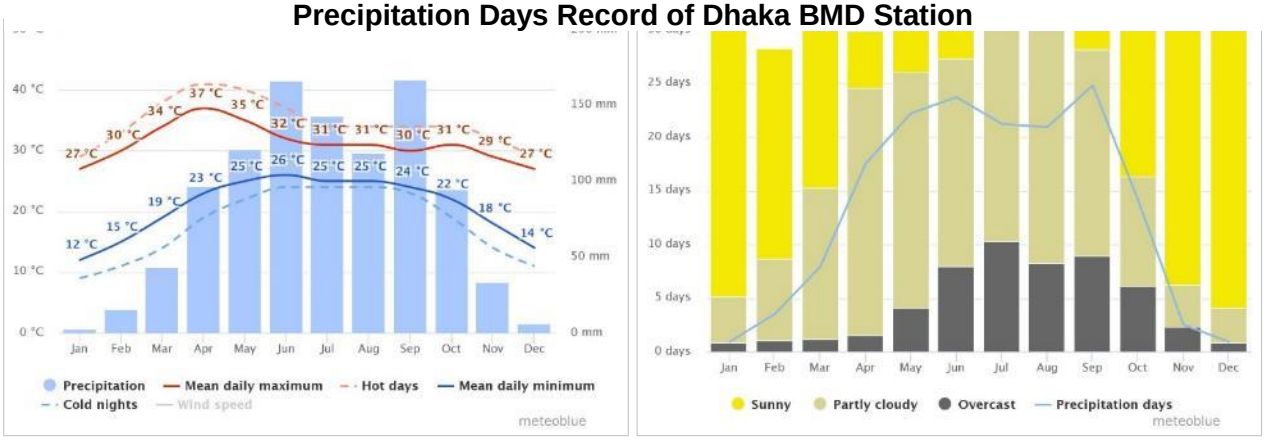
4. Climate

50. The project site is located in Dhaka Division. According to Köppen climate classification, it falls under Aw category which is characterized by tropical wet and dry climate. Hence, it experiences hot and humid summer and dry winter. According to the climatic characteristics, Bangladesh is divided into 7 different climatic sub-regions. The study area of the project falls under the south-central climatic zone of the country.

51. Temperature data of Dhaka Station from Bangladesh Meteorological Department (BMD) for 34 years (from January 1980- December 2017) has been analyzed to see the monthly variation of the average maximum temperature which is between 39.6°C to 30.1°C. The monthly variation of the average minimum temperature is 22.5°C to 6.5°C. See **Figure 8** for details.

52. Monsoon is a prominent season in this area. The average monthly rainfall during monsoon (June-September) season from 1980-2017 is 332 mm/month. Annual average rainfall is 2066 mm/year. The driest period of the year is winter when the average monthly rainfall varies from 21 mm/month to 7.21 mm/month. See **Figure 8** for details.

Figure 8: Precipitation, Temperature, Sunshine and Precipitation Days Record of Dhaka BMD Station



Source: https://www.meteoblue.com/en/weather/forecast/modelclimate/dhaka_bangladesh_1185241 (accessed 1 May 2019).

D. Biological environment

1. Flora

53. The BITAC site possesses some variety of plants such as: the Banyan (Ficus bengalensis), Sada koroi (Albiza Procera), Tamarind (Tamarindus indica), Shimul (Bombax ceiba), and Ashwath (Ficus religiosa). The Rasna (vanda roxburghii) was also commonly found.

54. The BACI site is devoid of plants. However, common grass species were found such as: Cyperus rotundus, Cynodon doctylon, Amaranthus philoveroides, Alternanthera sessilis, Alerodendron viscosum and Eurena loba (See **Figure 9**).

[12] Bangladesh Water Development Board. 2007. *Effects of Over Withdrawal of Groundwater in Dhaka City*. Dhaka. Dhaka.

Figure 9: Flora Found in the Proposed Sites

2. Fauna

55. Both sites are devoid of animals that can be seen. At BITAC site, students reported a few squirrels were being sighted sometimes. However, the BACI site is barren and far from any forest or bush land that may be home to foraging animals.

3. Protected area

56. There is no protected area such as natural park, sanctuary and conservation site in the project alignment.

E. Socio-Economic Environment

57. The current population of Dhaka Metropolitan area is more that 15 million as of 2013.[13] The population is growing by an estimated 4.2% per year, which is one of the highest rates amongst the Asian cities[14]. The continuing growth reflects ongoing migration from rural areas to the Dhaka urban region, which accounted for 60% of the city's growth in the 1960s and 1970s. More recently, the city's population has also grown with the expansion of city boundaries. According to the Far Eastern Economic Review, Dhaka will be home to 25 million people by the end of 2025[15].

58. **Traffic Congestion.** Dhaka city suffers one of the worst traffic congestions in the world. The city lacks an organized public transport system. Construction of MRT and a BRT is currently going on to solve the problem. Cycle rickshaws and auto rickshaws are the main mode of transport within metro area, with close to 400,000 rickshaws running each day[16].

59. **Water supply and sanitation.** Tejgaon area is well developed with water supply system since the area is an industrial and commercial area. In contrast, Uttara Sector 16 is under development. According to Rajuk report, with regard to water supply, 53.5% of the sample

[13] Newgeography.com. *Evolving Urban Form: Dhaka.* (accessed 2 May 2019).
[14] McGee, Terry. 2006. *Urbanization Takes on New Dimensions in Asia's Population Giants*. Population Reference Bureau. Archived from the original on 14 February 2008. Retrieved 27 September 2006.date accessed: 2 May 2019
[15] Asia Times. 2006. *Planet of Slums by Mike Davis*. (accessed 2 May 2019).
[16] Lawson, Alastair. 2002. *Dhaka's Beleaguered Rickshaw Wallahs*. BBC News. (accessed 2 May 2019).

households had access to it. However, access to piped water supply of DWASA is absent in four mauzas - Fayedabad, Uttarkhan, Mausair and Purakar. About 98.5 % of the sample households had access to DWASA water supply, followed by Dakshinkhan, 82.3%.

60. Although Tejgaon has a developed sanitation system, Uttara Sector 16 has no sanitation system yet. The area is not populated; therefore, such situation is expected.

61. Air and noise pollution: In general, Dhaka suffers from serious air and noise pollution. Usually Dhaka exhibits an Air Quality Index (AQI) over 300 points, which indicates severe air pollution. Tejgaon, the BITAC site is within the industrial zone and busy area. Therefore, the AQI is expected to be quite high. Although, no site-specific data is available for Tejgaon. In contrast, the BACI site is expected to be less polluted as the site is yet to be populated and the nearest highway is 200m from the proposed site.

62. Like air pollution, noise pollution is also high is Dhaka city. Although, there is no site-specific data, a study[17] reveals that noise from main roads of Dhaka city often exceeds 70dB, which is lot higher than WHO guidelines for safe limit (45dB). However, noise pollution is expected to be low in BACI site due to its location in a non-populated place.

63. **Waterlogging and drainage congestion.** Tejgaon area, the drainage system is well developed. Reports of waterlogging has not been heard off yet. However, the Uttara site is prone to waterlogging. There is no any complete drainage network in the project area yet, an on- going process of construction have been going on. On April 29,2018 Uttara witnessed flooding after just one hour of rain.

[17] Razzaque, M.Mahbubur & Chowdhury, Sanjib & Helali, Maksud & Bodén, Hans. 2010. On the impacts of noise pollution in Dhaka. 17th International Congress on Sound and Vibration 2010, ICSV 2010. 4.

V. POTENTIAL IMPACTS

A. Methodology

64. This section identifies the potential impacts that the various elements of the proposed Project may have on aspects of the physical, biological and socio-economic environment. The identification of the potential impacts will be considered for the two distinctive Project stages (construction and operation) as detailed in **Section 3**. The activities undertaken during each of these Project stages form the basis for potential impact identification and analysis.

65. Assessment of potential impacts requires a multi-disciplinary approach in which a wide range of issues are taken into consideration to identify and determine which potential Project impacts may be significant and therefore require the application of reasonable and effective management and/or mitigation. Most projects result in positive and negative potential impacts on the environment, society and economy, all of which are identified and assessed in this section.

66. Certain impacts identified in this section have the potential to be significant. The determination of whether a given potential impact is significant depends on several factors:

- The potential for on-site and off-site impacts;
- The potential for direct and indirect impacts;
- The frequency and duration of a potential impact;
- The geographic area affected by a potential impact
- The period of time affected by any potential impact;
- The sensitivity of the receiving environment; and
- The degree of confidence with which the potential impacts of the action/activity are known and understood.

67. In case for most industrial/infrastructure projects, potential negative impacts sometime could be far more numerous than beneficial impacts. The regional and national economic benefits associated with the implementation of any development project are considered to fall outside the scope of an IEE/EIA, and therefore not considered here. However, it is generally expected that these long-term benefits will ultimately trickle down to the local population and will make a contribution to an improvement in the quality of life.

68. The checklist matrix is a comprehensive matrix of environmental effects and impacts indicator designed to stimulate the analysts to think broadly about possible consequences of contemplated actions (Munn, 1979)[18]. The table below represents the matrix checklists developed for the present project. In this checklist, actions, which may affect the various stages of the project activities, are listed and the degrees of significant environmental impacts are shown. The terms none, minor, moderate and major are used in the checklists to evaluate the magnitude of significant environmental impacts and colour codes have been used accordingly. Positive or beneficial impacts are also identified.

69. In the interaction matrix, the location, construction, and operational phases of the proposed development are considered separately in order to distinguish the short-term and long-term impacts. See **Table 7** for details interaction matrix.

[18] Munn R.E. 1979. *Environmental Impact Assessment: Principles and Procedures*. 2nd Edition. John Wiley, New York.

Table 7: Interaction Matrix of Potential Impacts of SEIP Construction and Renovation Activities on Various Environmental and Social Sectors

Project Activity/ Hazards	Environmental Resources													Social Resources								
	Land Forms	Soil	Land Use	Air	Climate Change	Drainage	Surface Water	Ground Water	Noise Levels	Vibration	OH&S	Ecology	Aquatic	Demographics	Livelihoods	Sociocultural	Land Use	Services	Cultural	Health & Safety	Vulnerable Groups	Community Cohesion
Demolition Phase (for BITAC only)																						
Site preparation	S	S	S	S		S	S		S	S	S	S										
Heavy equipment operations				S						S	S									S		
Cranes, wrecking balls and sledge hammers operation				S						S	S									S		
Debris cleanup			S	S							S	S								S		
Storage, handling and disposal of waste				S							S									S		
Generation of sewage		S	S	S																S		
Influx of demolition workers											S											S
Transportation by road				S					S													
Storage and handling of chemicals									S	S	S											
Maintenance of vehicles and equipment											S											
Construction Phase (For BITAC and BACI site)																						
Site Clearing/ Levelling	S	S	S	S		S	S		S	S	S	S										
Building of structures laying of pipelines	S			S					S	S		S						S				
Heavy equipment operations				S						S	S									S		
Storage, handling and disposal of waste				S			S				S									S		
Generation of sewage		S					S				S									S		
Influx of construction workers															S			S		S		S
Transportation by road				S	S						S											
Storage and handling of chemicals				S			S				S									S		
Maintenance of vehicles and equipment				S							S											
Concreting works				S			S		S	S	S									S		

Project Activity/ Hazards	Environmental Resources													Social Resources									
	Land Forms	Soil	Land Use	Air	Climate Change	Drainage	Surface Water	Ground Water	Noise Levels	Vibration	OH&S	Ecology	Aquatic	Demographics	Livelihoods	Sociocultural	Land Use	Services	Cultural	Health & Safety	Vulnerable Groups	Community Cohesion
Operation Phase (for all sites)																						
Water demand								L					S									
Wastewater discharge/ disposal								L					S									
Disposal of wastes		L		S				S			L									L		
Employment															L			L			L	L

	No negative impact
	Minor negative impact
	Moderate negative impact
	Major Negative Impact
	Positive impact
L	Long term Impact
S	Short term Impact

B. Discussion on Potential Impacts

1. Beneficial impacts

70. SEIP will contribute positively to the local environment specific to the selected training sites by developing healthy and safer environment to the premises housing such sites with natural light and well-ventilated classrooms, structures resilient to environmental extremes (including climate variability such as severe storms and, in some cases, geophysical hazards such as earthquakes and landslides), improve hygiene among trainee, and provide clean drinking water. Capacity building of stakeholders in environmental safeguards and solid waste management including preparation of climate resilient infrastructure will enhance knowledge and awareness for sustainable infrastructure development of the selected training sites in future. See **Table 8** for beneficial impacts of the proposed project.

Table 8: Potential Beneficial Impacts of the Proposed Project

Sector	Beneficial Impacts
Construction	
Employment	Major employment opportunity during construction project since local labours will be preferred during construction
Improved drainage system	BACI site is barren. Construction of new building along with its own drainage system will also contribute to improvement of drainage system
Improved sanitation system	BACI site construction is also expected to be improve sanitation system
Operation	
Socioeconomic impact	New construction of 2 training centres will attain more access and retention of students; Increasing skilled training may develop the society and neighborhood; Provision of permanent and temporary employment opportunities
Renewable energy option	Solar panels installed on roof and use of energy efficient lighting system will save energy which will ultimately contribute to reduction of CO_2 emission.
Rainwater harvesting	Provision of “rainwater harvesting” systems in the building will aid water conservation
Climate resilience	Provision of using local materials and improved building blocks will make the building more resilient to climate change and associated hydro metrological disasters

2. Sector where no significant impact envisaged

71. Some aspects of the environment that are not expected to be significantly affected by the construction process have been screened out and will not be mentioned further in assessing the impacts of the construction process (**Table 9**).

Table 9 Sectors Where No Significant Impacts Envisaged

Field	Rationale
Climate	Short-term production of dust is the only effect on atmosphere
Geology and seismology	Excavation will not be large enough to affect these features
Industries	There are no major industries in any areas to be affected by the project
Tourism	Tourists mostly drive by the villages located as these are located on the highway
Community	Construction will not affect population numbers, location or composition

3. Negative impacts

72. However, construction, repairing, renovation and demolition activities may cause some adverse environmental impacts including dust and noise pollution, though very minor and insignificant in scale, disruption of natural ecosystem, occupational health hazards, risk from existing poor sanitation system and land as well as water contamination. Due to some vulnerable geographic location (in some cases, if any), there might also be some risks including those of natural disasters (e.g., earthquakes, cyclone, floods, landslide, etc.) and extreme climate events. These impacts are not anticipated to be induced by SEIP but rather, they are related to the geographical location of some of the training sites and climate induced. The expected negative impacts and their magnitude are discussed in **Table 7**.

4. Assessment of potential negative impacts

73. The following potential negative impacts are envisaged from the following SEIP activities:

(i) Construction of new training centres
(ii) Demolition of existing structure

74. **Traffic Congestion.** BITAC site is on busy premises. Expected impact may rise from traffic movement (heavy vehicles) during construction works.

75. **Air pollution.** Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

76. **Top soil loss followed by soil erosion.** Significant excavation, cut and fill is expected. 3-story/6-story building will also need concrete mixing, although the extent of time may not exceed couple of weeks. The proposed sites are on relatively flat land. BITAC site is on enclosed built-up area. BACI site is on sand filled developed area. Therefore, significant soil erosion is not expected. The impacts are negative but short/medium term, site-specific within a relatively small area and reversible by mitigation measures.

77. **Noise Impacts.** Construction noises may hamper every day educational activities of the students and teachers at BITAC site. Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. Noise Impact on construction workers. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

78. **Water Pollution.** Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water, especially at BACI site but insignificantly.

79. **Air Quality.** Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.

80. **Community Health and Safety:** BITAC site is within the campus and adjacent to a busy road. Therefore, there are potential risk of community health and safety. The risk includes: exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; exposure to dust and noise; falling objects; work in confined spaces; exposure to hazardous materials; exposure to electrical hazards from the use of tools and machinery; construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures. The BACI site is relatively away from community. Therefore, no health and safety risk are anticipated.

81. **Waste generation:** All the SEIP sites are expected to generate construction waste. Domestic waste from workers are also inevitable. Hazardous waste also expected to be generated from drilling fluid, generator oil, vehicle oil, paints, mix etc. Without proper management, this will pollute soil, water and air and spread public nuisance.

82. **Worker's health and safety:** There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in populous areas. Workers need to be mindful of the occupational hazards, which can arise from working in height and excavation works. Potential impacts are negative and long-term but reversible by mitigation measures.

83. **Problems due to demolition:** It is expected that manual demolition work will take place. If demolition is not planned properly, can create nuisance with deadly hazards. Absence of proper safety cautions, debris disposal and spoils managements plan etc can create havoc local environmental and even can cause death to demolition workers. Given the BITAC hostel to be demolished is 3 storied, thus risk is relatively low.

5. Impacts mitigation and environmental enhancement measures

84. The potential negative impacts along with mitigation measures are discussed in the environmental mitigation and management plan (EMP), **Table 14** and **Table 11**. Some environmental enhancement measures are also suggested in **Table 12**.

VI. ENVIRONMENTAL MITAIGATION AND MANAGEMENT PLAN (EMP)

A. Purpose of this EMP

85. The objective of this Environmental Management Plan (EMP) is to formulate measures, which will:

- Mitigate adverse impacts on various environmental components, which have been identified during observation;
- Protect environmental resources where possible;
- Enhance the value of environmental and social components where possible.

86. The EMP also includes a monitoring plan to enable evaluation of the success or failure of environmental management measures, and to carry out reorientation of the plan if found necessary. It is emphasized that many of the protective and enhancement measures can be implemented by adopting suitable planning and design criteria for construction of the project. This EMP is also made site specific with guidelines for the contractors to be able to operate according to the Bangladesh Government and ADB requirements to comply with their relevant policies.

B. Environmental Management Plan (EMP)

87. The EMP is necessary on the grounds that it will manage the environment by off-setting the negative impacts with possible mitigation measures and enhancing the positive impacts within the allocated fund from the project. Thus, the main objectives of the EMP for the construction of the access road project are:

- Define the responsibilities of the project proponents in accordance with the three project phases (design, construction and operation);
- Facilitate the implementation of the mitigation measures by providing the technical details of each project impact, and proposing an implementation schedule of the proposed mitigation measures;
- Define a monitoring mechanism and identify monitoring parameters to ensure that all proposed mitigation measures are completely and effectively implemented;
- Identify training requirements at various levels and provide a plan for the implementation of training sessions;
- Identify the resources required to implement the EMP and outline corresponding financing arrangements; and Providing a cost estimate for all proposed EMP actions

88. The Environmental Management Plan (EMP) presented in **Table 10** for BITAC and **Table 11** for BACI. Some environmental enhancement measures are also recommended in **Table 12**.

89. Budgets to implement the measures are in presented in the EMP implementation cost **Table 14** and **Table 15**.

Table 10: Environmental Mitigation and Management Plan (EMP) for BITAC

Ref. No.	Impact/Issue	Mitigation Measure	Responsibility
1. Demolition Phase			
0.1	**Planning of demolition** It is expected that manual demolition work will take place. If demolition is not planned properly, can create nuisance with deadly hazards. Absence of proper safety cautions, debris disposal and spoils managements plan etc can create havoc local environmental and even can cause death to demolition workers. Given the BITAC hostel to be demolished is a small one, risk is relatively low.	• Develop a decommissioning plan for the proposed site including risk assessment and management plan for debris disposal, worker safety, solid waste management plan before construction starts. This is the contractor's responsibility and needs to be supervised by the Construction Supervision Engineer and EHS Consultant.	BITAC authority and contractor
2. Construction Phase			
2.1	**Top soil loss followed by soil erosion** • Significant excavation, cut and fill is expected. 11-story/6-story building will also need concrete mixing, although the extent of time may not exceed couple of weeks. • The proposed sites are on relatively flat land. BITAC site is on enclosed built-up area. • The impacts are negative but short/medium term, site-specific within a relatively small area and reversible by mitigation measures.	• Utilize readily available sources of materials. If contractor procures materials from existing burrow pits and quarries, causing less cut and fill that leads to top soil loss. • Borrow areas and quarries (If these are being opened up exclusively for the project) must comply with environmental requirements, as applicable.	BITAC authority, CSC, EO
2.2	**Noise Impacts** - Construction noises may hamper every day educational activities of the students and teachers at BITAC site - Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. - Noise Impact on construction workers - The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• If it is not practicable to reduce noise levels to or below noise exposure limits, the contractor must post warning signs in the noise hazard areas. Workers in a posted noise hazard area must wear hearing protection. • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required).	BITAC authority, CSC, EO
2.3	**Water Pollution** Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water, especially at BACI site	• BITAC site is well drained. The Contractor of the Project shall make simple processing to muddy water like filtering and sedimentation, and direct discharge is prohibited; the Owner shall strengthen construction management to perform civilized construction. • See the general Waste Management Plan at Appendix II.	BITAC authority, CSC, EO

Ref. No.	Impact/Issue	Mitigation Measure	Responsibility
2.5	**Air Quality**: • Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. • The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• The proposed site at BITAC is within busy campus. Therefore, air pollution and public disturbance is expected from construction works and construction vehicles. Provide dust-proof measures like construction barrier at concrete mixing station, or mix concrete inside building to effectively control dust pollution. • Water in due time the construction site on non-rainy days, including the road section in construction and major transportation road. • Watering frequency shall be determined by the site supervision personnel according to the actual situation.	BITAC authority, CSC, EO
2.6	**Community Health and Safety:** • Exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards; • Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Contractor's activities and movement of staff will be restricted to designated construction areas. • Use small mechanical excavators to attain faster excavation progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[19] • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. • Create traffic regulation and diversion zones during construction work. The proposed site is on the main road, and it is expected that heavy vehicle movements can cause traffic nuisance. Therefore, traffic regulation and diversion will be important to avoid traffic nuisance. A generic Traffic Management Plan (TMP) is attached with this IEE as Appendix III: Traffic Management Plan.	BITAC authority, CSC, EO
2.7	**Waste generation** • The site is expected to generate construction waste. • Without proper management, this will pollute soil, water and air and spread public nuisance	• Update the 'Waste Management Plan' in Appendix IV: Solid Waste Management Plan and get approval from site supervising engineer and environmental officer. • Conduct separate waste collection and promote recycling and reuse. • Appropriate disposal of non-recyclable waste according to rules • Hazardous waste should be treated under the related regulation	BITAC authority, CSC, EO
2.8	**Worker's health and safety**: • There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in populous areas. Workers need to be mindful of the occupational hazards, which can arise from working in height and excavation works.	• Comply with requirements of Government of Bangladesh Labour Law of 2006 (amended in 2013) and all applicable laws and standards on workers' health and safety (H&S). • Setting up a work camp near the site may not be possible due to its busy premises and commercial nature. The contractor needs to choose a proper site for a work camp with prior approval from the construction engineer and	BITAC authority, CSC, EO

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

Ref. No.	Impact/Issue	Mitigation Measure	Responsibility
	• Potential impacts are negative and long-term but reversible by mitigation measures.	environmental expert appointed by EA, and in close consultation with BITAC officials. • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. • Produce and implement a site H&S plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training [20] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records.	
2.9	**Traffic disruption** BITAC site is on busy premises. Expected impact may rise from traffic movement (heavy vehicles) during construction works	• Warning lights should be set up along the construction road sections, guiding the access of vehicles. • Follow the TMP stipulated in Appendix III of this IEE	BITAC authority, CSC, EO
3. Post Construction Phase			
3.1	**Post-construction clean-up:** Damage due to debris, spoils, excess construction materials.	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; • All excavated roads shall be reinstated to original condition; • All disrupted utilities restored;	BITAC authority, CSC, EO

[20] Key areas that are to be covered during training shall be in compliance with the Health and Safety Manual according to site specific requirements and shall be conducted by the Supervision consultants

Table 11: Environmental Mitigation and Management Plan (EMP) for BACI

Ref. No.	Impact/Issue	Mitigation Measure	Responsibility
1. Planning Phase			
1.1	**Climate Enhancement Measures** The BACI site is located on a low lying are that has potential of flooding.	• Follow Environmental Enhancement Measures stipulated in Table 13	BACI authority
2. Construction Phase			
2.1	**Disturbances in Ecological setting** The construction/camp sites are devoid of vegetation, birds or local fauna. No impact is expected during construction or operation.	• The BACI site is barren and wetlands is nearby. It is possible to plant a few trees in the site during construction. Trees with small but long canopy should be preferred during plantation. About 20 plants can be planted in the site given the current design.	BACI authority, CSC, EO
2.2	**Noise Impacts** - Temporary increase in noise level and vibrations may be caused by excavation equipment, and the transportation of equipment, materials, and people. - Noise Impact on construction workers - The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• BACI site is not populated and traffic is absent. Therefore, noise impacts are expected to be restricted within the site workers. • Utilize modern vehicles and machinery with the requisite adaptations to limit noise and exhaust emissions, and ensure that these are maintained to manufacturers' specifications at all times. • All vehicles and equipment used in construction shall be fitted with exhaust silencers. Use silent-type generators (if required).	BACI authority, CSC, EO
2.3	**Water Pollution** Excavation, run-off from stockpiled materials, and chemical contamination from fuels and lubricants may result to silt-laden runoff during rainfall, which may cause siltation and reduction in the quality of adjacent bodies of water	• There are waterbodies near to the site. Water pollution may occur in this water bodies. See the general Waste Management Plan at Appendix IV. • Awareness must be raised among workers on solid waste management. • Specific dumping containers are to be kept in the site. • All waste materials should be disposed in proper places after completion of construction.	BACI authority, CSC, EO
2.4	**Air Quality**: • Conducting works at dry season and moving large quantity of materials may create dusts and increase in concentration of vehicle-related pollutants (such as carbon monoxide, sulphur oxides, particulate matter, nitrous oxides, and hydrocarbons) which will affect people who live and work near the sites. • The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• The sand and other such dispersible material must be removed after completion of work. • Provide dust-proof measures like construction barrier at concrete mixing station or mix concrete inside building to effectively control dust pollution. • Water in due time the construction site on non-rainy days, including the road section in construction and major transportation road. • Watering frequency shall be determined by the site supervision personnel according to the actual situation.	BACI authority, CSC, EO
2.5	**Community Health and Safety:** • Exposure to physical hazards from use of heavy equipment and cranes; trip and fall hazards;	• Contractor's activities and movement of staff will be restricted to designated construction areas.	BACI authority, CSC, EO

Ref. No.	Impact/Issue	Mitigation Measure	Responsibility
	• Construction works will impede the access of residents and businesses in limited cases. The impacts are negative but short-term, site-specific within a relatively small area and reversible by mitigation measures.	• Use small mechanical excavators to attain faster excavation progress. For rock and concrete breaking, use non-explosive blasting chemicals, silent rock cracking chemicals, and concrete breaking chemicals.[21] • Under no circumstances may open areas or the surrounding bushes be used as a toilet facility. • Create traffic regulation and diversion zones during construction work. The proposed site is on the main road, and it is expected that heavy vehicle movements can cause traffic nuisance. Therefore, traffic regulation and diversion will be important to avoid traffic nuisance	
2.6	**Climate extremities due to geographic location** BACI site is located in a flood vulnerable zone. Therefore, climate extreme events should be considered during construction	• Plinth height should be considered using flood level analysis • Painting should be weatherproof and building design should consider ample space for accommodate more people during flood and storm event.	BACI authority,
2.7	**Waste generation** • The site is expected to generate construction waste. • Without proper management, this will pollute soil, water and air and spread public nuisance	• Awareness must be raised among workers on solid waste management. • Specific dumping containers are to be kept in the site. • All waste materials should be disposed in proper places after completion of construction • Update the 'Waste Management Plan' in Appendix IV: Solid Waste Management Plan and get approval from site supervising engineer and environmental officer. • Conduct separate waste collection and promote recycling and reuse. • Appropriate disposal of non-recyclable waste according to rules • Hazardous waste should be treated under the related regulation	BACI authority, CSC, EO
2.8	**Worker's health and safety**: • There is invariably a safety risk when construction works such as excavation and earthmoving are conducted in populous areas. Workers need to be mindful of the occupational hazards, which can arise from working in height and excavation works. • Potential impacts are negative and long-term but reversible by mitigation measures.	• Comply with requirements of Government of Bangladesh Labour Law of 2006 (amended in 2013) and all applicable laws and standards on workers' health and safety (H&S). • Prior permission is needed before establishing a work camp which shall well fenced and worker are not allowed outside unless having specific purpose. The camp site needs to be approved by the EA's construction engineer and Environmental consultant in close consultation with BACI officials. • Ensure that all site personnel have a basic level of environmental awareness training. If necessary, the environmental management specialist and/or a translator shall be called to the sites to further explain aspects of environmental or social behavior that are unclear. • Produce and implement a site H&S plan which include measures as: (i) excluding the public from worksites; (ii) ensuring all workers are provided with	BACI authority, CSC, EO

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

Ref. No.	Impact/Issue	Mitigation Measure	Responsibility
		and required to use personal protective equipment (reflectorized vests, footwear, gloves, goggles and masks) at all times; (iii) providing H&S training [22] for all site personnel; (iv) documenting procedures to be followed for all site activities; and (v) maintaining accident reports and records.	
3. Post Construction Phase			
3.1	**Post-construction clean-up:** Damage due to debris, spoils, excess construction materials.	• Remove all spoils wreckage, rubbish, or temporary structures (such as buildings, shelters, and latrines) which are no longer required; • All excavated roads shall be reinstated to original condition; • All disrupted utilities restored;	BACI authority, CSC, EO

[22] Key areas that are to be covered during training shall be in compliance with the Health and Safety Manual according to site specific requirements and shall be conducted by the Supervision consultants.

Table 12: Environmental Enhancement Measures Suggested for the Project

Considerations	Environmental Enhancement Measures
Environmental Enhancement Measures The BCCSAP 2009 and NAPA 2005 documents of the Bangladesh Government required that actions must be taken to build climate resilient structure capable of combating climate related disasters. Aside GoB requirements, ADB's long-term strategic framework 2008–2020 (Strategy 2020)[23] also focuses on one of its five core specialization: "environment including climate change" which requires projects to be climate sensitive. Therefore, Climate and Environment enhancement measures during planning and design phase of a construction is necessary	**Rainwater harvesting** Both BITAC and BACI training centres are aimed at a minimum 1000 students per annum. The use of machineries during training, drinking water consumption, water requirements for other daily needs etc. are expected to put pressure on ground water abstraction, which is a severe problem in Dhaka city. As IPCC[24] observes increase of extreme and frequent rainfall events due to climate change, it is recommended to install rainwater harvesting system on the rooftops with a large reserved tank underground so that that rainwater can be collected from rainfall evens. This water can be used for daily activities except for drinking and may contribute a little to decrease the ever-increasing pressure on ground water in Dhaka city. **Flood resistance measures** (i) Reduced drainage channel size causes flooding. Installing of large capacity new drains will help discharge excess storm water. Drains are to be kept free of waste, siltation and encroachments. Arrangements and capacity for short term/ emergency pumping should be considered when and where appropriate. (ii) Sanitation is damaged due to flood. Sanitation systems should be made climate resilient, with installation above the flood level. (iii) Sludge drying areas and solid waste landfills must be above flood inundation level or protected with embankments or linings to avoid. (iv) Ensure road is cambered as designed. Use concrete surfaced roads. Better compaction and use of stronger materials for road bases. Build more culverts and drainage for road base. **Solar lighting** In both construction sites, there are large rooftops which can be used for installing solar lighting system. This can contribute in lighting the security lights at nights and contribute to decreased consumption of electricity. **Water management** Ground water is precious in the context of Dhaka city. Therefore, the new construction and renovations may look forward to some water conserving technologies: using ultra-low-flush toilets and low-flow shower heads.

[23] ADB. 2008. Strategy 2020: The Long-Term Strategic Framework of the Asian Development Bank 2008–2020.Manila

[24] Hijioka, Y., E. Lin, J.J. Pereira, R.T. Corlett, X. Cui, G.E. Insarov, R.D. Lasco, E. Lindgren, and A. Surjan, 2014: Asia. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1327-1370.

	Green building materials Use of locally produced materials needs to be preferred to reduce climate footprint. Also use of hollow bricks can reduce the carbon footprint of a construction. Hollow-bricks are eco-friendly since they are manufactured by using recycled/waste material/natural substitutes like coal ash, rice husk, granite slurry, fly ash, etc. Because of the used materials hollow bricks can reduce the use of cooling and heating devices as per the seasonal requirements due to their thermal insulation property. This reduces the energy consumption thus saving the resources and money. Many local produces within Dhaka are now manufacturing hollow bricks.

VII. ENVIRONMENTAL MONITORING PLAN

A. Environmental Monitoring plan

90. In the context of a project, the environmental monitoring and management plan is concerned with the implementation of the measures necessary to minimize and offset the adverse impacts and to enhance beneficial impacts. Unless the mitigation and benefit enhancement measures are identified in the IEE and fully implemented, the prime function of the IEE cannot be achieved. Thus, the objectives of environmental monitoring and management plan for the present project are: (i) identification of monitoring requirements and monitoring indicators; (ii) mitigation measures to reduce or eliminate negative impacts; and (iii) enhancement measures to maximize positive impacts.

91. Monitoring performance of a project is very important and sometimes vital. For surveillance of the environmental performance of a project and monitoring of the quality of the local environment, environment in the work zone and the general impact zone have to be performed appropriately. For an upgradation project, monitoring is mainly important during the construction phase. The SEIP is responsible to implement the overall environmental monitoring and management plan. However, during the construction stage, the contractors are responsible to mitigate all environmental impacts related with the construction activities.

92. Monitoring points have been selected based on the sensitivity of the location with respect to sensitive receptors. The following areas should be monitored to check if the proposed project is having any impact:

(i) Soil Erosion and Drainage Congestion
The important issue that needs be monitored during new construction is soil erosion and drainage congestion. The BACI site is a potential drainage congestion site. Also, wetlands are around the proposed site. Therefore, monitoring soil erosion around the project site will be a major task to undertake. Any change in waterlogging at the adjacent area or hint of erosion needs to be noted and information must be sent to the Environmental Officer in charge for further action.

(ii) Air and Noise Quality
Due to the variability of the construction activities, namely changes in batch composition, type of construction activity and other anthropogenic influences, the ambient air quality of the project area may change. If the air quality with respect to any parameter exceeds by more than 25% of its last monitored value, the monitoring frequency shall be doubled and cause of the increase investigated. If the construction activities are found to be the reason for this increase, suitable measures should be adopted.

93. The full-fledged Environmental Monitoring Plan with frequency and responsibilities is detailed in **Table 13**.

Table 13: Environmental Monitoring Plan for the Subproject

No	Environmental Issues	Significant Impact	Purpose of the Monitoring	Monitoring Method			Responsibility	
				Method of Collecting and Reporting Data	Location	Duration and Frequency	Implementation	Supervision
1. Pre-Construction Phase								
1.1	Tree plantation	Tree felling (5 matures, couple of samplings /ornamental trees) are expected at BITAC site. However, space is congested and there is no scope of replantation at the site. However, there is scope of plantation at BACI site. Tree planation at this site will improve the site's environmental significance as the site has been sand filled by Rajuk for development which was a precious wetland.	▪ Improvement of existing environment	Visual inspection	In the site	During the pre-construction period	Contractor	BACI, construction Supervision consultant
2. Construction Phase								
2.1	Topography and Landscape Changes	Excavation along the edge of the building alignment will leave large unsafe holes.	▪ Restoration of changes due to construction activities ▪ Visual amenity	Inspection	In the work site	Construction stage/ Weekly inspection	Contractor	Construction Supervision Engineer, BITAC/BACI
2.2	Air Quality	▪ Dust resulting from construction work ▪ Exhaust gas from construction machinery and vehicles used for mobilization of equipment	Evaluation of effect of the mitigation measure towards air pollution	Visual inspection is suggested since no sensitive areas nearby	In the work site	Daily	Contractor	Construction Supervision Engineer, BITAC/BACI
2.3	Wastes and drainage congestion	▪ Construction waste from construction work ▪ Domestic waste from workers ▪ Hazardous waste such as dry batteries, etc.	Evaluation of effect of the mitigation measure for waste	Record of kinds and quantity of waste, and the disposal method	In the work site and Workers camp	Daily	Contractor	Construction Supervision Engineer, BITAC/BACI
2.4	Disturbance to Existing Social Infrastructure and Services	▪ Increase in traffic Jam is expected to be low ▪ Increased road traffic may disturb the local residents ▪ Traffic jams caused by increased vehicles during construction	Evaluation of effect of construction schedule	Record of numbers construction vehicles	Project site	Continuous Record	Contractor	Social Safeguards Expert, BITAC/BACI

2.5	Infectious Diseases such as HIV/AIDS	Temporary influx of migrant labor during construction may increase risk of infection	Evaluation of sanitation for labor	Labor health record	Related institutions	Twice a year	Contractor	Social Safeguards Expert, BITAC/BACI
2.6	Work condition (including work safety)	Labor accidents	Evaluation of effect of the work safety plan	Record of accidents	Contractor's office	Continuous Record	Contractor	Social Safeguards Expert, BITAC/BACI
2.7	Accidents	Traffic accidents	Evaluation of effect of traffic schedule	Record of accidents	Contractor's office	Continuous Record	Contractor	Social Safeguards Expert, BITAC/BACI
2.8	Disturbance to Community traffic and installation of proper road signage	Traffic accidents, number of events are expected to be low	Evaluation of effect of the work safety plan, Evaluation of effect of traffic schedule	Records of road signage implemented, visual inspection	Along the approach road	Continuous record	Contactor	Environmental /social safeguards specialist, BITAC/BACI
Operation Phase								
3.1	Accidents	▪ Traffic accidents	Evaluation of effect of the work safety plan	Record of accidents and fire	Along the r	Continuous Record	BACI/BITAC and all other SEIP institutes	BACI/BITAC and all other SEIP institutes

B. EMP Implementation Cost

94. Most of the mitigation measures require the contractors/project authority to adopt good site practice, which should be part of their normal procedures already, so there are unlikely to be major costs associated with compliance.

95. Environmental monitoring is an essential tool in relation to environmental management as it provides the basic information for rational management decisions. The prime objectives of monitoring are:

a) to check on whether mitigation and benefit enhancement measures are actually being adopted and are providing effective in practice;
b) to provide a means whereby impacts which were subject to uncertainty at the time of preparation of the IEE, or which were unforeseen, can be identified, and steps to be taken to adopt appropriate control measures; and
c) to provide information on the actual nature and extent of key impacts and the effectiveness of the mitigation measures which, through a feedback mechanism, can be taken into account in the planning and execution of similar projects in the future.

96. There are two basic forms of monitoring: (i) visual observation or checking, coupled with inquiries; and (ii) physical measurement of selected parameters.

97. In the phase of construction, monitoring of some selected parameters like air, water, noise, etc. is done by physical measurement. It should be mentioned here that the monitoring program should ensure compliance with national environmental standards. The importance of this monitoring program is also for ensuring that the project does not create adverse environmental changes in the area and providing a database of operations and maintenance, which can be utilized if unwarranted complaints are made.

98. Mitigation, that is the responsibility of BACI/BITAC and contractor, is mandatory as part of their management of the project. The cost estimation for Environmental Mitigation Measures and Monitoring is given in the following **Table 14** for BITAC and **Table 15** for BACI. The total mitigation and monitoring cost for the BITAC project is calculated as BDT 1,839,600 including the remuneration of Contractor's Environment, Health and Safety Officer (EHSO). The BACI project will cost BDT 1,850,100. The total duration of the engagement of EHSO has been considered during the entire project and the requirement of experience and education will be confirmed and approved from the Construction Supervision Engineer (CSE).

Table 14: EMP Implementation Cost for BITAC Project

EMP Task no.	Mitigation and monitoring item	Unit	Cost/unit	Total unit	Total cost
1. Pre-construction period					
1.1	EMP training workshop	nos.	10,000	1	10,000
2. Construction period					
2.1	Air quality (PM10, PM 2.5, SOx, NOx) 3 times during construction	Nos.	25,000	3	75,000
2.2	Noise and vibration, monthly inspection during construction	Nos.	5,000	18	90,000
2.3	Waste management	Weekly	Monitored by EHSO		0
2.4	Water quality for construction camp workers (As, FC, TDS, salinity and Fe) 3 times during construction period	Nos.	20,000	3	60,000
2.5	Soil erosion and drainage congestion	Weekly	Monitored by EHSO		0
2.6	Traffic management	Weekly	Monitored by EHSO		0

EMP Task no.	Mitigation and monitoring item	Unit	Cost/unit	Total unit	Total cost
2.7	Occupational health and safety	Daily	Monitored by EHSO		0
2.8	Accidents	Daily	Monitored by EHSO		0
2.9	Community complains and grievance	Daily	Monitored by EHSO		0
2.10	Dust suppression measures	Daily	Lump some		30,000
2.11	Other expenses				0
	Transportation for environmental monitoring	Monthly	10,000	18	180,000
	Communication	Monthly	2000	18	36,000
	Reporting and report production	Monthly	2000	18	36,000
	Remuneration of the EHSO	Monthly	40,000	18	720,000
	PPEs	Lump sum for 60 workers			100,000
	First aid	Lump sum for 60 workers			15,000
	Drinking water supply for workers	Lump sum for 60 workers			50,000
	Labour shed, separate male female toilet	Lump sum for 60 workers			100,000
	Work safety and traffic signs	Lump sum			10,000
	Rain water harvesting	Lump sum			100,000
	Waste Management facilities	Lump sum			30,000
Total					**1,632,000**
03. Operation period					
3.1	Draining water quality (As, FC, TDS, salinity and Fe) 4 times in two years	Quarterly	20,000	4	80,000
3.2	Waste management (waste bin setup, carry away)	Lump sum for two years			30,000
	MITIGATION AND MONITORING				
	Pre-construction period				10,000
	Construction period				1,632,000
	Operation period				110,000
	Total				1,752,000
	Contingency: 5% of total				87,600
	Grand Total				**1,839,600**

Table 15: EMP Implementation Cost for BACI Project

EMP Task no.	Mitigation and monitoring item	Unit	Cost/unit	Total unit	Total cost
1. Pre-construction period					
1.1	EMP training workshop	nos.	10,000	1	10,000
2. Construction period					
2.1	Air quality (PM10, PM 2.5, SOx, NOx) 3 times during construction	Nos.	25,000	3	75,000
2.2	Noise and vibration, monthly inspection during construction	Nos.	5,000	18	90,000
2.3	Tree plantation (10 trees around the plot as specified in the EMP, should be nurtured for the entire construction period with case installed for protection, the amount is only paid after the trees has survived and well grown for the entire construction period))	Nos.	1000	10	10,000
2.4	Waste management	Weekly	Monitored by EHSO		0
2.5	Water quality for construction camp workers (As, FC, TDS, salinity and Fe) 3 times during construction period	Nos.	20,000	3	60,000

EMP Task no.	Mitigation and monitoring item	Unit	Cost/unit	Total unit	Total cost
2.6	Soil erosion and drainage congestion	Weekly	Monitored by EHSO		0
2.7	Traffic management	Weekly	Monitored by EHSO		0
2.8	Occupational health and safety	Daily	Monitored by EHSO		0
2.9	Accidents	Daily	Monitored by EHSO		0
2.10	Community complains and grievance	Daily	Monitored by EHSO		0
2.11	Dust suppression measures	Daily	Lump some		30,000
2.12	Other expenses				0
	Transportation for environmental monitoring	Monthly	10,000	18	180,000
	Communication	Monthly	2000	18	36,000
	Reporting and report production	Monthly	2000	18	36,000
	Remuneration of the EHSO	Monthly	40,000	18	720,000
	PPEs	Lump sum for 60 workers			100,000
	First aid	Lump sum for 60 workers			15,000
	Drinking water supply for workers	Lump sum for 60 workers			50,000
	Labour shed, separate male female toilet	Lump sum for 60 workers			100,000
	Work safety and traffic signs	Lump sum			10,000
	Rain water harvesting	Lump sum			100,000
	Waste Management facilities	Lump sum			30,000
Total					**1,642,000**
03. Operation period					
3.1	Draining water quality (As, FC, TDS, salinity and Fe) 4 times in two years	Quarterly	20,000	4	80,000
3.2	Waste management (waste bin setup, carry away)	Lump sum for two years			30,000
MITIGATION AND MONITORING					
	Pre-construction period				10,000
	Construction period				1,642,000
	Operation period				110,000
	Total				**1,762,000**
	Contingency: 5% of total				88,100
	Grand Total				**1,850,100**

C. Monitoring and Reporting

99. **Implementation arrangements.** Project Implementation Units (PIUs) will be formed in each of the IAs (i.e. BACI and BITAC), with a dedicated safeguards focal person. PIUs will be assisted by a supervision team. The supervision team will include an environment specialist engaged during project implementation. Also, there will be a dedicated Environment Officer (EO) from the contractor's part who will monitor the environmental safeguards and report to the IA.

100. The training centres management and principal will be responsible for overall environmental monitoring during the operation phase of the school building.

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

(i) conduct periodic site visits for projects with adverse environmental impacts;
(ii) review the periodic monitoring reports submitted by the executing agency to ensure that adverse impacts and risks are mitigated as planned and as agreed with ADB;

(iii) work with executing agency to rectify to the extent possible any failures to comply with their safeguard commitments, as covenanted in the legal agreements, and exercise remedies to re-establish compliance as appropriate; and

(iv) prepare a project completion report that assesses whether the objective and desired outcomes of the safeguard plans have been achieved, taking into account the baseline conditions and the results of monitoring.

VIII. GRIEVANCE REDRESS MECHANISM

102. The objective the grievance redress mechanism (GRM) is to resolve complaints as quickly as possible and at the local level through a process of conciliation; and, if that is not possible, to provide clear and transparent procedures for appeal. A well-defined grievance redress and resolution mechanism will be established to resolve grievances and complaints in a timely and satisfactory manner. All affected persons will be made fully aware of their rights, and the detailed grievance redress procedures will be publicized through an effective public information campaign. The grievance redress process includes three levels:

A. First Level of GRM

103. The first level and most accessible and immediate contact for the fastest resolve of grievances are the contractors, with assistance from a supervision team on site. Prior to construction of any works, the project implementation unit (PIU) will ensure local community meetings are held to notify residents and businesses of any temporary disturbances, and to inform them of the Project and the GRM. If any complaints arise, the contractors, with assistance from the supervision team can immediately resolve the complaint on site. The contractor's and supervision team's office phone number will be posted in public areas within the subproject areas and construction sites. Any person with a grievance related to the project works can contact the project to file a complaint. The contractor may seek the assistance of the supervision team safeguards specialists (the environmental specialist or social safeguards specialist) to resolve the issue. The supervision team safeguards (environment and resettlement) focal person will immediately address and resolve the issue with the contractor within 1-2 days, if the complaint remains unresolved at the field level. The PIU safeguards focal person will fully document the following information: (i) name of the person; (ii) date complaint was received; (iii) nature of complaint; (iv) location, and (v) how the complaint was resolved.

B. Second Level of GRM

104. Should the grievance remain unresolved; the contractor with assistance from the supervision team will forward the complaint to the PIU safeguards focal person. The person filing the grievance will be notified by a supervision team safeguards focal person that the grievance was forwarded to the PIU safeguards focal person. The PIU will address the grievance. Grievances will be resolved through continuous interactions with affected persons, and the PIU will answer queries and resolve grievances regarding various issues including environmental or social impacts. Corrective measures will be undertaken at the field level by the PIU safeguards focal person within 7 days. He/she will fully document the following information: (i) name of the person; (ii) date complaint was received; (iii) nature of complaint; (iv) location and (v) how the complaint was resolved.

C. Third level of GRM

105. Should the grievance remain unresolved, the PIU's project director will activate the third level of the GRM by referring the issue (with written documentation) to a Grievance Redress Committee (GRC), which will, based on review of the grievances, address them in consultation with the PIU, contractor, the supervision team, and affected persons. The GRC will consist of representative of the Ministry of Expatriates' Welfare and Overseas Employment, as chairperson, EA/IA representative and other relevant stakeholders. A meeting will be called with the GRC, if necessary, where the affected person can present his/her concern and issues. The process will promote conflict resolution through mediation. The GRC will meet as necessary when there are

grievances to be addressed. The GRC will suggest corrective measures at the field level and assign clear responsibilities for implementing its decision within 15 days. The functions of the GRC are as follows: (i) to provide support to affected persons on problems arising from environmental or social disruption, asset acquisition (where required), and eligibility for entitlements, compensation, and assistance; (ii) to record grievances of affected persons, categorize and prioritize them, and provide solutions within 15 days; and (iii) to report to the aggrieved parties' developments regarding their grievances and decisions of the GRC. The EA/IA safeguards focal person will be responsible for processing and placing all papers before the GRC, recording decisions, issuing minutes of the meetings, and taking follow-up action to see that formal orders are issued, and the decisions carried out.

106. Safeguard monitoring reports will include the following aspects pertaining to progress on grievances: (i) number of cases registered with the GRC, level of jurisdiction (first, second, and third levels), number of hearings held, decisions made, and the status of pending cases; and (ii) lists of cases in process and already decided upon may be prepared with details such as affected person, date of notice, date of application, date of hearing, decisions, remarks, actions taken to resolve issues, and status of grievance (i.e. open, closed, pending).

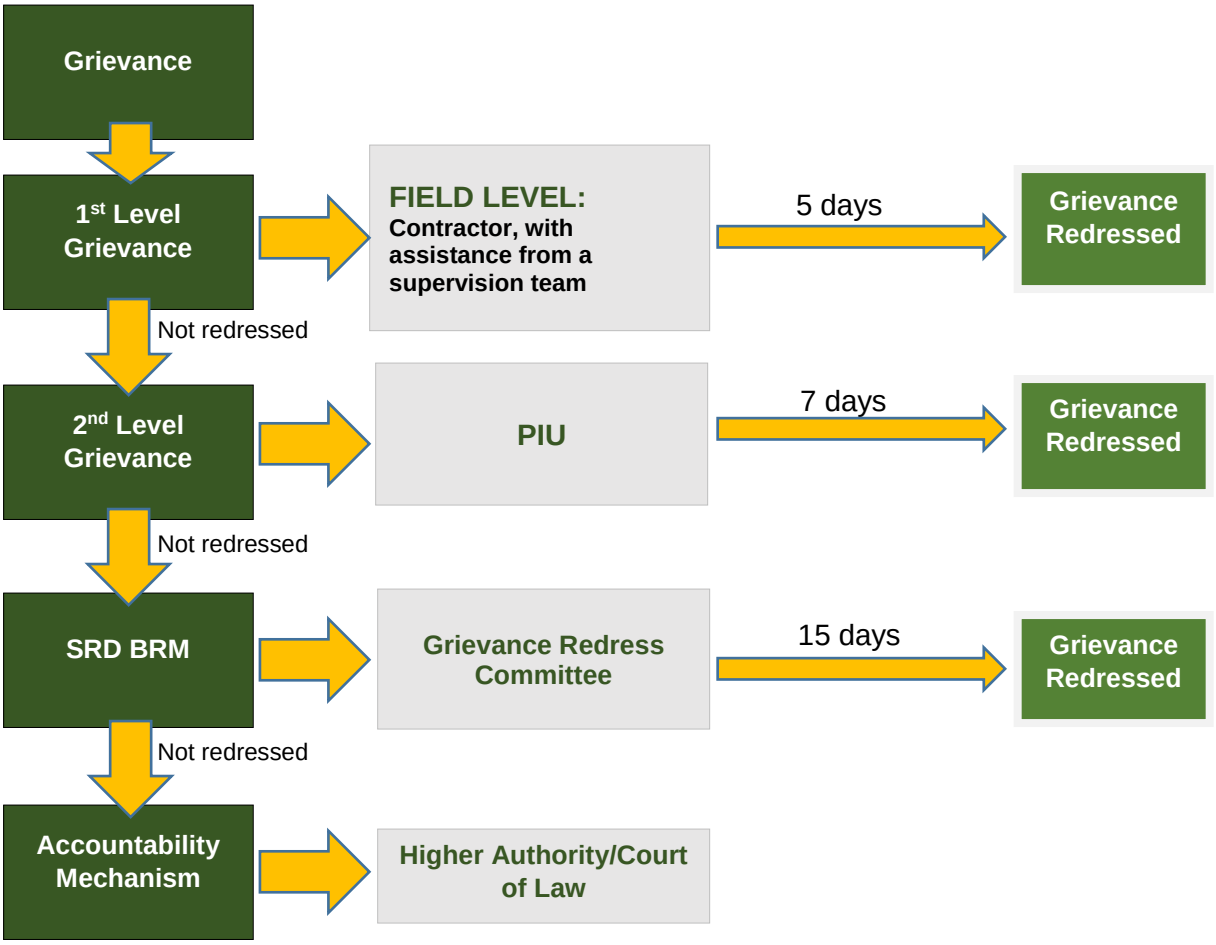
107. All costs involved in resolving the complaints (meetings, consultations, communication and reporting / information dissemination) will be borne by the EA/IA.

108. Where an affected person is not satisfied with the outcomes of the 3 levels of the Project GRM, the affected person should make good faith efforts to resolve issues working with the South Asia Regional Department through ADB's Bangladesh Resident Mission. As a last resort, the affected person can access ADB's Accountability Mechanism (ADB's Office of Special Project Facility or Office of Compliance Review).[25] ADB's Accountability Mechanism, including information on how to file a complaint, will also be explained to affected households.

109. The grievance redress mechanism and procedure are depicted in **Figure 10**.

[25] Contact information on ADB's Bangladesh Mission is in https://www.adb.org/countries/bangladesh/main. Information on ADB's Accountability Mechanism is in www.adb.org/site/accountability-mechanism/main

Figure 10: Grievance Redress Process



IX. STAKEHOLDER CONSULTATION AND INFORMATION DISCLOSURE

A. Stakeholder Consultation

110. Initial Public consultation has been carried out in the project area with the objectives of minimizing probable adverse impacts of the project and to achieve speedy implementation of the project through bringing in awareness among the community on the benefits of the project. Representatives from the training centres and students were consulted to give them the opportunity to express their views and concerns. They were told about the impacts all of which could be easily mitigated. The audience expressed satisfaction of such mitigation measures (**Figure 11**). The public consultations (Interview with BITAC/BACI representatives and students) were held during field visit in 7 and 8 April 2019.

1. Findings of the Public Consultation

111. Most of the people were keen to know the possibility of employment in the project. There is a requirement of about 20 people during the peak period of the project. The employment is largely depending on the types of job and will be assessed on a case-to-case basis by the contractor according to needs. Findings of the public consultation summarized below (**Table 16**)

Figure 11: Public Consultation for the BITAC and BACI Project

Table 16: Summary of the Public Consultation

Sl no.	Question/Concerns	Response by the consultant/authority
01	During labour recruitment, should the locals be given priority during construction?	• This largely depends on the types of job and will be assessed on a case-to-case basis by the contractor according to needs.
02	Where you are going to put new building?	• The consultant discussed the proposed areas for BACI and BITAC
03	Are you going to demolish the existing building?	• The consultant explained that the BITAC existing hostel will be demolished to make room for the new construction
04	Priority for jobs should also consider women; women can do the same work.	• Priority will include women and there will not be any discrimination as far as possible depending on the nature of the job.
05	People present at site suggested that the local people should be the first ones to be employed in the subproject.	• The consultant explained that local people would be employed accordingly to job requirement.

Sl no.	Question/Concerns	Response by the consultant/authority
06	Wishes to speed up the subproject.	• It was explained that implementation would take place immediately after the rainy season.

B. Information Disclosure

112. Information is disclosed through public consultation and making available relevant documents in public locations. The following documents will be submitted to ADB for disclosure on its website:

(i) IEEs (including subproject EMP);
(ii) Updated IEEs (including EMP) and corrective action plan prepared during project implementation, if any; and
(iii) Environmental monitoring reports.

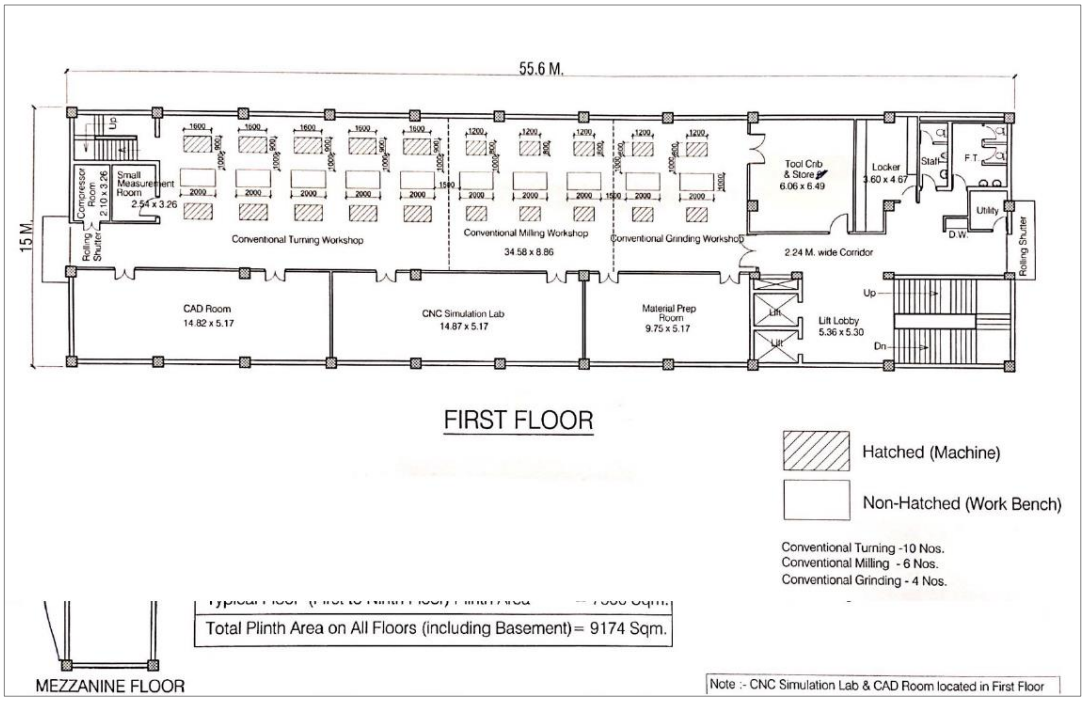
113. The EAs/IAs will send a written endorsement to ADB for disclosing these documents on the ADB website. The PIUs will provide relevant safeguards information in a timely manner, in an accessible place and in a form and language understandable to affected people and other stakeholders. For illiterate people, other suitable communication methods will be used. Disclosure will follow ADB's Public Communication Policy, 2011.

X. CONCLUSION AND RECOMMENDATIONS

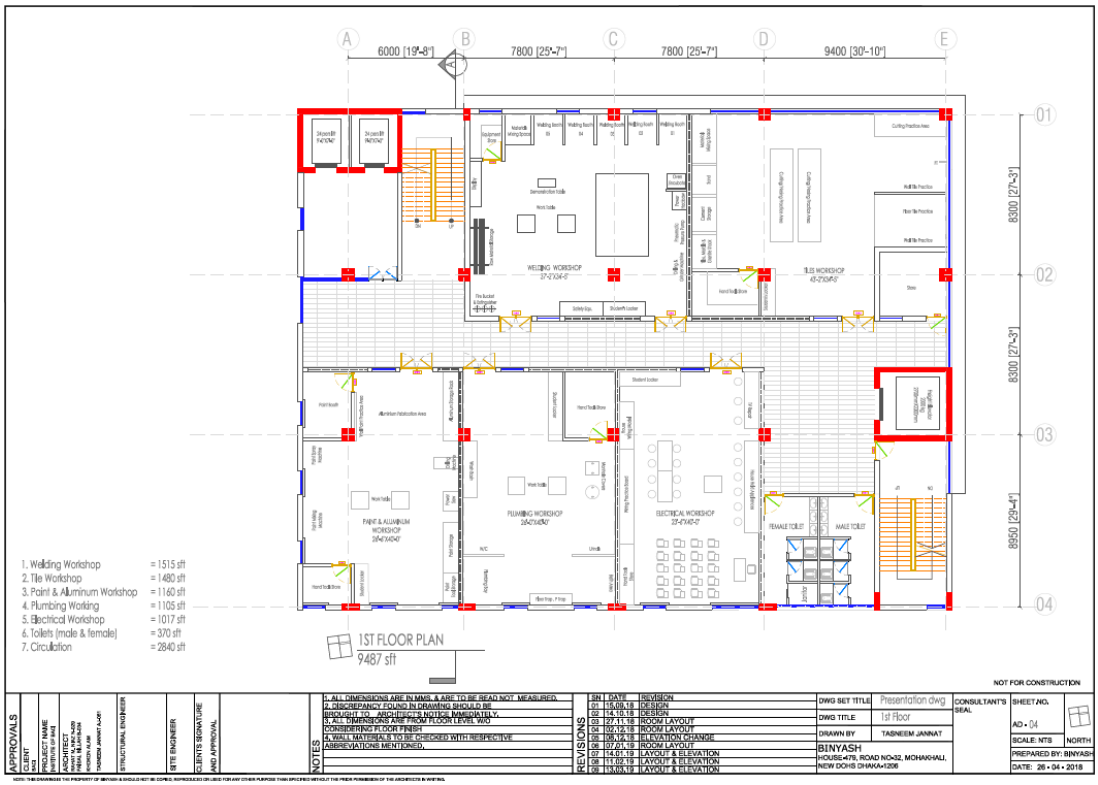
114. This report assessed various existing environmental parameters in and around the SEIP selected training and, although adverse impacts to be generated during SEIP preparatory stage will be minor and insignificant, outlined the actions planned to minimize any significant negative impact. None of the SEIP training sites is located in a sensitive ecosystem, and is not significant from the historical and cultural perspective. SEIP will not cause any significant adverse environmental and social impacts during pre-construction, construction, repair or renovation phase. Rather, the positive impacts due to SEIP operations will more than outweigh the insignificant negative impacts.

115. The limited and insignificant negative impacts due to SEIP are, over an insignificantly very short period, mainly associated with water logging, water pollution, dust and noise pollution, occupational health hazards, risk from poor sanitation system, and management of labor at the sites. Moreover, most of the associated impacts are expected to be limited to the building construction/repair/renovation phase and, will therefore, be absolutely temporary in nature. Proposed construction sites are located in such areas so that negative impacts will become minimal. Adequate mitigation actions will be undertaken in line with management and monitoring of the set of recommended mitigation measures. Regular monitoring of the recommended mitigation measures shall also be carried out during the implementation phase of the project.

APPENDIX I: BITAC FLOOR PLAN



APPENDIX II: BACI FLOOR PLAN



APPENDIX III: TRAFFIC MANAGEMENT PLAN

A. Operating Policies for TMP

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

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

B. Public Awareness and Notifications

2. The awareness campaign and the prior notification for the public will be a continuous activity which the project will carry out to compensate for the above delays and minimize public claims as result of these problems. These activities will take place sufficiently in advance of the time when the roadblocks or traffic diversions take place at the particular streets. The reason for this is to allow sufficient time for the public and residents to understand the changes to their travel plans. The project will notify the public about the roadblocks and traffic diversion through public notices, ward level meetings and city level meeting with the elected representatives.
The PIU will also conduct an awareness campaign to educate the public about the following issues:

a) Traffic control devices in place at the work zones (signs, traffic cones, barriers, etc.);
b) defensive driving behavior along the work zones; and
c) Reduced speeds enforced at the work zones and traffic diversions.

C. Install Traffic Control Devices at the Work Zones and Traffic Diversion Routes

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

- Signs
- Pavement Markings

- Channelizing Devices
- Arrow Panels
- Warning Lights

4. Procedures for installing traffic control devices at any work zone vary, depending on road configuration, location of the work, construction activity, duration, traffic speed and volume, and pedestrian traffic. Work will take place along major roads, and the minor internal roads. As such, the traffic volume and road geometry vary. The main roads carry considerable traffic; internal roads in the new city areas are wide but in old city roads very narrow and carry considerable traffic. However, regardless of where the construction takes place, all the work zones should be cordoned off, and traffic shifted away at least with traffic cones, barricades, and temporary signs (temporary “STOP” and “GO”).

APPENDIX IV: SOLID WASTE MANAGEMENT PLAN

Consequences	Mitigation measures	Records	Reporting	Responsibility
Debris disposal	a. The debris disposal site should be identified which are preferably barren or low-lying areas away from settlements. b. Prior concurrence will be taken from concerned Govt. Authorities or landowner c. Due care should be taken during site clearance and disposal of debris so that public/ private properties are not damage or effected, no traffic is interrupted. d. All efforts should be made to use debris in road construction or any other public utilities. e. The debris should be stored at site ensuring that existing water bodies and drains within or adjacent to the site are kept safe and free and no blocking of drains occurs.	Generation and disposal quantity with location of disposal Recyclables waste generation and disposal Domestic waste disposal locations details	The waste generation and disposal details will form part of quarterly report to the PIU	**Prime Responsibility:** Contractor will be responsible for waste management and reporting **Supervisory Responsibility**: CSE/PIU
Dust	a. All dust prone material should be transported in a covered truck. b. All liquid waste like oils and paint waste should be stored at identified locations and preferably on a cemented floor. c. Provision of spill collection pit will be made in the floor to collect the spilled oil or paint. These should be sold off to authorized recyclers. d. All domestic waste generated at construction camp preferably be composted in portable mechanized composter. The composted material will be used as manure. In case composting is not feasible, the material will either be disposed off though municipal waste disposal system or disposed of through land burial. The dump site must be covered up with at least six-inch-thick layer of soil. e. Only appropriately design and compliant landfills will be used for disposing waste	Visual inspection by CSE supervisor and note as checklist record	The waste generation and disposal details will form part of quarterly report to the PIU	**Supervisory Responsibility**: CSE/PIU
Oil/chemical spills	a. All efforts should be made that no chemical/ oily waste spill over to ground or water bodies.	Visual inspection by CSE supervisor and	The waste generation and disposal details will form part of	**Supervisory Responsibility**: CSE/PIU

Consequences	Mitigation measures	Records	Reporting	Responsibility
	b. All precautions should be followed for emergency preparedness and occupational health & safety during construction and handling a waste. c. Provision of fire extinguishers will be made at the storage area	note as checklist record	quarterly report to the PIU	
Traffic movement with waste	a. Adequate traffic control signals and barriers should be used in case traffic is to be diverted during debris disposal. All efforts should be made to ensure avoidance of traffic jam, which otherwise results in air pollution, noise pollution and public unrest. b. Hazardous waste and chemicals should be stored in a dedicated storage area that has: 1) weather protection, 2) solid impermeable surface and drainage to treatment system, 3) security fence/lock, 4) primary and secondary containment with 110% volume for liquids.	Visual inspection by CSE supervisor and note as checklist record	The waste generation and disposal details will form part of quarterly report to the PIU	**Supervisory Responsibility**: CSE/PIU
Domestic waste	a. Domestic waste shall only be disposed of at the approved, appropriately designed, compliant waste management facility (landfill). Land burial of waste shall not be permitted.	Visual inspection by CSE supervisor and note as checklist record	The waste generation and disposal details will form part of quarterly report to the PIU	**Supervisory Responsibility**: CSE/PIU

APPENDIX V: TREE PLANTATION AND MANAGEMENT PLAN

Steps	Management initiatives	Records	Reporting	Responsibility
Preparation of the Plantation Area	The open areas near the subproject site will be identified and selected. During the selection of the block plantation sites, the availability of the water in nearby areas will be taken into consideration as the survival of the tree saplings depends on the availability of water or watering facilities.	Demark tree plantation area, record of drawing for proposed tree plantation	Contractor	**Prime Responsibility:** Contractor **Supervising responsibility:** CSE/PIU
Preparation of Pits and Sapling Transplantation	The location of each plantation pit will be marked according to the design and distance of the plantation. The size of the plantation pit varies depending upon the species of the plants, height of the saplings. Selection of native fruit bearing plants will be chosen for plantation. Trees will be planted on the alternate rows in a straight line for the prevention of the horizontal dispersion of the pollutants. Hence the pit will be dig accordingly. During the time of placing the tree saplings the roots will be freed from plastic or any type of cover which is normally use for the transplantation of the tree saplings from the seed bed to the tree plantation pits. This exercise will help the root hairs to reach the soil.	Demark tree plantation area, record of drawing for proposed tree plantation	Do	Do
Spacing	For the survivability of the tree species planted spacing between the saplings should be maintained. Spacing which are usually used for teak planting are 2 x 2 m^2, 3 x 1m^2, 3 x 3 m^2, 4 x 2 m^2 and 4 x 4 m^2, depending on site condition. For the construction site, wider spacing for native fruit bearing plants are suggested for large canopy and ample sunlight.	Record of Tree plantation	Do	Do
Time of Plantation	As per the normal practices followed under the silvicultural guidelines plantation of the tree sapling to be done only after the first shower during the rainy season. The best time for plantation is after 15 days from the day of first shower during rainy season.	Do	Do	Do
Protection of Tree saplings	Circular tree guard should be placed after the plantation of the saplings for the protection of these young plants from the ravages of cattle, sheep and goat and other animals. If tree saplings died or damage occur after placing the circular tree guard, timely replacements of damaged plant and thereafter care is important.	Do	Do	Do

Steps	Management initiatives	Records	Reporting	Responsibility
Selection of Tree Species	The contractor will choose the local and Vulnerable, endemic species as decided by the employer.	Do	Do	Do
Maintenance (include thinning) : Weeding	Low pruning at 6 months**;** **Thinning:** Thinning will start after the stand is 3-4 years old and repeated every 4 years until the stand is 15years old. Between 15-25 years old, thinning should be conducted every 5 years and after25 years old, thinning will be done after every 10 years. When the canopy closes, at about 6years, 30-40% of the stems will be thinned to selectively remove suppressed, diseased and badly formed trees.	Record of Survivability rate	Do	Do

APPENDIX VI: DEMOLITION PLAN

This is a generic demolition plan. The specific plan for BITAC will be developed by the contractor based on available technique, equipment, manpower, chemicals and subsequent approvals from concerned authorities, as well as the existing situations of BITAC. The below shows a sample case.

The initial scope of work includes the removal of above ground facilities within the zoned area of main drawing (worksite). Mobilization and demobilization of necessary demolition building, personnel and consumables to and from the site include:

Removal of:

- Process units;
- Buildings;
- Above ground structures;
- Storage tanks;
- Piping;
- Pipe racks/culverts (careful dismantling of pipework);
- Plant;
- Instrumentation controls;

Removal of Hazardous Materials

Oil

The Contractor will engage an environmental contractor, to drain and clean all oil prior to the removal from site. Contaminated oils (Polychlorinated biphenyls (PCB's)) will be disposed of by the contractor. Any oil remaining will be flushed through until such time as the oil concentration has decreased to less than 2 mg/kg, thus rendering the transformer fit for recycling. Containment and control of waste will be of paramount importance and a policy on zero spillage will be adopted.

Residual liquids

An environmental inspection will be carried out by the Company worker(s) in conjunction with Environmental Officer to identify the extent of hydrocarbon contamination within the redundant pipelines and process plant. Once the level of contamination has been established as per DOE guideline, a sequence and methodology will be derived so as to contain and remove residual materials.

General Demolition Technique

Prior to any induced collapse techniques, structural calculations will be undertaken and a cut by cut methodology produced and signed off by the structural engineer. The majority of demolition will be carried out by excavators using shears and grapple attachments ranging from 36 to 120 tones.